



## GEOGRAPHY

THE area with which this work deals is the Malay Peninsula in its widest sense, from the Isthmus of Kra and the Pakchan estuary on the north, to Cape Roumania in Johore on the south, the southernmost extremity of the Asiatic Continent. The islands adjacent to the Peninsula are also included.

The area is a natural but not a political unit, the greater portion forming part of the British Empire, either as the Crown Colony of the Straits Settlements, the Protectorate of the Federated Malay States, or the rather more loosely attached states, the suzerainty over which passed to Great Britain by the Anglo-Siamese Treaty of 1909, and by later treaties entered into with these states individually. These states are collectively known as the Unfederated Malay States.

The northern third of the Malay Peninsula forms part of the kingdom of Siam.

For administrative purposes, the island of Labuan, off the north coast of Borneo, once itself a Crown Colony, Christmas Island and the Cocos Keeling group in the Indian Ocean, form part of the Crown Colony of the Straits Settlements; the Malay State of Brunei in the north of Borneo is also under British protection. The ornithology of these territories does not enter into the scope of this book.

Geographical details, especially when compressed into small compass, are arid reading, but some brief account is here necessary, as even now few people are familiar with the Malay Peninsula, which is vaguely known as the place somewhere near India where rubber and tin come from, and as the country of the "curst Malayan creese."

### I. THE CROWN COLONY OF THE STRAITS SETTLEMENTS

#### (A) SINGAPORE

Singapore is an island at the southern extremity of the Malay Peninsula, commanding the ocean route from Europe and India to China, and within a hundred miles of the Equator. It is roughly diamond-shaped, with a length east and west of about twenty-two miles, and a breadth north and south of fourteen, and an area of 217 square miles. It is separated from the mainland to the north by a depth of water that does not exceed six fathoms in places.

The straits between it and the Rhio Archipelago to the south, and thence to Sumatra, are rather deeper, but an elevation of the sea-bottom of less than thirty fathoms would obliterate them.

The coastal districts of Singapore are flat, much of them having once been swamp, and to the north and west there is a good deal of mangrove; to the east and in the south there are stretches of sand. The interior is undulating land, and there are numerous low hills, rising to a maximum elevation of about 500 ft.

Though traditionally the site of a Javanese empire, Singapore was practically uninhabited until the foundation of the city and port by the foresight of Sir Stamford Raffles in 1819. It was then covered with forest. At the present day but little primeval forest remains, except for a few blocks protected as "reserves" by the Forest Department. Even these are greatly impoverished, and much of the indigenous flora is now extinct or on the verge of extinction. At one time gambier and pineapples were largely grown on the island, but in later days have been replaced by coconuts and rubber.

The nominal list of birds attributed to the island is a large one. The latest, compiled by Mr Chasen, of the Raffles Museum, Singapore, and founded on his own collections, and on all available records, comprises no less than 291 species, nearly half the total number known from the whole of the Malay Peninsula. As has been pointed out, however, very many of these records are erroneous, specimens having been merely forwarded from Singapore, and credited to the place as resident, whereas their real origin may have been from the adjacent mainland or even farther afield. This is more especially true of the records of the earlier voyagers. At the present day, undoubtedly, many species have become locally extinct or no longer visit the island, and it would probably be difficult, even over a period of years, to accumulate a list of more than 150 species at the present day. On the other hand, not a few birds originally exotic are now becoming acclimatized in the island.

A characteristic of the island fauna, which has probably always existed, is the non-occurrence or comparative rarity of such birds as pheasants and partridges, trogons, barbets, woodpeckers and the smaller babblers, which are abundant on the adjacent mainland. Another interesting fact is that, in many cases, intensive study of the island birds has shown that certain species are more closely allied to forms occurring in the islands to the south, and in Sumatra, than to the Peninsular races. It would almost seem that at one time the Singapore Straits, which are wider and deeper, were less of a faunal barrier to birds coming from the south, than the Johore Straits to the north, which are now shallower and very narrow.

