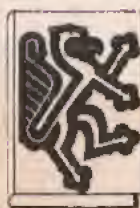


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FASCICULI MALAYENSES

ANTHROPOLOGICAL AND ZOOLOGICAL RESULTS OF AN EXPEDITION
TO PERAK AND THE SIAMESE MALAY STATES, 1901-1902

UNDERTAKEN BY

NELSON ANNANDALE AND HERBERT C. ROBINSON

UNDER THE AUSPICES OF THE UNIVERSITY OF EDINBURGH AND
THE UNIVERSITY OF LIVERPOOL

ZOOLOGY

PART I

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ITINERARY IN PERAK, SELANGOR, AND THE SIAMESE MALAY STATES

BY NELSON ANNANDALE AND HERBERT C. ROBINSON

AS accurate information regarding the Malay Peninsula, and especially those states under Siamese rule, is difficult of access, or altogether inaccessible, we have thought it well to add to our report a brief general account, personal as well as zoological and anthropological, of the places at which we stayed and the country we traversed. Those sections of the itinerary deal with districts we visited together which have been prepared jointly, but as each of us worked in places of which the other can have little or no first-hand information, one or other has added his name at the end of other sections, which treat, chiefly or wholly, of places for the facts regarding which he is alone responsible.

PART I. PERAK AND SELANGOR

SOUTH PERAK

WE stayed rather over two months in the Batang Padang district of South Perak, the greater proportion of our time being devoted to anthropological work, though conditions relatively more favourable than in the Patani States enabled us to get together a considerable zoological collection, representing nearly all terrestrial divisions of the animal kingdom. The district, as a whole, has only been opened up within the last twenty years, and before was entirely buried in primeval jungle, with only a few scattered Malay hamlets and a comparatively large number of Sakai camps. It is now, under British administration, one of the most important mining districts in the state of Perak, while planting operations have also been commenced on a considerable scale, though the high price of labour, due to the mining industry, has militated against this form of activity. Under these circumstances, it will be readily understood that the district is by no means a favourable one for studying the

indigenous Malay, who is to be found chiefly in the more agricultural districts of Kuala Kangsar and Krian ; as a matter of fact, even the Malay population, such as it is, consists, to a large extent, of Achinese and other island folk, as the official census¹ would seem to indicate.

The case is different when we come to consider the Sakais (Mai Darát). The whole of the main range of the Peninsula, which here attains a height of over seven thousand feet, as well as the subsidiary foot-hills, is still untouched by civilization, and only occasionally visited by wandering Chinese and Malay pedlars ; while the mountains are inhabited by a considerable Sakai population, who still retain, in many respects, their primitive habits and customs. As far as the tribes living in the higher hills are concerned, there has not been time for the purity of the race to be affected by Chinese and Malay admixture—a contingency which the comparatively strict ideas of sexual morality held by the Sakais also postpones for the present.

We give a short account of each village visited in the Batang Padang magistracy, with a record of the work accomplished.

Bidor. A large village some seven miles from Tapah, which was, at the time of our visit, the administrative centre of the district, though now that the railway from Penang to Singapore has reached Bidor, the headquarters have been transferred to the latter place. The population is considerable but mainly Chinese, though several Sakai communities exist within a few miles. In the immediate proximity of the village there is no old jungle, the land consisting of worked-out tin diggings, with a few badly cultivated rice-fields.

We stayed at Bidor, which has an unenviable reputation for unhealthiness, for two or three days at a time on several occasions during January and February, 1902. During this time we measured a fair number of Perak Malays as well as several Sakais from Perangkap, a clearing at the base of the main range, seven or eight miles away, and paid a visit to a Sakai camp at Paku. We also investigated some interments, and obtained an imperfect skull of a Sakai woman, and a small ethnographical collection. Practically no zoological collecting was done, but a few Hymenoptera and Heterocera were obtained, and here, for the first time, we met with the nocturnal wasp, *Vespa doryloides*, which is usually so common in Malayan countries, but which appears to be absent from, or very scarce in, the Patani States.

Gedong. A small Malay clearing, with about forty inhabitants, a few miles from Bidor. The clearing is surrounded by bamboo jungle, and we visited a small camp of Sakais in the immediate neighbourhood, obtaining some ethnographical specimens and the measurements of several individuals.

1. *Fascic. Malay.—Anthropology*, part I, pp. 29, 68, 69.

A number of birds belonging to the ordinary Malayan lowland fauna were obtained, among them a young individual of the rare *Baza sumatrensis*, which was brought to us by a Sakai, but nothing else of note. Among the insects the most striking point was the great abundance of beetles belonging to the family *Languridae*, which we only met with elsewhere sporadically.

We stayed at Gedong from January 6th to 13th, 1902.

Jeram Kawan. A small hill-rice clearing four or five hours up stream from Sungkei, at the limit of navigation for canoes. The place is surrounded by high jungle, and some thermal springs close by are much frequented by big game, including gaur, sambhur, rhinoceros, pig, and tapir. A good many species of animals not elsewhere collected were secured here, among the vertebrates being specimens of the recently described bat, *Emballonura peninsularis*, MILLER, and skins of *Heliornis personata* and *Phodilus badius*. The crocodile *Tomistoma schlegelii* was also noticed on a log on the river. Several camps of the Mai Darát existed at no great distance from Jeram Kawan, and the members of one party who visited us were measured.

We stayed at Jeram Kawan from February 12th to 16th, 1902.

Jor. A public works bungalow on the banks of the Jor river at its point of junction with the Batang Padang, about twenty miles from Tapah, and about two thousand feet above the level of the sea. We stayed at Jor for two or three nights in January, 1902, on our way to and from Telôm, and collected a few species of insects. Jor seems to be about the superior limit of the lowland fauna in the Batang Padang valley, and we noticed that *Ornithoptera brookeana*, still common in the remoter parts of Batang Padang, though almost extinct in the rest of Perak, was not found beyond this point. Dragon flies were very numerous at Jor,¹ but we did not obtain specimens. A species of the Rhopaloceran genus *Leptocircus*, always local in the Peninsula, is here abundant. Between Jor and Tapah we captured two specimens of a tortoise allied to *T. emys*, which has been described by Mr. BOULENGER as *Testudo pseudemys*.

In a restricted belt below Jor the hillsides are covered with clumps of a giant bamboo, which reach an enormous height and girth, producing beast-like sounds as they swing together in the wind, and providing one of the most magnificent manifestations of vegetable growth to be found anywhere in the tropics.

Sungkei. A large Malay village fifteen or sixteen miles from Tapah, on the river of the same name. Being situated in a district largely agricultural, the place has only a small Chinese population, and the Malays are probably of a rather less mixed type than at any other place in the Batang Padang district which

1. See footnote on p. 193, *Fascic. Malay.—Zoology*, Vol. 1.

we visited. Through the exertions of the Penghulu (headman of the sub-district), a man of considerable influence among his compatriots and a relation of the Sultan of Perak, we managed to obtain measurements of a considerable number of Malays and of several Sakais, who happened to be visiting the village. In the immediate vicinity the country is mainly arable and orchard land, but at no great distance there are tracts of old jungle. A good many species of birds not elsewhere seen were obtained at Sungkei, including *Treron nipalensis*, *Platysmurus leucopterus*, and a species of *Platylophus*, as well as a new rat, *Mus annandalei*, which is very distinct from any hitherto known from the Peninsula. The situation of the rest-house, near the bank of the river, was very attractive to moths and nocturnal Orthoptera, and a considerable number were captured at light.

We stayed at Sungkei from February 6th to 11th, 1902.

Tapah. A considerable town on the Batang Padang river, about six miles from the railroad between Kinta and Telok Anson, the port of South Perak. Until quite recently it was the headquarters of the district magistrate, but has now been superseded by Bidor. As it is the centre of an important mining district, the population is mainly Chinese, but there are also a large number of Klings (Madras Tamils) and Bengalis. The small and mixed Malay population of the neighbourhood is principally settled in surrounding hamlets, not in the town itself.

We stayed in Tapah on several occasions during January and February, but our time was almost entirely occupied in preparations for other journeys, and we did little or no scientific work in the place; two Sakai skeletons were, however, obtained from deserted clearings in the vicinity.

Telôm. A dilapidated bungalow in the mountains separating Perak from Pahang, about forty miles from Tapah. Though within the jurisdiction of Perak, Telôm is technically in Pahang, as it is situated three or four miles east of the main watershed, on the headwaters of a small stream running into the Telôm River, which is itself a tributary of the Pahang. The height of our collecting station was between three thousand five hundred and four thousand feet above sea level, but the mountains in the immediate vicinity ran up to over seven thousand feet. The district round Telôm is inhabited by tribes of Sakais, of whom, for a variety of reasons, we were unable to see as much as we desired. A large number of them, however, were met with, a few measurements were taken and a small ethnological collection was obtained from them.

Zoologically, Telôm was quite the most interesting place that we visited, as the fauna was entirely a mountain one, differing in important respects from

that of the surrounding lowlands, and assimilating in many features to that of the Himalayas, and of the mountains of the Greater Sunda Islands. The rainfall must have been extremely heavy, and the jungle was denser than that met with anywhere else in the Peninsula. The trees were loaded with epiphytes of various orders, orchids being especially numerous, though but few were in flower at the time of our visit, and the myrmecophilous fern, *Polypodium cornosum*,¹ or an allied species, was common. Of other plants, a fine rhododendron with large umbels of salmon pink flowers, a species of violet, which grew in great abundance among the rocks at the edge of the stream, and a *Rubrus*, bearing small, tasteless fruit, may be mentioned. Curiously enough, no species of pitcher plant was observed on the Batang Padang mountains, though several are abundant on the Larut hills and were also found on the Selangor mountains, further to the south. The Sakais form large plantations, some of them over fifty acres in extent, at an altitude of from one thousand five hundred to five thousand feet, in the neighbourhood of Telôm, in which they grow a kind of millet and a coarse tapioca, bananas and rice not flourishing at these altitudes, and their methods of agriculture are very destructive to the jungle, as no more than two or three crops are ever taken from a clearing.

Mammals were scarce, but one species of rat, three squirrels, one of which, *Sc. maclellandi leucois*, does not seem to occur in the Peninsula except on high ground, and a tree shrew (*Tupaia*), were obtained, as well as the skulls of a very large bear and of a wild pig, these being purchased from the Sakais. Reptiles and Amphibia were very rare, and no species of *Draco*, so abundant on Bukit Besar and the Selangor hills, was even seen.

Birds², on the other hand, were abundant both in species and in individuals, though the thickness of the undergrowth and the precipitous nature of the ground rendered collecting very difficult. Flocks of a small babbler (*Stachyridiopsis locager?*) flitted about the clearing round the bungalow, and were so fearless that it was difficult to get far enough from them to obtain specimens in an undamaged condition. Imperial pigeons (*Carpophaga badia*) were common on the neighbouring peaks, though we never obtained specimens, and on our downward journey both of us saw several individuals of a dull grey pigeon which ROBINSON has little doubt was the rare *Columba grisea*, G. R. GR., only known with certainty from Borneo and Sumatra. Other species seen but not obtained were *Melanocichla peninsulæ*, afterwards found on Gunong Semangko, Selangor, and a ground thrush that from its strongly hooked beak was probably a *Zoothera*. Ali, our headman, persisted in saying that he had seen a silver

1. See Yapp, *Annals of Botany*, Vol. XVI, No. LXII, pp. 186-299.

2. Information regarding the birds of those districts which we visited together is due to my collaborator. N. A.

pheasant on more than one occasion, but we did not come across it ourselves. The most interesting specimen obtained was a small Ploceid belonging to a genus (*Chlorura*) hitherto only known from the mountains of the Sunda Islands and the Phillippine highlands. Altogether, the Batang Padang mountains, which had previously been explored by Mr. L. WRAY of the Perak Museum, would undoubtedly yield a rich harvest to any ornithologist who was prepared to stay at elevations exceeding three hundred feet for some considerable time, and who would be content with quality rather than quantity in his collection.

With the exception of butterflies, which were very numerous, and amongst which were several Tenasserim forms and also a fine new *Prioneris*, the insects were not particularly striking, though small and inconspicuous forms were enormously abundant. Among the beetles, red and black Malacoderms of various genera were especially noticeable, while a magnificent new species of the Longicorn *Lysinda*, a moth and several Diptera were evidently members of the same mimetic association. Dragon flies of all families were very scarce, and not more than three species were even observed. The collections of invertebrates, so far as they have been worked out, show that the fauna, as might be expected, is largely made up of species that are also found in Tenasserim on the one hand and the mountains of Borneo and Sumatra on the other, while the Burmese element, which is so marked in the lowland fauna of the Patani States, is almost absent.

We stayed at Telôm from January 16th to 28th, 1902.

SELANGOR

Kuala Lumpur. Kuala Lumpur is the capital of the State of Selangor and the administrative centre of the Federated Malay States. While ANNANDALE was in Upper Perak and the Siamese States, I spent some three months in the town, but, with the exception of a few insects captured at light, no collections from this locality are included in the present report. The town is situated in the midst of a thickly populated mining district, and there is no considerable area of jungle nearer than five or six miles. At Batu, about seven miles away, there are large limestone caves similar to those at Biserat, and a few spiders and other Arthropods, including species of *Scutigera*, were collected there, as well as the 'moon snake,' *Coluber taeniurus*.

Semangko Pass. I spent a week in May, 1902, at this locality, which is exceptionally well situated for zoological collecting. It is a rest-house on the border between Selangor and Pahang, on the main watershed of the Peninsula, at a height of two thousand seven hundred feet. On either side the mountains rise steeply to over five thousand feet, and the whole country for miles

around is almost untouched jungle. On Gunong Semangko, to the north of the Pass, an alluvial tin mine has recently been opened, with its main workings situated at a height of over four thousand feet. The path from the trunk road to this mine leads through deep jungle and afforded an admirable collecting ground. Among other vertebrates, a new species of lizard (*Lygosoma miodactylum*) was collected, as well as other forms recently described from the Larut Hills in central Perak, while in birds, specimens of *Cutia cervinocrissa* and *Melanocichla peninsulæ*, hitherto only known from the types collected by Mr. WRAY in 1887, were secured. Some thirty or forty species of moths were captured at light in the rest-house, and of these some ten or a dozen have been described as new to science by Colonel SWINHOE.'