#### (B) PENANG

Penang, situated on the west coast of the Peninsula, in lat.  $5^{\circ} 20' N.$ , about three hundred and fifty miles from Singapore, is a mountainous island, in area rather over 100 square miles, or slightly smaller than the Isle of Wight. It is separated from the mainland by a shallow strait about four miles wide, much encumbered by mudbanks and not ordinarily navigable by ocean-going

steamers. On the south and west there are considerable areas of flat, alluvial land devoted to the cultivation of coconuts and rice, but the core of the island is steep and mountainous, composed of granite, and rising, in several peaks, to an altitude of over 2700 ft. Originally the island was covered with heavy forest, but much has been cleared and devoted to the cultivation of cloves and nutmegs, an industry which has passed through many vicissitudes. A fair amount of original jungle still remains on the crests of the hills and at the north-west corner of the island, which has been preserved in the interests of water conservancy.

Until the end of the eighteenth century, Penang, like Singapore, was inhabited by only a few fishermen. Between 1786-1790, through the enterprise of Captain Light, the East India Company obtained a perpetual lease of the island from its titular owner, the Sultan of Kedah, and since that date it has grown continuously in population and importance as being the natural entrepôt for the trade of the northern parts of the Malay Peninsula and, until recent years, of much of that of Eastern Sumatra.

The museums of Europe contain much material from Penang, for which Dr Cantor, a surgeon in the employ of the East India Company, is in the main responsible. Our knowledge of the fauna of the island itself, as distinct from the mainland adjacent, is, however, by no means exact, and many birds attributed to Penang have, in all probability, never really been found there. The fauna, owing to the varied contours of the island, is probably rather more extensive than that of Singapore, and there is more untouched jungle. An interesting field of work is, therefore, still open to the ornithologist who is prepared to devote the leisure time of years to the subject.

The study of the sea-birds frequenting Pulau Perak, an isolated and barren rock some seventy miles from Penang on the direct course to Ceylon, may be commended to his notice.

#### (C) PROVINCE WELLESLEY

Province Wellesley is a strip of land from ten to fifteen miles deep, on the coast of the Peninsula facing Penang, with an area of 280 square miles. It was acquired from the Sultan of Kedah, early in the nineteenth century, in order to protect the trade of Penang. The country is mainly flat alluvial land, though there are hills on the eastern and southern border, none however exceeding 1700 ft. The district at one time produced a little indigo and much sugar, but is now devoted to the growing of coconuts, rubber and rice. Little original forest remains and the country is now of no great interest to the zoologist. In the period from 1840-1870, however, not a few collections were made there, and many of the specimens attributed to Penang were really from this province.

#### (D) THE DINDINGS

Administratively part of the settlement of Penang, but separated from Province Wellesley by the whole of the coast-line of the state of Perak, the Dindings consist of two large islands, Pulau Pangkor and Pulau Pangkor

Kechil, a group of islets off the estuary of the Perak river, known as the Pulau Sembilan or Nine Islands, an isolated island, Pulau Jarak, in the middle of the Straits of Malacca, about thirty miles to seawards of Pangkor, and a strip of mainland running north from Pangkor, with a total area of about 180 miles.

Originally ceded by Perak to Great Britain between 1826 and 1874, in order that the menace of pirates might be effectually dealt with, the territory, which includes an excellent deep-water harbour, remained undeveloped until late years, though a considerable quantity of rubber and coconuts is now grown, and there is a large fishing industry. Both islands and mainland are hilly, rising to over 2000 ft. in parts, and there is still much old jungle.

The fauna has not been exhaustively studied, but is fairly well known. That of Pangkor is of special interest as including in its members the argus pheasant, not known on any of the larger islands, and barking deer (*Kijang*), while curiously enough squirrels are quite absent. The Sembilan Islands—all quite small and rocky, though covered with jungle and scrub, and rising steeply from the sea to a maximum height of rather over 600 ft.—are a halting-place for multitudes of birds during the migration season from October to December. The same may be said of Pulau Jarak, where also the Nicobar pigeon (*Caloenas nicobarica*), unknown on the mainland of Malaya, is a resident breeding bird.

#### (E) MALACCA

The territory of Malacca, the largest of the settlements comprising the Crown Colony of the Straits Settlements, lies between the Protected State of Johore and the Federated Malay State of the Negri Sembilan on the west coast of the Peninsula, with a coast-line of somewhat over forty miles, Malacca itself being some hundred and twenty miles by sea from Singapore. The site of an historic Malay sultanate—and then one of the great emporia of trade in the Far East—Malacca was conquered by D'Albuquerque in 1511, and remained under the Portuguese flag until 1650 when it passed to the Dutch, and finally became British in 1824. Malacca has given its name to the whole Peninsula, and even now has in many quarters, especially on the Continent, a far wider significance than in strict accuracy the size of the town or settlement justifies.

The total area is some 720 square miles and the surface varied, alluvial flats on which the considerable Malay peasant population grows, or grew, rice, and rolling hills once devoted to the cultivation of gambier, or more especially tapioca, but now largely given over to the ubiquitous rubber.

There is still a certain amount of jungle in the settlement, and a good many plains and low hills, covered, in part, with lalang grass and secondary scrub. In the settlement proper there are no considerable mountains, Mount Ophir or Gunong Putri or Gunong Ledang, which is 4000 ft. high, and a conspicuous object from the roadstead of Malacca, being within the Johore border though its lower slopes are in Malacca.

The settlement is of special interest to the ornithologist as being the country from which nearly all specimens of Malayan birds originally reached Europe, and as being, therefore, the *terra typica* of very many species. The industry

must have been a considerable one and have employed numerous hunters. As far as it is possible to ascertain, it originated at some period anterior to 1830, and survived until about 1885, when it was discouraged by the British authorities and by Sultan Abubakar, then Maharajah of Johore. The hunters were persons of mixed Portuguese ancestry, locally known as Sirani, and in some cases Indians, and one of the last of them was employed by Mr L. Wray, then Curator of the Perak Museum, Taiping.

Their hunting-grounds seem to have been the lower slopes of Mount Ophir, and the country to the east and south of the settlement, but the collectors must, on occasion, have travelled farther afield, though but rarely outside the Peninsula. Their skins, once seen, can never be mistaken, as the make is very characteristic, being much compressed and cylindrical, with a shortened neck, and the legs pressed back into the body so that the skin appears to be smaller than the bird really was in life.

Mount Ophir, referred to in a previous paragraph, is classic ground to the ornithologist. Prior to about 1880 it was the only mountain of its altitude, 4000 ft., that was reasonably accessible in the whole of the Malay Peninsula—and indeed was at one time considered to be the highest mountain in the area. Collections have been made on it by numerous naturalists, notably by Wallace, Wardlaw Ramsay and Whitehead. Its fauna is not, however, of great interest, and includes no peculiar species, such as are found in the ranges farther north. It may indeed be surmised that, at no very distant period, it was a granitic island, surrounded by shallow sea, and that any physical connexion with the main range of the Peninsula has been very remote in time.

Both its fauna and flora are curiously like that of Kedah Peak, a similar mountain, of almost identical height, some thirty miles north of Penang Island.

## II. THE FEDERATED MALAY STATES

### (A) PERAK

The Malay State of Perak, the senior of the Federated Malay States, lies entirely on the western side of the Peninsula, its eastern boundary being the main watershed between the Straits of Malacca and the China Sea. To the north it is bordered by Province Wellesley and Kedah, and to the south by Selangor, the boundary in this case being the Bernam river.

Briefly it comprises, since the Anglo-Siamese Treaty of 1909, the whole drainage basin of the Perak, and parts of those of the Krian river to the north, and the Bernam to the south, and has an area of about 8000 square miles.