Labuansara. A small jungle clearing some eight miles from Kuala Lumpur, inhabited by a tribe of 'Orang Bukit,' a people of mixed Sakai stock. We visited them together on two occasions in June, 1902, and obtained a series of the more important physical measurements, as well as a small ethnographical collection. On our way to Labuansara we incidentally captured a specimen of the rare butterfly, *Charaxes durnfordi*, DIST., being the third known specimen of the typical form of the species.

HERBERT C. ROBINSON

CENTRAL PERAK

My personal knowledge of this part of the state is slight, being confined to a visit to the town of Kuala Kangsar and a drive thence to Upper Perak. There appears to be a considerable amount of cultivated land in the districts of Kuala Kangsar and Krian, and not much mining, so that the population has a larger element of indigenous Malay blood than in Batang Padang. Much of the country, however, especially towards the main range, has never been cleared, still supporting the jungle tribes, who, in this region, from what we could hear, are very largely of a mixed Semang stock.

Kuala Kangsar. An important Malay centre in Perak, being the residence of the Malay sultan. The town, which is on the railway, is small, but well laid out. The Malays here take their share in petty commerce, having many shops of their own, though even in Kuala Kangsar the majority of the larger stores are in the hands of Chinamen or Bengalis. From what I saw, I am certain that even the Malay of this district is not a homogeneous type, having probably absorbed a deal of Arab or bastard Arab blood.

I spent four days in Kuala Kangsar in March, 1902, and obtained a series of photographs of native-born Malays.

NELSON ANNANDALE

UPPER PERAK

The district of Upper Perak, including the 'New Territory,' which was ceded or restored by the Siamese in 1899, occupies a considerable area, but is mainly covered with jungle, there being very little cultivated land and few or no mines, though deposits of gold are said to exist at Berusong, on the Temongoh River. The settled population is small, being centred in the villages of Lenggong, Grit, and Temongoh, or scattered in small clearings on the banks of the Perak River, which here forms a very important ethnological barrier. The jungle tribes living north of it have no settled place of abode or permanent dwellings, while the hill clans to the south make large plantations, which keep them in the same place, at any rate for a time, and there is a marked difference between the Malays of the two regions thus naturally separated; there is said also to be a difference in the gibbons' found on the two banks, but this question has not been properly investigated. I spent a month (March 18th to April 18th, 1902,) in Upper Perak, doing very little but anthropological work, except to collect some butterflies.

Grit. The most important place in the New Territory, being situated only a few miles from the Rhaman border, at a point where large numbers of cattle are brought over into Perak. Formerly the village consisted of a collection of rather small Malay houses, but since 1899 a new settlement, with Chinese stores and government plank buildings, has come into being on the opposite side of the Grit River, a small tributary of the Perak. There is now a school for Malay boys at the place, and the district magistrate has a bungalow, which he frequently visits. The Malays of the place and of the surrounding hamlets are of a somewhat different type both from those of Kuala Kangsar and those of the East Coast States, having shorter faces, rather shorter heads, a slightly greater stature, straight hair, and clear yellowish complexions. Many Semangs inhabit the neighbouring jungle, coming regularly into the village to obtain tobacco and the like in exchange for jungle produce. Immediately round the houses the land has been cleared, and there are large wet rice-fields; many patches of secondary jungle and of grassy savannah exist in the vicinity, though most of the jungle is evidently old. The high woods abound in game birds, such as the fire-back pheasant, *Lophnia ignita*, and the long-beaked partridge, *Rhizothera longirostris*; and the butterfly, *Melanocyma faunula*, a very local form, is common. In comparatively open places in the jungle I found other species, such as *Papilio megarus*, *P. antiphates*, *Appias nero*, enormously prolific in individuals; but the scarcity of Danais was noteworthy.

I stayed at Grit from March 21st to April 3rd, 1902, and obtained there a considerable series of photographs, specimens (including a skeleton), and measurements illustrating the anthropology of the Semangs, and also a collection of the butterflies typical of the district, which differed considerably in its Rhopaloceran fauna from any we had visited, approaching the Jalor-Rhaman border most closely in this respect.

Janing. The government headquarters in Upper Perak at the time of my visit were here, though possibly they may have been moved elsewhere by this date. The place, situated on the Perak River, was very largely of European origin, and consists principally of government buildings and Chinese shops. The district magistrate, who until recently was the only European in the district, has an extremely comfortable house, with a large garden. The members of the Semang camps in the neighbourhood visit Janing regularly, where, it is said, they often get drunk. Rogue elephants have frequently broken down the telephone poles on the road between this place and Lenggong, and my men declared that one had attacked them as they loitered by the roadside behind my bullock cart. The road is not metalled, but is sufficiently good in dry weather to permit the passage of a gharry, or one-horse carriage. There is a good jungle-track, along which I walked twice, between Janing and Grit—a distance of about twenty-two miles. I stayed at Janing for a night or two on two occasions in March and April, 1902.

Lenggong. This is really the biggest and most important place in Upper Perak, but it has an unfortunate reputation for gang robberies. The Malays here chiefly claim descent from Rhaman or Kedah, but have a fabric of pottery¹ that appears to belong to the characteristic Perak type. There are Klings, Chinamen, and other Oriental foreigners in the village, which is a model of orderliness and respectability, as far as outward appearances go, as compared with the dirty little mining centres of Batang Padang; a fine rest-house, a hospital, and a school have a wonderfully civilized aspect. Janing is thirty-two miles distant from Kuala Kangsar, and the road is well metalled and in good condition, there being no government railway to compete with it. I left Kuala Kangsar by gharry at daybreak, and reached Lenggong in time for lunch, staying there for a night on my way to Janing, which is about twenty-six miles further on.

Temonggob. The only other village but Grit of any importance in the New Territory, being in the centre of a region occupied by numbers of jungle folk, who bring in the rattans and other natural produce they collect. The inhabitants of the village are Malays, evidently with a considerable admixture of native blood in their veins, and a Chinese store has lately been set up.

1. L. WRAY, *Journ. Anthropol. Inst.*, 1903, pp. 24-33.

Two separate tribes inhabit the neighbouring jungle, one living near the village, in subjection to the Malays, the other leading an independent existence on the hills, where they make large clearings for the cultivation of tapioca, yams, bananas, and millet—rice they refuse to eat. These two tribes, however, do not appear to be racially distinct from one another; we have called them 'Sakais' in the text, but it is evident, I think, that they are merely Semangs with some Malay blood in their ancestry, so that the term 'bastard Semangs,' which is used on the map, defines them more clearly. I reached Temonggoh on foot from Grit; the journey, along a very bad elephant track for the greater part of the way, should only have taken two days, but my guide lost the way, and I only discovered that we were travelling in a circle by noticing a hornbill's feather on the ground beside a tree trunk, where I remembered seeing it before, so that we were obliged to spend two nights in the jungle. On this journey I was very much struck by the variety of frogs and toads in the old jungle, where I noted eight species in one day, and also by the sounds produced by stridulating insects at night and by small birds early in the morning; indeed, the fauna of the tree-tops appeared to be richer than in any locality where we made zoological collections.

I stayed at Temonggoh for four days in April, 1902, obtaining some photographs, anthropological measurements, and ethnographical specimens, as well as four skulls of one of the jungle tribes, known as Sakai Jehehr.

NELSON ANNANDALE

PART II. SENGGORA, PATALUNG, AND TRANG

SENGGORA

THE state of Senggora, called Sun-kra or Sun-kla by the Siamese, has, if the districts of Tibaw and Chenaw be included, an area rather greater than that of Rhaman (*q.v.*). Of Tibaw and Chenaw very little is known, our own experience consisting merely of two days' hasty march along the coast; they seem to be sparsely populated in the interior, and to consist chiefly of jungle country. Senggora proper, on the other hand, has mostly been cleared, where the ground is not too barren to render clearing a work of supererogation, and it is doubtful whether any old jungle now remains within the district. The coast land of all three districts resembles that of the Patani States, but it is obvious that the sea is here rapidly eating into the land, as we saw many *Casuarina* trees that had been undermined by the waves and had fallen on the beach. A remarkable feature of the vegetation along this coast, especially in the immediate vicinity of Senggora town, is the abundance of certain myrmecophilous plants; in some places there is hardly a tree other than a *Casuarina*—for the *Casuarina* harbours few epiphytes or creepers—but gives support to one or more plants of a *Discidia*, which we found also growing on the same stump as a species of *Myrmecodia*, or an allied genus. We noticed, however, that the modified leaves of the *Discidia* were very liable to have holes eaten in them by some insect or mollusc, and that the ones so injured, which permitted water to enter their cavities, were not frequented by ants; the species inhabiting the bulbous stem of the *Myrmecodia* was not the same as that which lived in the leaves of the *Discidia* that grew a few inches away. On our walk along the shore from the mouth of the Tibaw River to Senggora town, we saw several sea snakes (*Hydrophinae*) which had been buffeted in the tremendous surf, which broke all along the coast, and cast ashore; they were evidently in a very vicious condition, attempting to bite any object thrust in their way. We were obliged to travel very light, and accomplished the journey from Kampong Anak Bukit, in Nawngchik, to Senggora in three days, although the foot track between the former village and the Tibaw River was almost entirely submerged, owing to the heavy rains which had fallen—it was December—and although the sand of the seashore, to which we took in order to avoid the floods, provided very heavy going. It is doubtful whether we could have moved with anything like the same rapidity, had we not gone barefoot, clad in the lightest of Chinese clothing, which the wind dried almost as soon as the rain had soaked it.

Kuala Zircom. A small Malay fishing village, at the mouth of the Chenaw River, where we spent a night on our way to Senggora. Near Kuala Zircom we entered a curious encampment, the huts in which were roughly built on the ground of slabs of bark. The people who occupied it were Malays, who said that they had never heard of white men, and asked whether white men were like Malays, *i.e.*, were Mahommedans. After we had warmed ourselves over a fire in one of the huts, and had grown more friendly with its inhabitants, who were very curious to know what manner of men we were, they told us that they were all just recovering from smallpox, and that the people of the village had driven them out of it. Little pieces of white bark, displayed on sticks at the Zircom side of the camp, were a sign that no one coming from that quarter might approach it, but no objection was made to us proceeding on our way in the opposite direction.

Senggora. The town of Senggora is externally a Chinese city, surrounded with a high castellated wall, and formerly closed at nights by heavy gates, which are now fixed permanently open to admit the entry of telephone and telegraph wires. The principal buildings also are Chinese, except some of the many Buddhist monasteries, whose high-gabled roofs appear amidst the foliage of the trees with the softest of mellow orange-brown, dull copper-green, and emerald-green tiles; they are built in the true Siamese style of architecture, which is founded on the Chinese, but is less solid and even more fantastic. The population, a large proportion of the Buddhist part of which must be in celibate orders, is partly Chinese, partly Siamese, and partly Malay, but the Siamese official element is large, as Senggora is the centre of the administration of all the country between Kelantan and Ligor, and the Malays, who retain el Islam, have mostly foregone their proper language in favour of Siamese. Indeed, we found that English carried us further than Malay in the town, for many of the officials could speak English well, though there are no pure bred Europeans resident in the state. Across the straits from the modern town, which has been built by former Chinese governors on the south bank of the entrance to the Taleh Sap, lies old Senggora, now chiefly occupied by Malays, the descendants of prisoners of war brought from Kedah two generations ago. These people occupy themselves in fishing, and the size of their families is so notorious that childless Siamese women in the town procure all their drinking water from a well in one of the Malay villages, attributing the fecundity of its inhabitants to this source. The Malays have also, in the vicinity, several villages entirely to themselves in which the houses are erected partly on dry land and partly on piles in the lake, so that they can draw up their dug-outs directly from the surface and suspend them beneath the platform on

which their dwelling-rooms are built. Altogether, the environs of Senggora offer a strange study in contrasts; for while phonographs and acetylene bicycle lamps are on sale in several of the Chinese shops in the town, real lake dwellings are in actual occupation within a mile or two. The town market dues are very heavy in Senggora, and a most irksome regulation was made at the beginning of 1902, forbidding women to carry on their heads, in the immemorial manner, anything intended for sale within the walls, the reason being that all such goods must be inspected by the police, who objected to pry too closely into things which had been sanctified by being placed on the head of a human being.

We spent ten days in Senggora in December, 1901, recruiting our health and preparing for a journey to Kedah, and one of us returned for another short visit at the end of the spring of 1902. A few spiders and one or two ethnographical specimens were all that we collected here, but on both occasions we thoroughly appreciated the kind hospitality of His Excellency the Siamese High Commissioner.

PATALUNG

This state, the south of which marches with Senggora, the west with Trang and other West Coast States, and the north with Ligor, or Nakawn Sitamarat, is thickly populated in the neighbourhood of the Taleh Sap, but there appear to be only scattered villages in the interior, where considerable numbers of Semangs probably still exist in the jungle. The country is flat near the coast, but dotted over with limestone peaks,¹ and the central range sends down low spurs to within a few miles of the lake. I travelled by boat from Senggora to Lampam in May, 1902, and from Lampam overland to Trang.

Lampam. This place, the capital of Patalung (Muang Talun in Siamese), is a neat little Siamese town, with handsome government offices, a fine temple, and a curious shrine in which crocodile skulls are revered. The population consists of Siamese, a few Chinamen and a considerable number of half-castes, the children of Chinese fathers and Siamese mothers. These people, who in the Patani States are confused with the race of their fathers, are here recognized as a class apart, wearing their hair hanging on the shoulders, but not in a queue; they are called Baba. The country all round Lampam is very highly cultivated, chiefly by Siamese, who have evidently a full share of Semang blood in their veins, and, to a less extent, by Malays, who dress and speak like their neighbours, though they live in their own villages and cling to the Mahommedan religion. The land is very fertile, producing two crops of rice in a year, and

1. It is the pointed conical form of some of these peaks which is believed to give the medicine-men of Patalung such great magical power (Cf. *Fascic. Malay.—Anthropology*, part I, p. 60).

the orchards of the district are famous throughout Lower Siam. The journey from Senggora to Lampam can be done in a day by boat, if there is no wind, and if sufficient boatmen be employed, but it took me two days and part of a night, owing to the choppy character of the waves in May. I spent two nights at Lampam, waiting for an elephant to take my baggage to Trang, and there procured the skeleton of a Siamese child. I also noted a curious insect that I had taken at the same place in 1889, namely, an aquatic glow-worm (apparently the larva of some Malacoderm beetle), which is common in the swamps round the town.