The Perak river, the second longest in the Peninsula, runs roughly north and south, more or less parallel to the main axis of the Peninsula, with a length of nearly 200 miles; the other rivers are shorter and run at right-angles to the axis. The coast of the state is flat alluvial land fringed with mangrove forest, and fronted by islands of similar character intersected by fairly deep water channels, but to seaward there is a broad and very shallow bank of mud and sand. Farther inland the land is higher, with subsidiary ranges of hills up

to about 3000 ft., not connected with the central axis ; and east of the Perak river the main range rises steeply to a height varying from 2000 to slightly over 7000 ft., being fronted in many places by precipitous limestone crags and hills of lower elevation. The main range is largely granite, but here and there it is capped by altered sedimentary rock. Running south from the Kedah border to the centre of the state, south of Taiping, the administrative capital of the state, is another granite range, whose peaks have an altitude of from over 6000 ft., Gunong Bintang, to 4700 ft., Gunong Ijau. The country bordering the Krian river in the north of the state is flat, alluvial land, and is now devoted to the intensive cultivation of rice, rendered possible by an elaborate irrigation system. Much of the land in this area, and also towards the mouth of the Perak river, was formerly planted with sugar, which has now been entirely replaced by rubber. The low-lying deltaic land between the mouths of the Perak and Bernam rivers is given over to coconut plantations.

The middle reaches of the Perak river and the drier portions of the coastal zone have been heavily planted with rubber ; there are, of course, many large tin-fields, notably in Kinta—which takes its name from a tributary of the Perak river—and in the district of Larut, near Taiping. Along the course of the Perak river, too, a large proportion of the Malay population lives, and there is much orchard- and garden-land and a little rice cultivation.

Above about 2000 ft., however, both on the main and subsidiary hill ranges, the country is covered with the original primeval forest, which has been little interfered with for mining or cultural purposes, while the ruggedness of the country at present renders the extraction of timber unprofitable.

The low-country forests, however—where they have not been destroyed for planting purposes—have been heavily cut over, and the policy of forest conservation and regulation now in force has been instituted none too soon if the country is to be even self-supporting in the matter of timber supplies in the not too distant future.

The ornithology of Perak is of greater interest than that of the Straits Settlements in that the higher mountains within its borders possess a fauna of their own, distinct from that of the lowlands, and closely allied to that of the higher mountains of Sumatra, Borneo and the distant Himalayas.

The fauna is very uniform, at a level above about 3000 ft., and practically no differences occur between that of the main and of the subsidiary ranges, such as the Taiping Hills. All have been investigated in considerable detail, but the credit of the first discoveries is due to Mr Leonard Wray, I.S.O., then Curator of the Perak State Museum. His collections contained most of the endemic forms known from the ranges, and were reported on by the late Dr R. B. Sharpe in the *Proceedings of the Zoological Society of London for 1887-1888*. An earlier paper which contains much interesting information on the birds of the lowlands is that by Lieutenant (now Brigadier-General) H. R. Kelham in the *Ibis* for 1881-1882. Conditions have, however, changed greatly since that day, and many species recorded then as common are now rarely seen.

## (B) SELANGOR

Selangor is the state south of Perak, and, like it, is bordered to the east by the main dividing ranges, to the west by the Straits of Malacca, and to the south by the Negri Sembilan. The area is about 3100 square miles.

It is watered by four principal rivers—the Bernam, forming the Perak boundary, the Selangor, the Klang and the Langat—the whole of the drainage basins of which are within the state.

The surface conditions are very similar to those of Perak. The sea-coast, north of the mouth of the Langat river to the Bernam, is deeply fringed with mangrove; off the mouth of the Klang river there are several large alluvial islands, also covered with mangrove, and broad mud-flats. South of the Langat, where the coast is more exposed, conditions are somewhat different. The mangrove and mud-flats disappear and their place is taken by sandy beaches, with groves of conifers or she-oaks (*Casuarina equisetifolia*), locally known as *pokau rhu* (Malay). At two localities, Kuala Selangor and Bukit Jugra, there are rounded granite hills, a few hundred feet in elevation, standing up like islands, as indeed they once were, from a surrounding sea of swamp. There is also a group of small islets of altered sedimentary rocks within the five-fathom line near the mouth of the Selangor river. Behind the mangrove zone on the coast there is, in many parts of the state, a belt of fresh-water swamp, overgrown with thorny palms and many other plants peculiar to the zone, which is also the habitat of many birds that are rare in other types of country, as, for instance, the finfoot, one or two of the bulbuls, and certain of the babblers.

The low hill-country behind the swamps and the higher mountains, which in this state reach an altitude of about 5500 ft., have a fauna different in no respects to that of Perak, and it is doubtful if any species can be said to be actually peculiar to the state, with the sole exception of a whistling thrush (*Arrenga robinsoni*), closely allied to forms from Sumatra and Java.

The ornithology of the state is well known; in early days (1878 onwards), while the interior was as yet inaccessible, large collections were made in the neighbourhood of Klang by W. Davison. Later on it was studied by Mr A. L. Butler, Mr C. B. Kloss and myself.

## (C) NEGRI SEMBILAN

The group of small states collectively known as the "Negri Sembilan" (nine countries) are situated between Selangor to the north, and Malacca and Johore to the south, with the Straits of Malacca to the west. Their eastern border marches with Pahang and is not co-terminous with the watershed; a good deal of the territory, notably that of Jelebu, drains into the China Sea.

The main ranges terminate towards the south and dwindle in height, no summit within the states attaining 4000 ft. Few, therefore, of the indigenous endemic species of the Malay Peninsula are found in Negri Sembilan. The terrain is mainly undulating, and there are many winding valleys of great beauty, given over to the cultivation of rice, surrounded by low hills, originally



jungle-covered, the lower slopes of which are now largely cleared for rubber cultivation. Near the coast, which is sandy, there is a good deal of coconut-land; near the Johore border there are large areas, originally planted in gambier and tapioca, which are now either rubber or lalang waste.

No very special work has been done on the avifauna of Negri Sembilan, which, as might be expected, is almost identical with that of Malacca and Selangor. So far as is known no species is peculiar to the state.

#### (D) PAHANG

The state of Pahang is by far the largest of the Federated Malay States, with an area of nearly 14,000 square miles. It lies entirely on the eastern side of the Peninsula, bordered on the north by the Unfederated States of Trengganu and Kelantan, on the south by Johore, on the east by the China Sea, and on the west by the Federated Malay States of Perak, Selangor and the Negri Sembilan. The Pahang river, the longest in the Peninsula, is entirely within its borders. The coast is low and sandy, with much swampy land behind it, and the lower courses of the rivers run through flat alluvial land, but to the west especially, and on all its borders, the land is hilly or mountainous.

Besides the main range on the west, which is mainly granitic and has summits of 7000 ft. or slightly over, there are two isolated massifs; one, Gunong Benom, also of granite, rising to over 6000 ft., situated on the west central portion of the state, and the other, the Gunong Tahan range, in the middle of the northern border, of altered sedimentary rocks, sandstone and quartzite, which includes the loftiest summit in the Malay Peninsula, 7184 ft.

The agricultural and mining industries of Pahang are less developed than in the western states and the population is smaller, largely confined to the banks of the bigger rivers. There is, therefore, a much greater extent of untouched jungle, and the native fauna has, consequently, been less interfered with, though big game, elephant, bison (*scladang*) and rhinoceros have been much harried and stand in serious danger.

Except for the swampy south-east corner, and the coastal districts, the fauna, especially of the mountains, is well known, and large collections exist in Europe, in Malaya and elsewhere. The difference between the fauna of the main range and that of Tahan is, however, much less than the varied geological formations would lead one to expect, and exhaustive study of the latter mountain has revealed only two species that are peculiar to it—a handsome woodpecker and a long-tailed warbler (*Suya waterstradti*). The big white-crested argus pheasant (*Rheindardius ocellatus nigrescens*) is at present known only from Pahang, where it is found on the lower slopes of several mountains, but is almost certain to occur in the neighbouring states of Trengganu and Kelantan.

#### THE TIOMAN ARCHIPELAGO

Off the coasts of Pahang and Johore, and at varying distances from the coast, lies a group of islands of differing size and altitude. The largest and loftiest, Pulau Tioman, belongs to Pahang, while most of the others, including

Pulau Tinggi, Pulau Pemmanggil, Pulau Aor, Pulau Babi and Pulau Sibul, are Johore territory. There are numerous smaller islands, some little more than tide-way rocks.