The Taleh Sap. This extraordinary lake, known to the Malays as Laut Dalam (the Inner Sea), is nearly fifty miles long and of very variable breadth, but not, save for a few deep pockets, more than a few feet deep. To the south it communicates freely with the sea, and a canal has been cut between a point near its northern limit and the coast, though there does not appear to exist any such natural channel as that marked on many maps, which very possibly, however, has recently disappeared. Another artificial channel, known as Klong Sukhum, in honour of Phya Sukhum, the Siamese High Commissioner, who directed its construction, now joins the Taleh Sap to the Ligor River. The waters of the lake, at any rate in December, March, April, and May, are only slightly brackish, though the tides are felt in the Lampam River. The islands with which it is dotted are either low and marshy or consist of limestone peaks rising abruptly from the water. The latter afford in the caves with which they are riddled a breeding-place for *Collocalia innominata*, the edible nests of which are extremely valuable, while the reed-beds round the other islands and along the shore shelter innumerable water-fowl, especially the cotton teal, *Nettapus coromandelianus*, and the tree-duck, *Dendrocygna javanica*, which is generally called a teal in the Straits. There is a small cetacean, probably a species of *Platanista*, in the lake, and a viviparous sting-ray is caught off Lampam, where sharks are said also to occur. The centre appears to be almost devoid of animal and vegetable life, though a few minute worms were taken by Mr. RICHARD EVANS and myself in 1899; but beds of *Potamogeton* and other water-weeds at the mouth of the Lampam River have evidently a very rich insect and crustacean fauna, while the fish from the same locality are partly marine and partly freshwater forms. The marine or lacustrine zoologist who was willing to be satisfied with minute and inconspicuous specimens would find a most interesting hunting-ground in this lake and its northern adjunct, the Taleh Noi, and although the people who inhabit the shores have an unenviable reputation among the Malays and Siamese, I never experienced anything but courtesy from them.

NELSON ANNANDALE

TRANG

This state marches with Patalung on the east and reaches the sea on the west, including within its jurisdiction a number of islands which the native Mahommedans regard as appertaining to the sultanate of Kedah. The interior of Trang, where Semangs are said to have been formerly numerous, is occupied partly by Siamese rice cultivators and partly by Chinese pepper planters, but the coast people are either Mahommedan, Samsams, or pagan Orang Laut. The road from Lampam, a good sandy track recently set in order, passes through little but cultivated ground between the base of the western slope of the main range, which reaches an altitude of several thousand feet at this point, and the large market town of Tap-tien, formerly the capital of Trang, from which I proceeded by boat to Kantang, the whole journey taking three days. The banks of the Trang River are here densely wooded, but the jungle has a peculiar character, due to its estuarine nature at a considerable distance from the sea, for, even as high as Tap-tien, there are a number of small floating islands, composed of the roots of nipa palms with other vegetation entangled among them, which float up stream with every tide. In the neighbourhood of Kantang this palm is largely cultivated for the sake of its sap, out of which sugar is made, and of its young leaves, which serve in place of cigarette papers.

Chau Mai. A place on the coast, a few miles north of the estuary of the Trang River. Formerly the limestone cliffs at this place, and the caves which they contain, were regarded as sacred by the Orang Laut, who deposited their dead in the latter, but Chinese pepper planters, searching for bats'-dung guano, have dispelled the sacred influences. The character of the vegetation on this coast is strikingly varied, for immediately along the shore there is usually a belt of casuarina trees, and behind them there are vast tangled mangrove creeks, the trees of which give support to many orchids and other epiphytes, while the characteristic flora of the cliffs resemble that on the limestone islands of the Taleh Sap, having as its most conspicuous member a large candelabra-like euphorbia. I saw among these cliffs a land crab some six or eight inches across the carapace; it appeared to be one of the *Oxypodidae*, which has ventured further from the sea than many of the species of this family are in the habit of doing, but my men unfortunately left a specimen which I had obtained behind. The duck, *Asarcornis scutellata*,¹ so scarce in collections, appears to be common on the Trang coast, going inland every evening and passing in numbers over the town of Kantang.

Kantang. The new capital of Trang, founded about ten years ago by the Chinese hereditary governor, who has now been promoted to the high

1. The 'Skeat' specimen was procured by myself in the interior of Patalung, and the note on my label gave the statement that the species was migratory as a native belief (Cf. Bonhote, *P.Z.S.*, 1901, Vol. I, p. 80).

commissionership of the 'circle' of which Trang forms a part. To the ethnologists and naturalist Kantang is not a place of any interest, except, perhaps, as regards the butterflies common in its vicinity, which struck me as being different from those seen elsewhere. The town consists chiefly of government offices and elegant villas, in which the officials live, and it is far more modern in all essentials than any place on the East Coast which we visited. I was obliged to wait at Kantang for some days to get a boat to take me to the coast, and again to catch the steamer for Penang, and during my stay was much indebted to the kind offices of Mr. A. STEFFEN, a German engineer in the employ of the Siamese Government, the native officials' being here suspicious of me. From Mr. STEFFEN I procured some valuable ethnographical and antiquarian specimens.

Ban Phra Muang. A large 'Malay,' or, more accurately, Samsam, village at the mouth of the Trang River. I spent several days there in May, 1902, obtaining some ethnographical specimens and a series of anthropometrical data. The people, who call themselves Malays, are recognized as Samsams by their neighbours, that is to say, as being of mixed Malay and Siamese origin. They speak a dialect of Siamese mixed with Malay words and phrases, and resemble the Malays of Upper Perak in appearance.

Pulau Mentia. A little island lying off the Trang coast. Part of it is high, and there edible birds'-nests are collected. The part facing the coast, however, is flat, with the most beautiful white sand, and is occupied for part of the year by a Samsam community which has its permanent village some distance up the Chau Mai River. A family of Orang Laut Kappir were also encamped on the island at the time of my visit. The fauna between tide-marks was very varied, owing to a plentiful growth of sea grass (*Zostera*), among which Holothurians, some of which were captured as trepang, were particularly numerous, while the 'pearl oyster,' *Arenga margaritifera*, or an allied species, was taken in great numbers from the sand, rather as an article of diet than for its pearls, a few of which were, however, collected. A Sipunculid worm, *Phymosoma japonicum* in all probability, was dug out from the sand and eaten by the Samsams, as well as several bivalves and a lantern shell (*Lingula*). On Pulau Mentia, where I was only able to spend one night, I obtained two skulls, which I believe to be those of Samsams.

Pulau Telibun. This island is partly the delta of the Trang River, but has also a limestone basis. It is densely wooded except along the coast opposite the mouth of the river, where it has a muddy shore, in which a variety of

1. The High Commissioner at Senggora had given me a letter of introduction, of course written in Siamese, to the Governor of Trang, and in this letter it was stated that I had come 'to inspect knowledge,' so that I was naturally regarded as some new kind of spy.

molluscs, crustaceans, and coelenterates abound. When the tide goes out, the whole shore becomes covered in a moment with vast numbers of little pinkish crabs, resembling the Australian genus *Mycteris* ; they are perpetually on the move, not infrequently walking right across the discs of gigantic mud-coloured sea anemones, which remain expanded, but very inconspicuous, in little pools caused by the tide swirling round their bases. Hundreds of the crabs cling to their tentacles, but the rest proceed on their way, without apparently learning by experience to avoid them. A Patani man, who accompanied me, and who had never seen so many crabs together, exclaimed when I pointed them out to him, ' What a fine relish they would make ! ' and rushed forward to capture them, but they sank instantaneously into the sand. I spent several days on Pulau Mentia, staying in the Siamese revenue station recently established on the island, and obtained some interesting musical instruments and other specimens from a Samsam camp, where I also measured a few of the men.

NELSON ANNANDALE

PART III. THE PATANI STATES AND KEDAH

RHAMAN

Rhaman is the largest of the seven Patani States, bordering on the north with Tibaw, Jalor, Patani, Jhering, and Telubin; on the west with Kedah; on the east with Kelantan, Legeh, and Telubin; and on the south with Perak. We spent a few days at Ban Kassot on the Jalor border in 1901, and I made a hasty journey from Upper Perak to Patani through Rhaman in April, 1902, so that our acquaintance with this state is comparatively slight. Kota Bharu, the capital, we did not visit, but I was there in 1899; it is a small and unimportant village, not situated on any navigable river, and therefore only of note as a centre of the cattle trade between the East Coast and Perak.

Only a small proportion of Rhaman is under cultivation, the rest being buried, for the most part, in dense jungle, and only a few unimportant tin mines, all worked by Chinamen, now existing, though there are said to be rich mineral deposits. The district between Jarum and the Perak border, however, is an undulating savannah, covered with long buffalo grass, but intersected with many streams, the banks of which are thickly wooded and give shelter to numerous birds and to several of the scarcer jungle butterflies and dragon flies, such as *Kallima buxtoni* and a fine species of *Gomphus*, in comparatively large numbers.

The following villages were visited on my journey :—

Betong. Now the Siamese headquarters in the Hulu Rhaman district, which is often known as Neg'ri Jarum. Betong is a large and flourishing Malay village, evidently, from the size of the fruit trees, and the enormous masses of orchids upon them, of considerable age; the only non-indigenous inhabitants being a few Siamese officials and police and a couple of Chinese traders. The prevailing type of Malay is that noted at Grit, and a Semang tribe has its hunting grounds in the neighbourhood. The village fauna is that characteristic of the central region of the Peninsula, the common squirrel being *Sciurus vittatus*, not *Sc. concolor* or *Sc. caniceps*. The savannah¹ near is said to be inhabited by large herds of Sladang (*Bos gaur*) and Sapi (*Bos sondaicus* ?), with possibly a third species (*Bos frontalis* ?); but the habits of these wild cattle, if what was told me is true, differ from those of jungle individuals, for the former are said to be mild and inoffensive, while the latter are notoriously savage. The jungle fowl (*Gallus gallus*) is very abundant, and the cocks frequently come into the village and interbreed with the tame poultry. The domestic cattle

1. The hunting dog (*Cyon rutilans*) is also comparatively common in this district, and also, very possibly—in my opinion, probably—a species of jackal.

are chiefly of the 'Siamese' breed'; but zebu blood has been lately introduced, and many buffaloes are kept.

The journey from the Perak border to Betong took me three days on foot, but could have easily been accomplished in two, had it not been for the state of the track between Grit and Krunei—a regular slough of despond, churned into mud, and rendered filthy beyond description by the passage of cattle from the Patani States to Perak, and of elephants in both directions. It appeared to swarm with a parasite (possibly a Nematode allied to *Strongyloides intestinalis*²), which penetrated the skin of the feet, especially between the toes, and caused extreme irritation and discomfort. We had experienced the same pest in places on Bukit Besar where elephants had been, and the Malays say, probably with truth, that it originates in elephants' dung. I found the only way to obtain even comparative immunity from it was to walk barefoot and to wash my feet very carefully at every stream we crossed, as footgear of any kind, which, at any rate, the tenacity of the mud rendered irksome, appeared to harbour the parasite, which it was difficult to eliminate.

Jarum. A smaller Malay village, some six miles north-west of Betong, and probably at one time a more important place than at present. It still contains a residence of the Raja of Rhaman—a miserably dark and dirty old house, swarming with parasitic Acari, which are said to come from the goats stabled under it, sand flies and mosquitoes, especially *Anopheles*, which breed in enormous numbers in puddles of filth in the village, and which are the probable cause of the great prevalence of malaria in the neighbourhood. I stayed here for some days in April, 1902, waiting for an elephant to carry my luggage to the Patani River, and obtained a few butterflies and ethnographical specimens, but only caught a glimpse of the Semang tribe whose Malay master is the headman of the village.

Krunei. A straggling village, wholly Malay, close to the Perak border, which is here marked by a small cairn of stones standing at the edge of a pool called Lubong Gajah Puteh, or the pool of the white elephant. The chief of the Semang tribe whose Malay master lives at Krunei has obtained the right from a former raja to call himself Penglima Sakai; he and his followers acted as my porters for a short distance, and I did not stay at Krunei because he told me that he owed five dollars to a Malay and was afraid to enter the village. I spent the night at Kampong Jong (not the one marked on the map), a mile or two distant; it was evidently a place of recent foundation, as the fruit trees were just beginning to bear for the first

1. *Fascic. Malay.—Zoology*, vol. 1, p. 44.

2. See Dr. Paul Van Durme's *Embryons de Strongyloides intestinalis*, University Press of Liverpool, 1903

time. The headman, in whose house I stayed, told me that his people had come from a place called Kampong Lalang, the ruins of which I passed the next day a few miles to the north-west. It was interesting to notice that the crow (*Corvus enca* (?)), which in the Malay Peninsula is rarely found at any distance from human dwellings, still haunted the site of this and other deserted villages that I passed in this tract of country.

Ban Maiwas. A small Siamese village near the point where the Maiwas River enters the Patani. Judging from the curly hair and dark complexions of many of the people, they have absorbed a considerable proportion of Semang blood, and they call the Semang tribe of the neighbouring jungle 'Sakai Perak,' saying that the jungle men have only recently come from over the border. It is probable, from the age of the fruit trees and from what we know of the Siamese invasions of this part of the Malay Peninsula, that the inhabitants of Ban Maiwas represent a comparatively recent Siamese settlement, which has intermarried to a great extent with the aboriginal inhabitants of the country, and, therefore, it is worthy to note, that while a large proportion of the population approximate to the aboriginal type, a minority appear to have the characters usually associated with purer Siamese blood than that habitually found in the Patani States, having clear yellow skins, straight hair, and somewhat Mongoloid features.

From a zoological point of view, Ban Maiwas is interesting, as being the village furthest west in this latitude in which I found the common village squirrel to belong to the *Sciurus concolor* type. The fauna in the neighbouring jungle seemed to be very rich, and at one point I found the cast pupal skins of *Flata limbata*, the Chinese wax insect, or an allied species, covering the leaves of a shrub in enormous numbers, while the moth-like adults of the same species clung to tree trunks in the vicinity, having much the appearance of a fungus that grows in the same situation.