Many of the islands are within the ten-fathom line, while others, including the larger ones, Pulau Tioman, Pulau Pemmanggil and Aor, are in depths exceeding twenty-five fathoms. In none have the birds differentiated into races which at the most are more than *very* slightly distinct from the adjacent mainland forms, though the mammals have varied to a much greater degree.

The avifauna is limited; no barbets, trogons or woodpeckers, and but few of the jungle babblers, occur, but pigeons of several species are numerous, and two or three species of terns have breeding colonies, some of large extent, as have three races of the small swifts (*Collocalia*) producing edible nests.

Though the islands are lofty, only one, Tioman, shows evidence of other than a low-country avifauna, a representative of the wren-babblers (*Corythocichla*) having been found at altitudes of 2000 ft. and over.

From their situation, and owing to difficulties of access during the north-east monsoon, these islands have been studied only during the summer months. It is probable that in October and November, and again in April, they are a halting-place for large numbers of migratory birds breeding in China, Japan and Siberia, and wintering in Malaya.

### III. THE UNFEDERATED MALAY STATES

The Unfederated Malay States, as explained in an earlier paragraph, are connected with the British Empire in a somewhat looser manner than is the case with the Federated Malay States, and have no inter-relationships, except that they communicate with the Colonial Office and each other through a common channel—the High Commissioner for the Malay States, resident in Singapore. Taken together, they cover an area only slightly less than that of the Federated Malay States, though industries and communications are, as yet, far less developed than in that polity.

#### (A) JOHORE

The state of Johore, with an area of about 7500 square miles, slightly less than that of Perak, occupies the southern portion of the Peninsula, stretching across it from the China Sea to the Straits of Malacca, and bordered on the north by Pahang, Negri Sembilan and Malacca, and to the south by the island of Singapore. It is drained by three fair-sized rivers, the Muar to the north and west, the Endau to the north and east, and the Johore entering the sea not far from Singapore. The state comprises a larger extent of level country than the states to the north, and there is much swamp, and a good deal of mangrove toward the south and south-west. There are, however, several mountains and hill ranges, including Mount Ophir or Ledang near the Malacca border, 4186 ft., which has been alluded to previously, and the Blumut and Pulau ranges, farther south. The latter range, which approaches 3000 ft. in altitude,

is now the source of the Singapore water supply, which is carried across the Tebrau Straits, which separate Johore from Singapore, by the same viaduct that carries the railway.

Rubber, gambier, coconuts, betel-nuts and tapioca are largely grown in Johore, and there is also a mining industry in tin and iron ore, but there is relatively much untouched jungle.

The ornithology is well known. Davison collected largely in the south, chiefly in the neighbourhood of Gunong Pulai, and his material, comprised in the Hume collection, is now in the British Museum. Collections formed by Dr Abbott on the southern and eastern coasts are in the United States National Museum at Washington. Mr C. B. Kloss collected largely for the museum that once existed in Johore, the contents of which have now been transferred to Singapore. There are no hills lofty enough to harbour a montane fauna, and the state, therefore, contains no peculiar species.

### (B) TRENGGANU

The state of Trengganu is bordered by Pahang on the south and south-west, and by Kelantan on the north and north-west, with a long coast-line on the China Sea to the east. It contains the whole of the watersheds of three considerable rivers—the Trengganu, Dungun and Kemamum—and several small ones, with a total area of about 6000 square miles.

Along the coast for some distance inland there is a strip of comparatively level country, which is thickly inhabited and planted largely with coconut and areca palms, though there is not sufficient rice grown for the use of the inhabitants, who are mainly occupied in fishing during the south-west or fine monsoon, and export considerable quantities of dried fish. There is also a small silk-weaving industry, and a little tin and wolfram is mined in the southern parts of the state. The interior of the state is wild and rugged, with mountains rising in places to over 5000 ft., and is very thinly inhabited. It is, of course, heavily forested.

The ornithology of Trengganu has been but little investigated, but enough is known for it to be stated with some confidence that it differs in no material respect from that of the neighbouring states of Pahang and Kelantan. Small collections made in 1899 by the "Skeat Expedition" are in the Cambridge University Museum, another, made by Dr W. L. Abbott and Mr C. B. Kloss, is in Washington, and the results of other expeditions are in the collections of the Federated Malay States Museum.

### (C) KELANTAN

Kelantan is bordered to the east by Trengganu, west by Perak, and south by Pahang. To the north-west it marches with the Siamese province of Petani, and on the north-east with the China Sea. The total area is about 5900 square miles—slightly less than that of Trengganu. The country comprises the whole basin of the Kelantan river, the fourth longest in the Malay Peninsula, and part of two smaller ones, the Golok and Semarak.

The country on the coast for some distance inland is flat and thickly populated, and sufficient rice is grown for the needs of the whole state, and there is also a not inconsiderable cattle-breeding industry. There are large coconut plantations on the coast, and rubber in the interior. Towards the Pahang and Perak borders, however, where the country is mountainous and thinly populated, the original heavy forest remains, though it is, as we approach the north, of a less luxuriant evergreen type. In these regions the fauna is exactly the same as that of the more southern parts of the Peninsula, but on the coast a slight change commences to show itself, and many birds that are rare or almost non-existent in the Federated Malay States are here abundant, these birds continuing their range northwards into Siam.

No very extensive collections have been made in the state, the principal ones being those of the "Skeat Expedition," now in Cambridge, and of Mr Waterstradt, a Dane, in the employ of Lord Rothschild, who was the first naturalist to study the birds of Gunong Tahan, and whose collections were reported on at length by Dr Hartert (*Novitates Zoologicæ*, vol. ix., 1902).

#### (D) KEDAH

The state of Kedah lies entirely on the western seaboard of the Malay Peninsula. To the north and east it is bordered by the Siamese provinces of Patani and Senggora and the Unfederated Malay State of Perlis, to the south-east by Perak, to the west by Province Wellesley, which originally formed part of it, and by the Straits of Malacca. It is drained by three considerable rivers, the Kedah, the Muda and the Krian, and its area is about 3800 square miles—rather more than that of Selangor.

The type of country is diversified; much of it is flat land which is given over to wet rice—of which Kedah produces a considerable surplus above its own requirements—while the rest is "glam" (*Melaleuca leucodendron*) swamp.

There is a good deal of undulating hill-land, formerly planted with tapioca and pepper, and now with rubber, and there is also much secondary jungle.

On the southern border the Larut range culminates in Gunong Bintang, a granitic peak over 6000 ft. in altitude. Towards the south of the state lies the famous Kedah Peak or Gunong Jerai—a landmark for all shipping entering the Straits of Malacca. It is a mountain, mainly of quartzite and other metamorphic rocks, slightly over 4000 ft. in height, and entirely surrounded by low land. Rising out of the plain there are also several hills of crystalline limestone, honeycombed with caves such as are characteristic of the whole of the Peninsula south to Selangor.

In Kedah the watershed between the Straits of Malacca and the China Sea is low, not exceeding a few hundred feet, and the seasons are far more marked than to the southward. There are, therefore, corresponding differences in the fauna, as in the case of Kelantan, and many Malayan species here attain their northern, as do Burmese species their southern, limit.

The fauna is well known, many of the specimens ascribed to Province Wellesley and Penang by the earlier writers having had their origin in the state.

The avifauna of Kedah Peak is a much impoverished one, quite different from that of the mountains on the main and Larut ranges, to the south of it. Up to quite recent times it was probably an island, as is Penang at the present day.

The birds of the evergreen forests are similar to those of Perak.

#### (E) THE LANGKAWI ISLANDS AND THE BUTANG ARCHIPELAGO

The Langkawi group, lying off the coasts of Kedah and Siam, consists of two large islands—Langkawi, which belongs to Kedah, and Terutau, separated from Kedah by a narrow strait, which is Siamese. The sea between them and the mainland certainly does not exceed fifteen fathoms in any part, and is mostly a good deal less.