The journey from Betong to Ban Maiwas took me three days, though the distance is short in a straight line. Several steep spurs had to be surmounted, and the track crossed and re-crossed the Patani River in such a way that the stream had to be forded fourteen times in the course of one morning; though the water was low, I had to swim at one ford. At Maiwas, owing to the kindness of the district magistrate at Betong, a well educated Bangkok Malay, who entertained me most hospitably, rafts were waiting to take me to Bendang Stah, another journey of three days, and from there to Patani, three days more. On the way I was able to obtain some interesting information regarding the popular religion of the people of the district from my raftsmen, especially about the cult, common to Mahommedans and Buddhists, of 'Joh Ni' a late raja of Rhaman.

PATANI

Of late years much confusion has arisen from the very varied meaning given in the Straits, in Europe, and in Siam to the term, 'Patani,' and it may, therefore, be well before commencing a description of the country in which the greater part of our time was spent, which was the original goal of our expedition, to explain the three different senses in which this term is used.

1. Until about a century and a half ago the *kingdom of Patani*, which was frequently governed by a female sovereign, appears to have been one of the largest and most powerful in Malaya, exceeding the modern states of Perak, Pahang, or Kelantan in size. It comprised the whole watershed of the Patani and Telubin Rivers, a part of the Upper Perak valley, and probably some of the northern tributaries of the Kelantan ; but very possibly it consisted rather of a confederation of petty native rajas under a powerful chief than of a single state, and Malay domination may never have extended much north of the Patani River, except immediately along the coast.

At the end of the eighteenth and the commencement of the nineteenth century the Siamese finally conquered the country, which had long owed them a feebly defined and easily broken allegiance ; and 'Patani' was divided into seven minor states, each independent of its neighbours, and each under a Siamese nominee, who was in some cases a Malay and in some a Siamese. It is from these Siamese governors, who were tributary to the Chinese governor of Senggora, himself a vassal of Siam, that the present Malay rajas of the seven states are descended. The names of the seven states are Nawngchik or Tojan, Patani or Tani, Jhering, and Sai or Telubin, along the coast ; and Jalor or Yala, Rhaman, and Ra-nge or Legeh, in the interior. During the greater part of our visit their local administration was kept separate, each state being under a Malay raja nominally and a Siamese governor or commissioner practically, except Nawngchik, the governors of which never became Mahommedans and which was entirely under Siamese rule. In 1902, however, the seven states were reunited, with the title of the Division of the Seven Provinces, under a commissioner resident in Patani town but responsible to the High Commissioner of the Ligor Circle, who resides at Senggora.

The term 'Patani' is usually held in the Straits to include these seven provinces, which are indicated when we talk of the 'Patani States.' We are indebted to the High Commissioner of the Ligor Circle for the following particulars regarding their population and that of the neighbouring states. His Excellency regards the figures as substantially correct, and if they are only moderately accurate, the curious and unexpected fact is shown that, even including the nominally independent principality of Johor, there are more Malays under Siamese than under British rule in the Malay Peninsula.

Population of Monthon Nakon Sri Thamarat (Ligor Circle).

‘The following figures are from the census, and may, therefore, be taken as accurate :—

PROVINCE	SIAMESE	CHINESE	MALAYS	TOTAL
Ligor (Nakon Sri Thamarat) ...	130,034	32,439	32,580	195,053
Senggora	78,307	31,323	15,662	125,292
Patalung	45,635	3,563	5,563	54,761
Division of the Seven Provinces.	39,563	19,780	138,466	197,809

The following figures for Kelantan and Trengganu are only approximate, as no census has been taken :—

Kelantan has about 250,000 inhabitants, of whom about 20,000 are Siamese, 15,000 Chinese, and the rest Malays.

Trengganu has about 120,000 inhabitants, of whom very few are Siamese ; there are about 1,000 Chinese, and the rest are Malays.’

There are no Europeans, and few Indians or Arabs, resident in the Patani States, Senggora, or Patalung.

2. *The modern state of Patani*, or, as the Siamese call it, Tani, is a small strip of territory, with a coast line less than ten miles long and a length of rather over twenty miles, the northern part of which extends on both sides of the Patani River, while the southern half is bounded by it to the west. Except in the immediate vicinity of the coast, where the soil is sandy and barren and supports large open woods of casuarina trees, the country is well cultivated, under artificial irrigation, and supports a population probably as dense as that of any part of the Malay Peninsula which is not occupied by tin miners. There is little or no old jungle left in the state.

3. *Patani town*, locally known as Kuala Bukar, is the most important place in the Division of the Seven Provinces, both as the seat of government and as the only port with a reasonably safe anchorage between Kuala Kelantan and Senggora. Patani Roads, indeed, enjoyed considerable reputation among the old voyagers, and formed a nucleus for the trade of ‘Further India’ in the seventeenth century, at which date there was a factory of the East India Company at Patani ; but nowadays, at any rate, anchorage is only possible in them from March to October, and they are so shallow that vessels drawing more than twelve feet must anchor over two miles from the mouth of the river, which is blocked by a bar rarely covered with more than four feet of water.

The town was situated, in 1901, on the east bank of the stream, about a mile and a half from the sea, but in the course of its history it has frequently been moved from one bank to the other, and in the summer of 1902 preparations were being made to build a new town across the stream. It is divided into two quarters, one occupied by Mahommedans, the other by Chinamen and Siamese, and the government buildings, consisting of a post and telegraph office, a police station, and the commissioner's residence, are situated between them on the river bank. Here also are the buildings of a Siamese *wát*, or monastery (almost the only solid buildings in the place except the mosque in the Malay quarter); they are surrounded by a balustraded wall with ornate gateways in Chinese style, and separated by a row of fine sugar palms from the river, over which a gorgeously painted and gilded guest-house has lately been built.

The Chinese quarter, in which the greater part of the local trade is conducted, contains numerous large houses of brick and rubble, and in its shops articles of European manufacture, such as crockery, hardware, cotton goods, and a limited selection of tinned provisions, can be bought at prices but little in excess of those current in the Singapore bazaars. Much of the purchasing, however, is carried on by means of little perforated pewter coins of Malay manufacture, and only current in the state of Patani, of which eight hundred go to the Straits dollar.

The Malay quarter, in which we rented a house during six months of our stay in the Patani States, is much less pretentious, and also less odorous, than the Chinese, consisting chiefly of a few large compounds belonging to the raja and other wealthy Mahommedans, and a street of small houses with open booths in front of them. This street leads from the raja's compound, in the open space in front of which a daily market is held, to a landing stage on the river, and in the opposite direction the town gradually merges into the cluster of hamlets which surround it, large open spaces being left for the cemetery and for cultivation. Two broad sandy roads, excellent except for their heat in dry weather, lead to Jambu and to the sea from the Malay quarter.

When we talk of 'Patani,' we refer to the town, unless it is otherwise stated or inferred.

The trade of Patani is probably less extensive than it was even at the middle of last century, and is carried on, as far as imports are concerned, almost exclusively with Singapore. A certain amount of jungle produce and a small quantity of inferior tin are brought down from the interior, and silk garments, woven in the town, are exported to Kelantan and Trengganu, being of better quality than the rather shoddy goods manufactured in these places; but the staple industries are the curing of salt-fish and the manufacture of salt in brine

pits on the coast. The crude salt is carried, chiefly to Kelantan but also to Trengganu and Senggora, in flat-bottomed sailing barges of five or six tons burden. A steamer called about once in five weeks on its way to Singapore, and as often on its way to Bangkok, during the first half of 1901, but it was discontinued later, and we are not aware in what way communication of the kind is now kept up.

Leaving Chinamen out of account, the population of Patani town is chiefly Malay, and those Siamese who live there belong largely to the official class and are not natives of Lower Siam. The Chinamen, however, have a large proportion of Siamese blood in their veins, and it is probable that half of them are really half-breeds. There must have been a considerable Bugis element at one time, and ANDERSON¹ states that in the seventeenth century there were many Japanese traders settled at Patani. When we reached Patani most of the shops in the Malay quarter were in the hands of Malays, but later in the same year a sudden irruption of Arabs and Tamils took place, who occupied many of them. The immigrants apparently came from Singapore. It is difficult to estimate the population of the town with any approach to accuracy, but, excluding the surrounding hamlets, it may reach the total of about five thousand, while the remainder of the state probably supports five or six times that number of people.

During the nine months of our stay in the Patani States (April to December, 1901), Patani was practically our headquarters, and we spent, in the aggregate, many weeks in the town, to which one of us returned for a brief visit in May, 1902. We collected a considerable proportion of our ethnographical collection here, and one of us conducted investigations, with interesting results, into the customs and beliefs of the fishermen.²

Our zoological work at Patani was chiefly marine, and in Patani Bay we obtained several species of sea-snake, including the anomalous *Thalassophis annandalei*, only known from this locality, and the rare *Distira wrayi*. We also took surface tow-nettings at different hours of the day and night, and Mr. ANDREW SCOTT tells us that they include representatives of a new family of Copepoda. The 'porter' crab, *Dorippe facchino*, which lies in the mud clasping a sea anemone to its back by means of modified ambulatory claws, was taken in shallow water, and we noted that a specimen from which the anemone had been forcibly removed seized hold of a Rhizostomous medusa, which had been accidentally placed in a jar with it, and carried it in the same position. When the anemone from another individual was placed in the jar, the crab dropped the medusa and snatched up the anemone.

1. *English Intercourse with Siam in the Seventeenth Century*. London, 1890, pp. 42-44.

2. *Fasciculi Malayenses—Anthropology*, part. 1.

Jujul. A large Malay fishing village on the east bank of the Patani River at its mouth. We obtained some specimens of fishing apparatus there.

Kampong Uban Tras. A Malay village, some eighteen miles above Patani, where one of us collected some zoological specimens.

JALOR

The state of Jalor has an area about three times greater than that of Patani, from the northern third of which it is separated by the Patani River. The Patani River also separates it to the east from Rhaman, which bends round to the south so as to march with it on this border too ; it marches with Tibaw to the west, and with Nawngchik to the north. The revenue of the state, owing largely to the amount of opium consumed in it, is larger than that of any other of the Seven Provinces, or, as the Malays call them, the 'Seven Fruit of Countries' (*Tujuh Buah Neg'ri*). The northern half is rather thickly populated, partly by Malays and partly by Siamese ; that is to say, by Mahommedans and by Buddhists, for we can find very little difference, except that of religion, between the two peoples in Jalor. South of Petai there is much primaeval jungle, and the tin mines, which are the largest in the Division, occupy only a small area, being, compared to those of South Perak, small and unproductive. A considerable proportion of our time was spent in Jalor, and we made two journeys through the southern half of the state to the Rhaman border or its vicinity.

Biserat. Biserat, which is known to the Siamese as Ta Sap, has been the Siamese headquarters in Jalor for some years, and the Malay Raja, whose residence is at Kampong Jalor, some miles away from the river, has lately been persuaded to take up his abode in a house on the outskirts of the village. The population is considerable, consisting almost entirely of Siamese officials and their families and of Chinamen and Chinese half-castes engaged in river transport or petty trade. At the time of our visits all the houses were of a flimsy nature, being built chiefly of bamboo and palm-thatch ; the largest was the old government offices, one wing of which was assigned to us by the Commissioner, as they were being replaced by more substantial timber buildings : among these a telephone station in direct communication with Senggora, Patani, and Kota Bharu (the chief place in Rhaman), which is also connected with Biserat by a good track.

The country round Biserat consists of a large and fertile plain, most of which is in use as rice-field or orchard, and the only jungle that remains in the district is that on two limestone hills, called Bukit Tapang and Bukit Bayu, which rise abruptly from the midst of swamps behind the village. Their

sides are more or less precipitous at all points, in many places so much so that there is no lodgement for soil, and vertical crags are exposed. Thus the hills, though they are certainly not more than about six hundred feet in height, have a massive and solid appearance, belied by the fact that they are penetrated in all directions by natural tunnels, which here and there expand into lofty domed chambers of considerable extent. Bukit Tapang and Bukit Bayu, in fact, are precisely similar in geological formation to many hills and islands on both sides of the Malay Peninsula. The stone of which they are formed is highly crystalline and has been exposed to metamorphic action of a kind that leaves little hope of the discovery in it of organic remains. It is evident that they represent the ancient land surface, now much eroded, through which the central range of plutonic rock has been erupted. In certain places, especially in the neighbourhood of Kampong Jalor and Tanjong Luar, the two formations meet and become confused together in a very curious way, and in such localities metalliferous veins appear to be common.

The fauna of Bukit Tapang and Bukit Bayu may be divided into two distinct sections, one of which is found on the exterior, while the other inhabits the caves. The former is prolific, for the vegetation that grows in the scanty soil which covers the limestone is more luxurious than might be expected from the rapidity with which the ground dries up after rain, and rich vegetation always means a rich fauna. It is noteworthy, however, that the fauna of these hills is by no means so characteristic, to all appearance, as the flora, which differs, on the one hand, from that found on granite mountains like Bukit Besar, and, on the other, from that which covers marine or semi-marine cliffs like those of Chau Mai or the islands of the Taleh Sap. Speaking generally, while the number of tall trees, epiphytes, and ferns is smaller than it would be in the former situation, the number of fleshy-leaved or fleshy-stemmed species is smaller than in the latter. The animals are mostly those found in the plains, though certain species, for example, the Malay serow, or 'kambing gurun' (*Nemorhaedus swettenhami*), do not occur on level ground. This antelope, the only one that penetrates down into Malaya, is especially common on limestone hills of the kind, taking shelter from the rain in the caves; but it also abounds on Bukit Besar. The avi fauna is not particularly noteworthy; an ant thrush (*Pitta cyanoptera*) becomes common at the base of the cliffs in November, and is partly responsible for the heaps of broken snail shells at the mouths of the caves, but a species of *Myiophoneus*, whose cry we frequently heard, probably contributes its share, for on a previous visit one of us collected a young specimen in just such a place on Bukit Tapang. Insects are rather scarce, but in some patches of jungle the tailor ant (*Oecophylla smaragdina*) is so abundant,

and so vicious, that passage through the thorny undergrowth is difficult. A careful search would probably reveal a large molluscan fauna, always rich on limestone, but we were unfortunate in this respect in the dryness of the year, which probably caused the majority of the species to disappear into the earth. As a member of the 'Skeat' Expedition one of us took on Bukit Tapang several new slugs of the brilliantly coloured and peculiar genus *Atopos*, as well as a very curious snail, *Rhiostoma jalorensis*, SYKES, which has a shell that looks as if it had become partially uncurled and had then been joined together by a tubular bridge running between two whorls. Its operculum is also peculiar, being very thick and fitting into the shell with a regular spiral screw, probably as a protection against the evaporation of moisture, as the species is found, at any rate in dry weather, buried in leaf mould, only dead and eroded shells occurring on the surface of the ground, where they are very common in certain places.

The cave fauna is mainly interesting because it is not a true cave fauna in the sense that that of the Mammoth Cave of Kentucky is one, probably because the Jalor caves, though they penetrate into the hills for a considerable distance, are not uniformly dark throughout, the roof having fallen in in many places and so permitted light and moisture to enter, and with them the fauna of the outside world. Nevertheless, there are several species found in the darker parts of the caves which are, at any rate, very rare elsewhere, notably the so-called 'moon snake,' *Coluber taeniurus*, which, however, is not so common as in the caves of Selangor. A very large whip-spider, *Stygophrynus cerberus*, SIMON, is extremely abundant on the walls, and a wingless grasshopper belonging to the family *Stenopelmatidae* is even more so. The latter has extremely long antennae, one of which is longer and stouter¹ than the other, and the whip-spider's first pair of legs, which it carries crossed over its back, are even longer than those of some of its allies, largely taking the place of eyes, though these organs, which would appear to be useless to the animal, are well developed even as regards their internal structure. Certain Isopods, found under stones in the caves, may possibly have degenerate eyes, but they have not yet been examined.

We stayed at Biserat for some weeks in June, July, October, and November, 1902, and there obtained a considerable proportion of our anthropometrical data regarding the Malayo-Siamese, as we have thought it best to call the very mixed indigenous population of the Patani States. Our subjects were partly prisoners in the jail and partly inhabitants of the neighbouring hamlets. We also made large zoological collections in the neighbourhood, and, as regards insects, were particularly fortunate because of two events, viz., the

1. Detailed measurements show that this is usually, but not invariably, the left antenna.—N.A.

discovery in an accessible position of a flowering shrub which attracted enormous numbers of beetles and other insects not elsewhere obtained, and, secondly, the arrival of the High Commissioner with a large train of elephants, which were followed or accompanied by some interesting beetles of the genus *Heliocpris*. The situation of the house in which we stayed, in an open space surrounded by orchards, proved attractive to moths, of which large numbers were taken round our lamp in the evenings. Several species of Diptera belonging to the family *Celyphidae* were collected, together with a Phytophagous beetle which some of them resembled very closely, as well as a number of ant-like spiders (*Atidae*), in some cases with their specific 'models.'

On each occasion we came to Biserat by boat from Patani—a dull and tiresome two days' journey, for the boat, a large flat-bottomed punt with a low-roofed cabin amidships, a small kitchen behind and a sloping platform for the polers in front, kept constantly sticking on a snag or sand bank. The river is so shallow and the currents are so variable that no steersman can know it intimately from one month to the next. The country on both banks is tame, covered with a succession of Malay and Siamese villages, which are separated from one another by patches of secondary growth and clumps of bamboo. The only interesting feature of the journey is the Sungei Bharu or 'New River,' a canal cut across a bend of the river by a late raja of Patani, who wished at one stroke to shorten the journey from the interior to his capital, to bring more water into the river which reached the sea through his territory, and to deprive the governor of Nawnghchik of the revenue accruing to him through the passage of goods through his state. All of this the canal has performed satisfactorily,¹ and it is a good instance of what can be effected in engineering by sheer force of numbers of workmen, though, of course, no great difficulty had to be surmounted in its construction. It is about six miles long, broad enough for two house-boats to pass one another with some difficulty, and very fairly straight.

Bayu. A village of indigenous Siamese about two miles from Biserat, from which it is separated by a stretch of level ground and then by Bukit Bayu. The village is surrounded with large orchards, especially of durian trees, which prove most attractive to the giant squirrel, *Ratufa bicolor*, when in fruit. It is separated from a considerable Buddhist monastery by a winding lake which occupies the hollow at the base of the cliff, immediately below which the monastery buildings have been erected. The monks have charge of a cave a little above their residence in which, about a century ago, a Chinese governor of Senggora on tour through the Seven Provinces caused a colossal recumbent statue of Buddha to be built. Since then many other figures of

1. But the Siamese did not permit him to levy tolls at both ends of the canal, as he wished to do.



Bukit Tapang, from near Biserat.

inferior size, but still gigantic, have been set up round it, and the cave is regarded as being sacred by Malays and Siamese alike.

We paid several visits to Bayu to measure the people, who were of the Siamese type normal in Jalor, many of them having wavy hair. From the lake we obtained specimens of a freshwater sponge and a freshwater Polyzoon.

Bendang Stab. An important village, partly Chinese and partly Siamese, a full day's journey, going down stream, above Biserat. Its importance lies in the fact that it is the point of embarkation of the tin from the Jalor mines, with which it is in constant communication by means of elephants and pack buffaloes, which we did not see elsewhere in the Patani States. We made no collections at this place, but spent a very uncomfortable night, tormented by minute Acari, in a Chinese house in the village, on our way from Tanjong Luar to Biserat.

Kampong Jalor. This village, which is marked as Raja Jalor on some maps, was until recently the most important in the state, being the residence of the raja at a date when the Siamese rule was merely nominal. It is still a considerable Malay centre, and its most important feature is the raja's compound, in which there is a large *balei*, or audience hall, built of flimsy materials and now much dilapidated, and reported to have been constructed at the cost of \$40. It contains the raja's insignia, which consist of a large drum, made of a hollow palm-trunk, and a huge wickerwork torch-holder. The village itself is dirty and crowded, and its inhabitants, very few of whom are Siamese, are mostly opium-smokers, many of them being employed in connexion with the raja's elephants, and all elephant mahouts, it is commonly said, being addicted to this habit. Few, however, indulge to excess, the majority merely taking a pipe in the morning and another at night; it appears to do them little harm so long as they can get their two pipes a day, but if this is impossible for a single day they become very weak and miserable. The opium monopoly in the village was held at the time of our visit by a Chinaman who had married a Siamese woman notorious as a witch who kept familiar spirits. She had originally been married to a member of the raja's family, being the daughter of a Bangkok noble, but several husbands had divorced her in succession, because of her reputation in respect of black magic.

The country round Kampong Jalor resembles that round Biserat, from which it is some five miles distant, but the limestone hills are rather higher and occur in close proximity to granite outcrops, on which vegetation is extremely scanty. The mammalian fauna is richer, owing to the neighbourhood of extensive tracts of jungle, and a number of species were brought us by the Malays, who appeared to be rather better jungle men than in some parts of the

Patani States. Among these was the type of a new species of civet cat, *Paradoxurus minor*. We also obtained, chiefly from the same source, several interesting reptiles, including a new tortoise of considerable size, *Cyclemys annandalii*, and a new snake, *Dipsadomorphus pallidus*. As heavy rain fell during the greater part of our stay at Kampong Jalor, we were able to do very little collecting ourselves, but we were fully occupied in preserving the specimens brought to us and in anthropological work. With the rains came numerous wading birds, which had hitherto been absent or scarce, including several species of heron and at least two of stork. Vultures of two species were very abundant, and specimens were obtained of both. The Siamese Commissioner had caused a house to be built for us outside the village, but it had been erected on an abandoned rice-field on which dead cattle and dogs had formerly been cast out, and the remains of these, and of the animals we had skinned, proved most attractive to the vultures, which sat on the ground in rows, often too fully gorged to fly, within sight of our verandah.

As regards anthropology, we obtained a considerable series of anthropometrical data, but not so large a one as we desired, owing to a rumour, spread we know not how, that we were measuring people in order to enlist them against their will in the white men's army. A large collection of ethnographical specimens were made, and much information concerning native beliefs and customs obtained. The specimens included some very fine neoliths, which were preserved as charms against lightning and as hones for the artificial spurs which were formerly attached to the legs of fighting cocks but are now illegal.

We stayed at Kampong Jalor in October and November, 1901, arriving from Biserat, and starting from the former village for our trip to the Rhaman border. Between Biserat and Jalor there is a road which is fairly good in dry weather, except that most of the planks in the bridges spanning the numerous runnels of water which traverse it have been stolen; during the rains the road becomes mostly mud, though cattle and elephants are warned off it by means of elaborate signs, such as a model of the elephant hobbles used in the country, suspended across the track or from a pole set up at its side.

Mabek. A small community of Malays in the interior of Jalor, situated near the point where the fauna and flora commence to take on a true jungle character, which is practically absent, except on Bukit Besar, northwards towards the sea. We noticed a very marked difference between the fauna of this place and that of the country round Biserat, especially as regards the dragon flies, which were more numerous here than at any other collecting

station, in species and individuals. Among mammals, a gibbon was common, and we obtained a specimen of the monkey *Presbytes* (*Semnopithecus*) *femoralis*, which seemed to replace the common *P. obscurus*. Several specimens of the rare porcupine, *Hystrix grotei*, were brought us by the natives.

Our object in visiting Mabek was to meet a small tribe of Semangs, calling themselves Hami or 'Men,' whose Malay lord resided there. In this we were, so far, successful, for we saw and talked with five adults and obtained from them several interesting ethnographical specimens, as well as taking measurements and photographs of them, but their master was afraid that we intended to kidnap them and so hindered us from seeing as much of them as we desired. At the same time, he arranged that the people of the village should refuse to sell us supplies, so that we could obtain little to eat. The Hami are probably of purer Semang stock than the Semán of Upper Perak.

Petai. A small Malay village some miles north of Mabek. Here we spent a night on the way to Tanjong Luar, incidentally obtaining some curious information regarding the Malay belief in familiar spirits and witches.

Tanjong Luar. Tanjong Luar is a small Malay hamlet only separated by the Sungei Groh, a tributary of the Patani, from the Siamese community of Ban Kassôt; but as the Sungei Groh also forms the boundary between Jalor and Rhaman, the two hamlets, or rather quarters of the village, are in different states, Ban Kassôt being on the Rhaman and Kampong Tanjong Luar on the Jalor bank. The two together contain some fifteen to twenty houses, whose inhabitants, being too lazy to practice artificial irrigation, cultivate hill rice (which needs no such aid for its growth), maize and bananas in small clearings often some little distance from the village, living during part of the year in their plantations. The scenery in the surrounding country is magnificent. The bold outlines of the limestone hills, which are several times higher than those near Biserat, the whiteness of the exposed cliffs, and the luxuriance of the vegetation at their base afford a series of contrasts very grateful in Malaya. At one point a stream makes its way through a lofty tunnel in a marble crag, and the hills, if the natives' stories be true, are full of splendid caves. We were invited by the Luang Chin, or head of the Chinese community in Patani, to visit a tin mine which he owned in the neighbourhood, having first been warned of the precautions we must take not to scare away the tin spirit. In forming the mine, which is probably the most important in the Patani States, the side of a hill has been completely dug away, but the Luang Chin told us that it did not now pay to work it to its full capacity. He took us to see in the immediate neighbourhood a beautiful little valley at the entrance to which a pair of huge rocky pinnacles stood sentinel, strangely reminiscent of certain rocks in Switzerland, except that one

of them was partly covered with Cycads—a family of plants rarely seen in numbers in the Patani States.

The fauna at Tanjong Luar is that of the central region of the Peninsula, especially as regards the butterflies, the only animals of which we made collections there. They congregate in enormous numbers on the Sungei Groh, which is very muddy owing to the tin workings higher up, and often settle in patches a foot or more square upon the banks. The yellow, red and white species, such as *Appias nero*, *Terias* and several *Pierinae*, keeping, as a rule, densely crowded and confused together, while the more sombre *Euploeidae* and their allies remain separate, consorting with those *Papilioninae* which resemble them in coloration, and the large black members of this last family dart from place to place, settling to drink alone.

At the time of our visit the people of the Ban Kassôt were being decimated—eight adults out of about forty had died during the preceding month—by a disease which closely resembled rapid consumption in its symptoms, while the children, almost without exception, appeared to suffer from something very like tuberculosis of the intestine. The houses of the village were unusually small and close, and were built in a little hollow, shadowed by three mountains, where the sunshine barely reached. As the people themselves told us, they ‘dwelt in the path of the spirits,’ which were constantly passing from one hill to another. This, they agreed, was the cause of their sickness, from which the neighbouring hamlets appeared to be free; indeed, it was only here that we experienced in the Patani States any form of disease so rapidly or widely fatal as those frequently associated with the tropics, for cholera, plague and beri-beri, if they exist in the Division of the Seven Provinces, are very rare, while smallpox, though probably endemic in a mild variety, only becomes epidemic, virulent and awe-inspiring to the populace at intervals of several years.

We had visited Tanjong Luar in order to meet a tribe of Semangs, who were said at that time (November, 1901) to have taken up their abode for the rains in certain caves, for we had heard that their ‘herdsman’ or guardian was the Siamese *Nai-ban* of Ban Kassôt, and although we failed in this project, our three days’ journey from Kampong Jalor—much of it through flooded rice-fields in which the horse leeches were uncomfortably common—was richly rewarded by the acquisition of an authentic Semang calvaria, which we found lying at the base of a cliff where the rest of the body had been completely devoured by porcupines, and of an almost complete skeleton of the same race, procured for us from a cave, in which the corpse had become partially mummified, by the medicine-man, or *môr*, of the village. The *Nai-ban*, herdsman of



View at Nawngchik town, with Bukit Besar in the distance.

the 'Sakais,' and his friends allowed us to loot their houses in our search for ethnographical specimens, which we did with great satisfaction both to them and to ourselves, having some difficulty in persuading them to accept the remuneration that we considered fair, but they regarded as altogether extravagant. Altogether we spent nearly a week in this neighbourhood, where we had the opportunity of inspecting the preliminaries of an indigenous Siamese funeral, as well as obtaining some interesting specimens.

NAWNGCHIK

The state of Nawngchik lies between Jalor and the sea, marching with Patani to the East and with Tibaw on the other side. Its area is about a third greater than that of Patani. Seen from the flank of the mountain Bukit Besar, the greater part of the state is covered with low brushwood, and little thick jungle remains. The population in a few localities is, however, dense, and there are open plains on which a large number of cattle are pastured. We paid three visits to Nawngchik, staying for some weeks at a time on two occasions, and a considerable part of our zoological, anthropometrical and ethnographical data were obtained in the state, as the conditions were favourable in all cases.