Both islands are in part granitic and in part of metamorphic formation, with much limestone, of which the smaller islands in the vicinity, many of fantastic outline, are composed.

The surface of Langkawi is varied, but there is a good deal of flat land, on which rice and rubber is grown. Gunong Raya, the highest mountain, is nearly 3000 ft., and is covered with jungle.

Terutau is smaller and much more rugged, with little flat land, though it does not attain so great an elevation as Langkawi. The latter island maintains a considerable population of fishermen and agriculturalists. Terutau is almost without permanent inhabitants. At different times considerable collections have been made, both on Langkawi and Terutau, by myself and others, though I have never been able to spend any great length of time on the islands.

Though no peculiar species occur in the group, the birds are of considerable interest, as many species—such as trogons, woodpeckers and large hornbills, and a certain number of timaliine birds—are not uncommon, which is unusual on islands of this type, and leads one to suppose that connexion with the mainland has been extremely recent, possibly much more so than in the case of even Singapore and Penang.

Mammals, which are numerous, exhibit a considerable degree of peculiarity.

Farther seaward, and separated from the Langkawi group by depths of water in the neighbourhood of thirty fathoms, is a group of three small islands, Pulau Butang, Pulau Adang and Pulau Rawi. They are practically uninhabited, very rugged and mountainous, rising to a height of about 3400 ft. on Pulau Adang, and covered with rather sparse forest.

The natural history has been investigated with some degree of completeness, and, as might be expected, the fauna, so far as birds and mammals are concerned, is a very impoverished one, consisting of little more than a monkey, a few small squirrels and rats, several pigeons and crows, and a few flycatchers and sunbirds. The birds are all of wide distribution, and show no sign of subspecific differentiation, being probably kept constant to type by frequent replenishment from the mainland. The mammals, however, have been able to vary a little.

## (F) PERLIS

Perlis is a small state to the north of Kedah, of which it was formerly an appanage, and has an area of a little over 300 square miles. Much of it is alluvial plain, covered with ricefields, but to the north there is a limestone range of about 2000 ft. elevation, and there are isolated limestone hills in other parts of the state. Old jungle, where it occurs, is thin and partly deciduous, and there is a belt of mangrove forest on the coast.

The avifauna is well known, and there are large collections from the state in the Federated Malay States Museum. They are of considerable interest, as indicating that the district is a transition area for northern and southern forms.

## IV. SIAMESE MALAYA

## PENINSULAR SIAM

The northern portion of the Malay Peninsula, from the Isthmus of Kra in about  $9^{\circ} 50' N.$  down to the Unfederated Malay States border, forms part of the kingdom of Siam, and covers an area of rather less than 30,000 square miles, or rather more than a third of the whole Peninsula.

The geography of this area is not particularly well known to English readers, nor is information readily accessible, and I have therefore given in condensed form the salient facts about each of the various divisions of this large area, working from south to north.

## EAST COAST: THE PATANI STATES

Patani, variously spelt Petani or Pattani, was at one time an independent Malay kingdom of considerable renown, and the site of an English trading post in the early years of the seventeenth century. Later, in the eighteenth century, the Malay state was conquered by the Siamese and divided into seven small principalities, under their own nominees. Siamese hold on the country became more effective year by year, and it is now the southernmost province of the kingdom, under a Governor, subordinate to the Viceroy, seated at Senggora. The population is mainly Malay, or mixed Malay and Siamese, with an inconsiderable Chinese element.

The country comprises the watersheds of two considerable rivers, the Patani and the Telubin. Near the coast it is flat and sandy, but up-stream there are large areas of rice-country and undulating hills, while on the Perak borders the main range of the Peninsula rises to over 5000 ft., and is covered with heavy jungle. There are also some isolated granite mountains of considerable height, the most notable being Bukit Besar, north of the Patani river, about twelve miles from the coast, which attains a height of nearly 4000 ft. From the plains rise limestone hills, some much honeycombed with caves.

The ornithology is well known. It has been investigated by the "Skeat