Nawngchik town, called Tojan by the Malays, is situated on a branch of the Patani which was formerly the chief effluent of that river; it lies about two miles from the sea, and about six from Patani town, with which it is connected by a sandy track and a ferry. A wooden bridge also serves for foot-passengers across the Nawngchik River, but is too weak to support an elephant; the only vehicular traffic in the neighbourhood is conducted in Japanese 'rickshas, which have been introduced into Patani and are occasionally taken to the neighbouring places. The population of Nawngchik town cannot exceed two thousand, consisting very largely of indigenous Siamese, though there is a considerable Chinese element. The place is the headquarters of the governor, who is also recognised as *raja* or *phya*. Much of the surrounding country is waste ground, covered with short grass and clumps of bushes, among the roots of which the orchid, *Phalanopsis esmeraldae*¹, is very common and reaches a magnificent development, differing from most orchids in preferring to grow in almost pure sand.

We were detained at Nawngchik for about ten days in December, 1901, waiting for elephants to take our baggage to Senggora. There were extensive floods at that time in the neighbourhood, and we were forced at last to leave

1. Malay children in this district call it *haji naik kuda* (pilgrims on horseback), owing to the shape of the flowers, but its common name is *piang musang* (civet cat's banana), owing to a belief that civet cats eat the fruit.

in dug-outs, which took us and our belongings in a ditch to within a few miles of Anak Bukit (*q.v.*), where we obtained elephants and porters with considerable difficulty. During our enforced stay we occupied a pavilion used by the raja as a grand stand when bull-fights were in progress. We shared the place with a caretaker, who spent his time in breeding fighting fish—an illegal way of encouraging gambling. The only zoological specimens collected were birds, among which were examples of the Indian roller, not hitherto been recorded from the Malay Peninsula, though it is common enough in December in the coast region of the Patani States. The most important acquisition, however, was a series of native Siamese skulls, which were obtained from trees near the town, a recrudescence of 'tree-burial'—a primitive custom now officially obsolete and utterly illegal in Lower Siam—having recently taken place.

Kampung Anak Bukit. A small Malay and Siamese village, about ten miles from Nawngchik, which has become important as a government station and as the point where the telephone and telegraph lines from Patani to Senggora and to Jalor and Rhaman diverge. The scenery between this point and the Tibaw River is remarkable, reminding one of us of parts of Queensland. Immediately along the coast is a narrow belt more or less sparsely covered with casuarinas and *Pandani*; above this are wide plains, overgrown with coarse grass, which is usually low but occasionally grows as tall as a man, and, dividing the plains at intervals, stand straight rows of 'trap' trees which closely resemble the *ti* trees (*Melanoleuca*) of Australia, having conspicuous white bark (out of which the cattle-drovers of these parts sometimes make the walls of their houses) and small foliage not unlike that of a birch. Behind these plains thick jungle, abounding in palms, occurs. Anak Bukit means the 'child of the hill', and the village has gained a name from its proximity to Bukit Besar.

We stayed at Anak Bukit for a night on two occasions in 1901, passing through the village on others and collecting a certain number of birds and insects. On our first visit, in April, when the country was very parched, one of us found the remains of a freshwater sponge, which was suspended, high and dry, but full of gemmules, from the stem of a creeper overhanging the bed of a torrent.

Bukit Besar, the 'Great Hill,' also called Gunong Negiri, is a mountain approximately 3,500 feet high, on the borders of Nawngchik, Jalor and Tibaw. It is a very conspicuous feature in the landscape of the coast region, for it rises abruptly from the plain on three sides, being quite isolated except for a subsidiary range of no great height, with which it appears to be connected towards the west or north-west. Its formation is granitic, with

1. It is probable that this name is given to different trees in different parts of the Peninsula.



JUNGLE ON BUKIT BESAR, NAWNGCHIK.

stanniferous veins in the rock, and its flanks are strewn with large granite boulders. Towards the south it is very steep, with curious gaps and caverns, but the northern slope, with which we are best acquainted, is gradual. On this side a large area has been cleared, reaching as high as about a thousand feet, but most of it is now overgrown with secondary growth, and, above, the jungle is virgin, except for an old clearing, at about 2,500 feet, which was originally made by tin prospectors, but afterwards occupied as a place of retreat by the monks of a Buddhist monastery at Sai Kau.

This clearing, in which we stayed, is overgrown with long grass, brush-wood and wild bananas; the plate of jungle on Bukit Besar gives a good idea of the vegetation both in such deserted clearings and in the ancient jungle surrounding them, but the small trees in the foreground are durian trees, which the monks have planted. On the lower slopes of the mountain the trees are high, with slender trunks, which are usually almost free of epiphytes, though ferns and orchids abound on the tree-tops. Above 3,000 feet bamboo thickets are common, while about 300 feet below the peak a sudden and complete change takes place in the flora, the trees becoming low and stunted, and their trunks being wreathed in moss, lichen, ferns, orchids and other epiphytes, among which we were surprised not to see a single pitcher plant. The ground orchid, *Anectochilus*, is abundant among the undergrowth, growing where there is a thin layer of soil over rock, and the summits of some of the large boulders in the jungle are buried in ferns and in the foliage and blossoms of a white-flowered orchid belonging to the genus *Calanthe*. Comparatively few of the tree orchids have conspicuous flowers, but a certain number were very beautiful, while the large seed-vessels of others, which scattered an impalpable powder of seed at a touch, showed that the blossoms had not been small. Two forms of vegetation may be mentioned as being connected with the fauna in a very special way, viz., (1) the gingerworts and wild bananas, and (2) certain forest trees, the trunks of which are strengthened by the outgrowth of laterally projecting buttresses at their base. Occasionally these buttresses coalesce at their free extremity, thus forming cavities in which dead leaves and rain water collect, and when this occurs, a regular microcosmos is the result. Between the buttresses of one such tree, in the water or on its surface, the following species were taken:—the lizard, *Gonatodes affinis*, which sought shelter in the water when disturbed; the snake, *Tropidonotus chrysargus*, feeding on the spawn of the frog, *Ixalus horridus*; the water bug, *Rhagovelia insignis*, which covered the surface in a little cloud and was not seen on any pool or stream in the neighbourhood; the larva of a dragon fly; the pupa and adult of a Tipulid, and the larvae of several other Diptera and

beetles. Of these the frog is probably peculiar to this habitat, while the same is possibly true of the bug. The broad leaves of the gingerworts and bananas also have their peculiar fauna. Many species of insects—including the members of a peculiar Dipterous family (*Diopsidae*), which, in the Malay Peninsula at any rate, are rarely found apart from these plants—delight to run about on and to hover over their surface, and others conceal themselves during the day in the funnels formed by the young leaves; while the so-called flying gecko, *Ptychozoon homocephalum*, not infrequently chooses the lower surface of the adult leaves on which to lay its eggs.

The larger mammals are scarce on Bukit Besar, but we often heard the curious cry of the male serow, *Nemorhaedus swettenhami*—something between a bleat and a bark—and the still stranger call of the muntjac (*Cervulus muntjac*), which is a regular roar. One night our slumbers were disturbed by the yelping of a pack of hunting dogs (*Cyon*) and by the growls of a pair of tigers which wandered round our hut; while traces of the Malay bear (*Ursus malayanus*) and wild pig were abundant. Among rodents we took specimens of six kinds of squirrels, and saw a family of a seventh, namely the variable species, *Sciurus finlaysoni*. Of those actually collected, two, *Sc. robinsoni* and the ground squirrel, *Funambulus insignis jalorensis*, were new, and we also obtained two new rats, *Mus bukit* and *M. jalorensis*. The birds were neither numerous nor peculiar, though many of them had exquisite plumage; only a few, probably owing to the isolated position of Bukit Besar, belonged to the true mountain fauna of the Peninsula. The reptiles and frogs were mostly arboreal forms, and therefore difficult to collect or even see; but we obtained two new frogs, *Ixalus horridus* and *Rhacophorus robinsoni*, and some interesting lizards, including the peculiar horned species *Acanthosaurus armata*, and also *Dibamus novae-guineae*—the only representative of a family not hitherto recorded from the mainland of Asia. Insect life was rich, but not so rich as in 1899, which was a very much wetter¹ year; we had opportunities both of collecting and also of photographing and observing, under natural conditions, a number of interesting forms, including the marvellous flower mantis, *Hymenopus bicornis*, the white and pink 'varieties' of which were proved to be mere phases in the life history, as SHELFORD believes, while a third phase, of a pinkish coffee-colour, was noted in connection with the flower of a creeper. We were not so fortunate as to obtain specimens of the *Peripatus* discovered on Bukit Besar by the 'Skeat' expedition.

1. It is possible that the annual rainfall in the Patani States is fairly uniform, but that its distribution through the months differs considerably from year to year. In 1899 there was almost daily rain between April and the end of what would be the summer in Europe. In 1901, a more or less sustained drought prevailed during this period in the plains, while thunderstorms were less numerous and violent on the hills. Neither year was considered extraordinary by the natives, who expect a heavy rainfall and high winds in the latter end of November, in December and January, and a short period of calm, dry weather in March and the beginning of April.

We lived on the mountain, for three weeks in April and May and a fortnight in August and September, in a little hut of branches and palm leaves, tied together with the stems of creepers, which our coolies practically built for us in the course of about two hours, and we had also a photographic dark room, constructed over a clear mountain stream, and a stage for drying specimens erected in the clearing. But for the dampness, due rather to a fine mist, which the sun never wholly dissipated, than to rain, for consequent attacks of violent toothache, for the parasite to which one of us has already alluded, and for land leeches, which were most unpleasantly abundant, we were very comfortable, as the Malays of Sai Kau brought us up provisions, which they sold to the cook for ridiculously small prices, almost every other day. They also brought little bamboo tubes full of specimens which they had collected during the ascent, and Siamese pig-hunters often visited us with similar wares, so that we saw a good deal of the natives even on the mountain. So far as we could discover, there are now no aborigines living on Bukit Besar, though it is quite possible that the stories of spirits with which our men were regaled on their return to the plains were due to the presence of some particular shy and retiring tribe, which may or may not be extinct.

Ban Sai Kau, sometimes called Kampong Pasir Putih by the Malays (both names meaning 'the village of white sand'), is a large village, or rather collection of hamlets, with about six hundred inhabitants, and lies immediately below Bukit Besar. The population is almost equally divided between Malays and Siamese, the two 'peoples' here, as in Jalor, being more accurately described as the followers of Buddha and Mahommed respectively. They do not, however, occupy the same hamlets, for every small group of houses is hidden in a grove of cocoanut and areca palms and other fruit trees, and separated by extensive rice-fields from its neighbours. Many cattle and buffaloes are also pastured in the neighbourhood, and the people, though very poor, are well able to live in comfort on the products of their fields, orchards and poultry, the sale of their cattle, many of which are sent over into Perak and Kedah, providing them with such luxuries as they desire. In type they differ somewhat from the Malayo-Siamese of Jalor, the common occurrence among them of wavy hair, a dark complexion and a very broad nose probably pointing to Semang blood, while it is possible that there has been less mixture with Chinamen or true Siamese. Their customs and education are very primitive, though Malay boys are invariably taught to read the Koran—often without understanding what they read—in Arabic, and we found that the majority of them could not count above ten, so that a purely concrete system of decimal arithmetic had to be used in our monetary

dealings, every ten cents being placed by itself in a little heap, and the different heaps being again combined in tens to form dollars. An interesting feature of their culture was the fact that they displayed a far greater tendency, possibly inherited from Semang ancestors, to decorate bamboo articles with engraved patterns than their Malayo-Siamese neighbours, though their patterns were of a more regular and elaborate character than those common among the wild tribes of the Peninsula. Their cloth, on the other hand, was very coarse, only three kinds of dye—the bark of the jack-fruit tree (*Artocarpus integrifolia*), the wood of a species of acacia and an indigo—being at all commonly employed, and checks being the only type of pattern as a rule attempted. Unlike most of the Malayo-Siamese, however, they grew a preportion of the cotton they used, and many of their spindles and other implements were finely carved, while the stands of their cotton-winders were often ornamented in a very tasteful way with a combination of carving and painting in simple colours. The everyday language of Mahommedans, as well as Buddhists, was a dialect of Siamese, but all the older Mahommedan men, and most of the younger ones, could also speak Malay.

The country round Sai Kau is not particularly interesting, except towards the mountain, and the greater part of our work there was anthropological. We obtained large ethnographical collections during the two visits we paid, one in May, when we stayed for about a week, and one in September, when our sojourn was rather longer. A number of people were measured, photographs were taken and two skeletons of murdered persons were procured, for it is not very difficult to carry off the remains of those whose violent death has caused their ghosts, which follow the remains, to be a menace to the neighbours.

JHERING

The state of Jhering lies between Patani and Telubin, which we did not visit, and the most direct route from the interior of Rhaman to the coast runs through it. Although its area is considerably larger than that of Patani, the proportion inhabited is very much smaller, for the interior of the country, according to all accounts, consists chiefly of swamps and morasses, in which the Jambu River, which appears to have been at one time connected with the Patani, now loses itself. The population is chiefly Malay, being almost entirely occupied in fishing and salting fish, but we heard persistent rumours of the existence of a large Siamese village, peopled by the descendants of former invaders, and the rajas of the state are of true Siamese origin, though now Mahommedans.

*Jambu.*¹ The capital of Jhering was probably the most thoroughly Malay place we visited in the Malay Peninsula, for it was of sufficient size, on the one hand, to be something of a centre for local traffic, and too insignificant, on the other, to be attractive even to Chinese traders, while Siamese influence appeared in 1901 less obvious than in other places in the Patani States. It is probable, from what one of us heard in Patani in 1902, that considerable external changes have since taken place in the town. In the summer of the previous year the place certainly had not more than 2,000 inhabitants, the great majority of whom were Malays, and the only building of any solidity was the mosque, which betrayed strong traces of Chinese design. A number of Malay rajas had houses in the town, for the place enjoyed the reputation of being very healthy, probably on account of the sea breezes which reach it through the odoriferous casuarina woods; but these 'palaces' were built for the most part of bamboo and palm thatch, though the size of some of them was considerable. One, assigned to us as a lodging, belonged to the Raja Mudah of Rhaman, at that date (June, 1901) a fugitive from justice, and was extremely commodious and cool, our quarters consisting of a large central hall, a room of the same width at the entrance for our followers, and a bedroom behind for ourselves. There was a well of good water inside the house, and the only objection to the place, according to the Malays, was that it was haunted by a spirit.

The surrounding country consists partly of barren, sandy stretches, partly of mangrove swamps, the latter following the course of the river, which is little more than a tidal creek, and of the many channels into which it breaks up at its mouth. The town lies about a mile and a half from the sea, and six miles by road from Patani.

More extensive traces of the old pagan religion of the Malays exist in this neighbourhood than at any other point on the coast which we visited, and the worship of spirits is carried on quite openly, whereas it is usually concealed. The custom of 'casting away sickness' on little models of ships is especially rife, and we were told that a few years ago, when an epidemic of smallpox raged throughout the Patani States, many children who were attacked by the disease were set adrift on rafts, in order that they might carry it away with them out to sea.

We spent ten days at Jambu, originally visiting it in search of health, as we were never well in Patani, probably because of the bad water supply. Much of our time was occupied in watching the habits of the 'walking fishes'

1. The name has been given the town on account of the large numbers of cashew nuts which flourish in the sandy soil of the neighbourhood, for this fruit, as well as the rose-apple, is called *jambu* in the Patani dialect of Malay.

(*Periophthalmus* and *Boleophthalmus*) on the mud flats exposed at low tide. An interesting series of these truly amphibious forms was obtained, and a number of the specimens have been found by Mr. J. JOHNSTONE to belong to a new species, which he has named *Periophthalmus phya*. A few ethnographical specimens were obtained, as well as the skeleton of a murdered Malay.

Cape Patani is a narrow sand spit, ranging in breadth from nearly a mile to a hundred yards or less, which stretches out to sea for ten miles from the south bank of the Jambu estuary. Its southern beach is exposed to the open sea (the Gulf of Siam), while it protects Pantani Roads to the north, at the same time rendering them liable to be silted up.

No greater contrast could be imagined than that between the jungle on Bukit Besar and the vegetation on Cape Patani, for here we have no tropical luxuriance, except in the tiny thickets which surround the pools of water that well up in the broader parts through the sand, but either woods as open as those on the South Coast of England, or scenes as parched and dry as the sun-stricken deserts of Somaliland. In the casuarina woods, with their lawn-like glades, gnarled tree-trunks and absence of undergrowth or epiphytes, there is little to tell the eye that one is not in a northern pine-forest, while in the sandy wastes round the villages, so hot that a European cannot walk barefoot on the sand at midday, the hedges of spurge, *Pandanus* and prickly pear¹ recall a country far other than Malaya.

As will be readily understood, the fauna of such a locality is peculiar and impoverished, though large numbers of cattle and sheep are pastured in the woods. Mammals, except otters and the two common monkeys, *Presbytes obscurus* and *Macacus fascicularis*, are rare; we heard stories of an enormous red rat which lived among the hedges, but saw neither it nor the civet cat which inhabits the woods; squirrels especially are scarce. Of birds, several woodpeckers are common, and a little black-and-white tit is particularly characteristic; the place of sea birds is largely taken by the fishing eagles, hawks and ospreys which nest in the highest casuarina trees, swarming on the beach wherever fishing operations are in progress. Towards the point, however, terns (*Sterna sinensis* and at least one other species) are fairly numerous, as is also a cormorant indistinguishable, except by its small size, from the common British species, while at the time of our visit (September and October, 1901), enormous numbers of plovers and sandpipers had just arrived on migration. The Malays who lived in the fishing villages on the Cape told us that, a little later, a bird they called *burong lah* paid them a visit of a few days in large flocks, and was captured for food with nets and snares. Their

1. Of course introduced; a species of *Opuntia* is now not uncommon in the dryer parts of Malaya.



View in the Casuarina Woods on Cape Patani.

description of its appearance and habits answered exactly to *Pitta cyanoptera*, which a Patani man later picked out from the whole collection in the Selangor State Museum as the *burong lab*, though this species is known at Jalor as *burong pachat*; but they said that there were two kinds of *burong lab*, one a little larger than the other, which did not travel together.

The insects in this locality are mostly small and inconspicuous, and there are few other invertebrates except marine forms. Among these we took, on the beach, an Opisthobranch mollusc so closely resembling a seed which commonly germinates in sea water that only a very close examination revealed its true nature. Indeed, one of us, some argument having arisen about these seeds, actually lifted the animal up under the impression that it was one of them.

The people living on Cape Patani are all Malays, who appeared to differ considerably, especially as regards their narrow faces, from any others we met with on the East Coast. Unfortunately, they were unwilling to be measured, and we only secured a very small series of physical data; their hair was straight. The nature of the soil makes agriculture impossible for them, but their cattle are valuable for export overland to Perak. The sheep are chiefly kept to be sacrificed at the shrine of 'Toh Panjang,' a Mahommedan saint, whose legend has been told by Mr. W. W. SKEAT in his *Fables and Folk-tales from an Eastern Forest*.

There are several little fishing villages on the sand-spit, of which Kampong Datoh, the seat of the shrine, and Kampong Tanjong Budi are the most important. We stayed at the latter for some days, being literally driven to it by the mosquitoes, which rendered life a misery in the camp we had established at the edge of the woods on the other side of the Cape. It is difficult, without seeming exaggeration, to give any idea of their numbers, and the only consolations we had regarding them were that their presence was to some extent compensated for by the absence of another plague, namely land leeches, and that they included few or no specimens of the malaria-bearing genus *Anopheles*, which appears to have a very local distribution in the Malay Peninsula.

KEDAH

Our only personal knowledge of this state was obtained during a hurried three days' journey through it from Senggora to Alor Stah, where we stayed one night. We were able, however, to verify one important geographical fact bearing on the question of the high level fauna of the Peninsula, which differs so completely, at any rate as far as the birds are concerned, from the fauna of the plains. There is a very distinct break in

the main range in Central Kedah, for in crossing from Senggora we neither ascended higher than a few hundred feet above sea level, nor did we see a single high mountain in the vicinity of the track. This fact is interesting, because it has frequently been taken for granted that the mountain fauna of Perak, which is not found much below 3,000 feet, has a continuous distribution with that of the mountains of Northern India, to which it is so nearly related; whereas it is evident, in the light of this observation, that no such exact relationship can exist at the present day, unless, as seems improbable, the mountain forms are in the habit of migrating across intermediate tracts of level ground. In short, it seems that the Malay Peninsula, as our whole collection has served to confirm, is connected with India, as regards zoogeography, in a degree not much more intimate than that which links it to Borneo, though many mainland forms peculiar to the plains have made their way south across the Isthmus of Kra. The discovery of an elephant, known from the Upper Siwalik beds, also in Nawngchik,¹ affords definite evidence that the Isthmus existed as long ago as late Pliocene or early Pleistocene times, and it is more probable that land has sunk beneath the sea in this region than that it has risen since the modern fauna came into existence.²

The part of Kedah through which we passed was almost covered entirely with secondary jungle of no great age; ancient forest did not exist, and villages were few and far between. We noted what appeared to be an abrupt change in the population as we passed into the state, the coarse, rather flat-faced type, common on the East Coast, giving place largely to one with far more refined and delicate features, resembling those of the people of South Perak. The track across the Peninsula at this latitude has largely fallen into disrepair, but is still good at many points.

Alor Stah. The modern capital of Kedah is situated some miles up the Kedah River from the West Coast of the Peninsula. Though it has not more than half-a-dozen European residents, it closely resembles Penang or Singapore in outward appearance, having handsome public buildings and private residences, a large Chinese and a large Indian quarter. We saw, however, during a walk through the town, at least one shop devoted entirely to the manufacture and sale of the *kris*, a weapon which is rapidly becoming obsolete in most parts of the Peninsula and is, of course, typically Malay. A daily steamboat service exists between Alor Stah and Penang, and there is a large export trade in cattle, poultry and fish, among the last being rice-field Silurids, which can be carried alive for long distances in wooden tubs with very little water and a cover to prevent their escape.

1. C. W. Andrews, *Fascic. Malay.—Zoology*, Part II, p. 305.

2. Fossils of marine origin were found in Central Patalung by Mr. W. W. Skeat and myself in 1899, which Professor McKenny Hughes (*Report Brit. Assoc.*, 1901, p. 414) regards as being of late Carboniferous or Permian-Carboniferous age. N.A.

- EXPLANATION OF THE MAP

THE map illustrating *Fasciculi Malayenses* has been prepared by the Edinburgh Geographical Institute from the latest surveys of the Malay Peninsula, to which we have added the positions, as nearly as it was possible to do so, of certain villages in South Perak and the Patani States. We are also responsible for the location of the jungle tribes as indicated. With regard to spelling, we have chiefly followed that of the large map published by STAMFORD for the Straits Branch of the Royal Asiatic Society, but have attempted to standardize such common geographical terms as *tanjong* (Cape), and in a few instances, such as that of 'Senggora,' we have returned to an earlier form that seems to give a more accurate rendering of the Malay name. For adding an *h* at the beginning of such words as *hulu*, we can plead no such excuse, but only the custom of Malay writers and scholars. Especially in the Patani States, it is often impossible to render native names with any degree of accuracy, but we have thought it best to follow a simple mode of spelling in such cases, even though it is phonetically inexact, rather than to adopt the somewhat complicated symbols used by Mr. W. W. SKEAT in transliterated local names in this and the adjacent districts.¹

The expenses in connexion with the map have been defrayed out of a further grant of £100, made by the University of Edinburgh from the Earl of Moray Fund, towards the publication of our Reports.

ERRATA

For *Malayensis* (heading) *lege*, *Malayenses*.

For Lampan *lege*, Lampam.

For Nwangchik *lege*, Nawngchik.

MAP OF CENTRAL SECTION OF MALAY PENINSULA

SPECIALLY PREPARED FROM LATEST SURVEYS AND FROM DATA BY N. ANNANDALE AND H. C. ROBINSON TO ILLUSTRATE "FASCICULI MALAYENSIS"



FASCICULI MALAYENSES

MAMMALS

BY

J. LEWIS BONHOTE, M.A., F.Z.S.

F.M., Zoology, pt I, October 1903.



INTRODUCTORY NOTE

ALTHOUGH from so rich a region, it will be seen that our collection of mammals embraces only some sixty-four species, of which several are represented by unique specimens. This is, perhaps, to be explained by the fact that I was only able to devote a small proportion of my time to this group, and also because we were not successful in securing the assistance of natives who were good jungle men. From time to time we set a very large number of traps, but found that the animals, when captured, were frequently either removed by small carnivores or else spoilt as specimens by ants. An efficient trap which will capture small mammals alive has, apparently, yet to be invented. In the districts visited by us I have little doubt, from my own observation, that there are a considerable number of small insectivores, shrews and the like, as well as a great variety of rats and mice, which can only be obtained by the merest accident by a collector who is not prepared to spend the great proportion of his time on the group. The Chiropterous fauna, too, must be very extensive, and I may mention that in the limestone caves near Kuala Lumpur I obtained, in one morning, twelve species, including the rare *Eonycteris spelaea*, which number could doubtless be increased by systematic collecting.

I have added to Mr. BONHOTE's paper certain field-notes made by Mr. ANNANDALE or myself, which are distinguished by being placed between inverted commas.

A complete set of all species obtained, including the types of new species, has been deposited in the National Collection.

HERBERT C. ROBINSON.

REPORT ON THE MAMMALS

By J. LEWIS BONHOTE, M.A., F.Z.S.

THE mammal collection brought home by Messrs. ROBINSON and ANNANDALE has, perhaps, tended more to our knowledge of the fauna of the Malay Peninsula than any other collection from that district which has reached this country of late years. This has not alone been due to the fact that the present material has been procured on the modern system, accurate measurements being taken, and the skulls carefully preserved apart from the skins, but also because during the last four or five years the 'Skeat' Expedition and the collections of Mr. LYLE in Siam proper, as well as large collections received in America from Dr. W. L. ABBOTT, had, while adding many facts, opened up many interesting points, several of which this collection has enabled us to solve. The result is that, although much still remains to be done, the mammalian fauna of the Malayan area is as well, or even better, known than that of any other part of the Oriental region.

The present collection contains some sixty-four species, of which eight are described as new. The connexion between the Malayan and Bornean fauna is shown, apart from species previously noticed as having representative forms in both localities, by the discovery of a cat, closely related to *Felis badia*, and a small squirrel, related to *S. lowii*, which I have named after Mr. ROBINSON. A species of *Rhinolophus* allied to, but quite distinct from, *R. affinis* is described; this species has been known for some time, but was considered as referable to *R. rouxi*, Temm., which, however, is shown not to be the case. It will probably, eventually, be found to occur in Borneo, as Mr. MILLER has already described another form of it from one of the islands in the S. China Sea, under the name *R. spadix*.

Four species of *Mus* are among the novelties; one, *Mus annandalei*, is a very distinct species, especially in its cranial characters, while of the other three two belong to the *Mus rattus* group, and one is allied to *Mus jerdoni*. Owing to the large number of species already described from this part of the world, the working out of these rats necessitated a very careful examination, as far as was possible, of the whole of the rats of the Oriental region, the results

of which are incorporated in the present paper, and will, I trust, prove of use to future workers. I must here record my thanks to Mr. GERRITT S. MILLER, of the National Museum at Washington, who very kindly sent me over a series of topotypes of several of his recently described species, which have been of the greatest assistance.

Two rare species of bats, whose occurrence on the Peninsula was doubtful, have been procured, viz., *Cynopterus ecaudatus* and *Nycteris javanica*, and also several specimens of Mr. MILLER's recently described *Emballonura peninsularis*.

Several fine adult skulls and skins of the porcupine *Hystrix grotei*, GRAY, hitherto only known from the type, a young specimen, were brought back. They are apparently of the same species as that recorded by me in the 'Skeat' collection as *H. yunnanensis*, which is probably identical with GRAY's species. *Nemorboedus swettenhami* proves to be a good form distinct from *N. sumatrensis*, and a revision of the *Tragulidae*, partly brought about by the series in this collection, has already been published. In addition to the actual specimens, the collectors have made some very interesting field-notes on the habits and distribution of several species, which will be found under those species to which they refer; among other points, a difference in the habits of *Sciurus vittatus* and *S. nigrovittatus*, which are now proved to be perfectly distinct species, is noted, and a curious difference between the habits of the former species on the East and West Coasts is pointed out. The distribution of species on either side of the Peninsula seems likely to be a matter of considerable interest, but at present our knowledge is too limited for any definite statements to be made; as a rule, the species on either coast appear to be much the same, but their distribution is different; in the case of *Funambulus insignis*, however, the Eastern form differs from that found on the West Coast. It has been found that LINNAEUS' name of *cynomolgus*, for the common macaque could no longer stand, as it applies to an African monkey, probably a baboon, and in consequence, RAFFLES' name of *fascicularis* has been used. Mr. MILLER has been followed in the use of the generic name *Presbytes* instead of that of *Semnopithecus*, in accordance with the laws of priority.

It only remains for me to tender my best thanks to Mr. OLDFIELD THOMAS, who has so greatly helped me with his advice and opinion on the difficult points which arose during the writing of this paper.

Hylobates sp. (?)

'We never actually saw a gibbon except doubtfully, at a great distance, on Bukit Besar, but we frequently heard them near Mabek, and judging from the noise they made they must have been very abundant on the hills round the Semangko Pass on the Perak Pahang boundary.'

'In Upper Perak it is believed by the Malays that different species of gibbon inhabit the two banks of the Perak River, and this belief is, to some extent, born out by the cries heard by myself (see *Anthropology*, part I, p. 1). I was surprised to see a gibbon, a white individual (*H. lar*, LINN.), among the mangrove swamps at the mouth of the Trang River; possibly it had escaped from captivity, as in the Malay Peninsula the genus *Hylobates* is usually confined to hilly ground covered with bamboos or dense jungle. The Siamese of Trang believe that all gibbons are females, being the other sex of the lôtung (*Presbytes*), which, they say, is always male.'—N.A.

Macacus nemestrinus (Linn.)

'The "broh" is frequently met with in captivity in the Patani States, but it is doubtful if it occurs wild in the districts we visited. It is often trained, especially by the Siamese, to pluck the nuts from the cocoanut palms, and captive specimens occasionally attain a very large size, but are apt, when full grown, to become morose and savage.

'This monkey is not uncommon near the villages of Upper Perak, and I believe that I have seen at least one troop in South Perak, at Gedong. It is captured in large numbers at Malacca, and is abundant on the outskirts of the town of Singapore, especially in the grounds of a Mahommedan shrine near the Tanjong Pagar docks.'—N.A.

Macacus sp. (?)

'In a patch of jungle, not far from Biserat, I came across a very large species allied to the preceding. I had only a light collecting gun with me and No. 12 shot, so I was unable to secure it, but as it was very leisurely in its movements I had an excellent view of it. In general colour it resembled *M. nemestrinus*, but excelled in size the largest specimen I have seen of that species, and possessed a very marked ruff of almost white hair round its face. The tail was very short, not more than about three inches in length.'

1. Macacus fascicularis (Raffles)

Simia fascicularis, Raffles, *Trans. Linn. Soc.* XIII, p. 246 (1822).

Macacus cynomolgus (Linn.), Blyth, *Cat.* p. 9; *id.* *Mamm. Birds Burma*, p. 7; Anderson, *An. Zool. Res.* p. 73 (1879); Flower, *P.Z.S.* 1900, p. 316; Bonhote, *loc. cit.* p. 872; and of authors generally.

a. ♂.	Patani.	2nd June, 1901.
b. ♀ ad.	Biserat, Jalor.	16th July, 1901.
c, d. ♀ ad., ♂ jr.	Biserat, Jalor.	16th July, 1901, and 20th July, 1901.
e. ♂.	State of Nawngchik.	17th September, 1901.
f, g. 2 ♂ imm.	Ban Sai Kau (captive spms.).	

This series shows a considerable amount of variation, the male from Nawngchik belonging to the rufous coloured variety (*M. aureus*), which colour is also approached by two specimens from Biserat ; the remainder are of various shades, all belonging to the commoner greenish-brown type.

The skull of one of the females from Biserat shows certain conspicuous differences in the teeth, also in the general build of the skull and size of the bullae. It may possibly be specifically distinct, but much more evidence bearing on the point is required before a definite opinion can be pronounced.

For many years this species has been known under the name of *M. cynomolgus* (LINN.), a name which should, unfortunately, no longer be used for it, as it undoubtedly belongs to an African species, probably a baboon. Nor is the name *M. cynomolgus* (BUFFON nec LINN.), as used by BLANFORD, available, as this species, renamed *M. irus* by CUVIER, was founded on what BUFFON considered to be *M. angolensis major*, REY, but which CUVIER shows to be a different species from Senegal, intermediate between the Guenons and Baboons. There is, therefore, no choice but to fall back on RAFFLES' species, which is well described, leaving little doubt as to the animal intended.

'The "kra," "krah," or "kerah," as it is variously called in different parts of the Peninsula, was common in all districts on the East Coast visited by us. It was specially numerous among the mangroves of the tidal creeks near Jambu, and was also not uncommon at Biserat, where specimens were obtained as they came to feed on the young Indian corn in a newly-made jungle clearing. In South Perak, where monkeys of all species are scarce, possibly owing to the presence of a large aboriginal population, we did not meet with it, but it was abundant in the vicinity of Kuala Lumpur, Selangor.

'Contrary to the experience of many naturalists we found the "kra" very wary, more especially upon the sea coast, where it was found impossible to obtain specimens without the expenditure of a quite disproportionate amount of time. It is frequently to be seen upon the ground walking with a peculiar stride and holding the tail parallel to the general line of the body. When the tide is low it often frequents the mud banks in search of crustaceans, etc., retreating to the mangroves when disturbed and chattering defiance at the intruder at a safe distance. The alarm-note is a rattle-like cry, from which the vernacular name is possibly derived. When young they are very commonly captured for pets by the natives, and one or two may generally be seen beneath the houses in almost every village, but it is very rare to see a really adult male in captivity, as they become very vicious on approaching maturity. Younger specimens seem, as a rule, much more ferruginous in colour than the older ones.

'We had three specimens of this species in captivity for some time, all of which had been taken from their mothers when too young to fend for themselves. Our Malays attempted to teach these monkeys, after they had reached a considerable size, to climb trees and bring down fruit, but we were surprised to find that not one of them was able to make the initial leap by means of which a wild "kra" negotiates the bare trunk of a tree below where the branches originate. Once they were lifted to the first branch they seemed thoroughly at home, but they appeared to have no idea how to commence climbing a tree. It is conceivable that this deficiency may have been partly a physical one, due to disuse of the hind limb in captivity, but we see no reason to regard this as being the case, believing rather that the inability was simply due to lack of education on the part of the monkeys, which had never been taught to climb by their parents. If this is so, it is a point of great interest in animal psychology. It may be well to note in the same connexion that we found that while young kittens of *Felis bengalensis* were able to swim perfectly well before their eyes were open, young Malay otters (*Lutra cinerea*), at the same stage, merely floundered about in a quite ineffectual manner when placed in a basin of water, and sank almost immediately.'

Macacus sp. (?)

'We had in our possession, for some months, a female of a species allied to the preceding, which was said to have been captured on the Patani River. Unfortunately, it died and its body was thrown into the river by one of the servants. It appeared to us to differ from the common form in having a much rounder head and a totally different facial expression, which it is difficult to put into words; in addition, it possessed a small crest, which was formed by the hair radiating from a circular whorl on the top of the head, and it was evident that when full grown it would have been a much smaller animal. We were inclined to regard this specimen as a representative of a species taking the place of *M. fascicularis* in the thickly-wooded central region of the Peninsula, very much as *Presbytes femoralis* probably takes the place of *P. obscurus*. Near Bendang Stah we saw several large families in the trees on the banks of the Patani River, that appeared to belong to the same variety as our captive specimen.'

2. Presbytes obscurus¹ (Reid)

Semnopithecus obscurus, Reid, *P.Z.S.* 1837, p. 14; Flower, *op. cit.* 1900, p. 317; Bonhote, *op. cit.* p. 872.

1. I have followed Mr. Miller (*Proc. U.S. Nat. Mus.*, XXVI, p. 477 (1903)) in using *Presbytes*, Esch., Kotzebue's Entdeck. Reise, III, p. 196 (1821), instead of the well-known *Semnopithecus*, Cuv. Dents. Mamm., pp. 14, 247 (1825).

<i>a, b, c.</i>	♂, ♀ skl., juv. in alc.	Tanjong Patani.	10th June, 1901.
<i>d-h.</i>	♂, 4 ♀.	Tanjong Patani.	1st October, 1901, 30th September, 1901.
<i>i.</i>	♂ jr.	Ban Sai Kau, Nawngchik.	18th September, 1901.
<i>k.</i>	♂	Tenebong, Jalor.	11th August, 1901.

A very typical series showing no variation. The immature specimen is just losing the first yellow pelage which is only left on the hind-quarters and tail. Over the rest of the body the hairs are of a uniform greyish-black, the light patch on the occiput being hardly distinguishable.

‘The lôtung is very generally distributed over those parts of the Peninsula that we visited, with the exception of South Perak. Near Biserat it was very abundant on the craggy limestone hills in the vicinity, where it was practically inaccessible, but it never approached the village. Among the casuarinas on Tanjong Patani it was abundant and tame, keeping in troops of one old male with five or six females and young; these old males are said by the natives to be frequently very savage and even to attack small children. In habits it is much more arboreal than the “krä,” and we never saw one of them on the ground. Judging from two specimens obtained the young must be born about February or March (at the end of the stormy season), and until they are about one-third grown are of a beautiful golden-yellow colour, with fur of a soft and silky texture.

‘When driven on to an isolated tree these monkeys would ascend the trunk as high as they could, and then strive to conceal themselves by pressing their bodies as closely as possible against the trunk or some large branch, under which circumstances it was very difficult to make them out exactly. At Tanjong Patani the food of those specimens which we examined had consisted entirely of the young shoots of the casuarina.

‘A curious change has taken place in the habits of this species at Biserat within the last two years. When ANNANDALE was there in 1899 as a member of the ‘Skeat’ Expedition, it was common among the fruit trees of the village, into which one or more families came down from the hills nearly every day. The natives deny that it ever does so now. The reason for the change is probably that the houses of Biserat have recently been separated from one another by a broad roadway. Possibly also the large numbers of Siamese and Chinamen now settled there may have something to do with the disappearance of the lôtung from the village, for these two races, unlike the Malays, eat the flesh of the monkey, believing that it has strong tonic qualities, especially for pregnant women. We noticed that while *P. obscurus* was extremely wary in the interior, it was comparatively tame in the neighbourhood of the purely Malay fishing villages on the coast.’

3. Presbytes femoralis (Martin)

Semnopithecus femoralis, Martin, *Charlesworth's Mag. N.H.* ii, p. 436 (1838);
Flower, P.Z.S. 1900, p. 318.

Semnopithecus siamensis, Müller and Schlegel, *Verbandl.* p. 60 (1841);
Anderson, An. Zool. Res., p. 37 (1879).

a. ♀ imm. Mabek, Jalor. 27th July, 1901.

There can be no doubt that this specimen belongs to the same species as that referred to in the description of *S. femoralis*. As to whether *S. femoralis* and *S. albocinereus* are one and the same species or not is a matter which cannot at present be satisfactorily settled. The typical *femoralis* is quite distinct from the typical *albocinereus*, but apparently intermediate forms may occur.

S. siamensis of MÜLLER should apparently stand as a synonym of *S. femoralis*, and according to the original description, MÜLLER's type was a dark coloured monkey and not 'clear ashy grey' as stated by ANDERSON. The original type locality of *S. femoralis* is Sumatra, so that further series may well prove it to be distinct from *siamensis*.

'I know nothing of this species except that it probably replaces the foregoing in the denser jungle towards the centre of the Peninsula, where it appears to be well known to the natives under the name of 'kaka.' It is extraordinarily agile and shy, and the one troop that we saw kept to the tops of the loftier trees in a patch of thick jungle near Mabek. *Semnopithecus* were very abundant, but I think that all that we saw between Mabek and Biserat belonged to *S. obscurus*.'

Presbytes sp. (?)

On Bukit Besar ANNANDALE saw a large brown monkey with an entirely black face and a very long tail; it was not improbably *S. maurus*.

4. Nycticebus tardigradus (Linn.)

Lemur tardigradus, Linn. *Syst. Nat.* 1, p. 44 (1766).

Nycticebus tardigradus (LINN.), *Blanf. Faun. Brit. Ind., Mamm.*, p. 45 (1888);
Flower, P.Z.S. 1900, p. 321; *Bonhote, op. cit.* p. 873.

a. ♂ ad. Jambu, Jhering. 7th June, 1901.

b. ♀ ad. Biserat, Jalor. 18th October, 1901.

Both these individuals belong to the variety described by Mr. BLANFORD as *N. bengalensis* (GEOFFR.)

'In Perak and Selangor this species is known as 'kongkang,' in the East Coast States of Patani and Jalor as 'nilong,' and in Jalor also as 'krä duku.' Around it many native superstitions centre, and the presence of a specimen on a fishing boat is believed to ensure a favourable wind. We never met with the species ourselves, the specimens in the collection having been brought in by the natives.'

5. *Felis pardus*, Linn.

Felis pardus, *Linn. Syst. Nat.* 1, p. 61 (1766); *Flower, P.Z.S.* 1900, p. 323.

a. Skull. Tanjong Luar, Borders of Rhaman and Jalor. November, 1901.

6. *Felis* sp. (?)

There is a single specimen of a young cat from Ban Sai Kau on the 21st May, 1901. The whole of the upper parts are of a dull rusty-red, the under parts white, spotted with black. Although it is impossible to make a definite statement on this single immature individual, it appears to belong to a species most nearly allied to *Felis badia* of Borneo, of which it is possibly the mainland form.

'The specimen commented on above was brought to us by the natives and kept alive for some days. It was of a very savage disposition, and escaping from its cage was killed in process of recapture. The species appears to be well-known to the villagers of the neighbourhood of Bukit Besar, who describe the adult as being of a uniform bright red, and in size "as big as a dog." The smaller jungle cats are known collectively as "rimau akar"—creeper cats.'

***Felis bengalensis*, Kerr**

'We obtained three kittens only a few days old at Kampong Jalor, which may probably be referred to this species.'

7. *Viverra zibetha*, Linn.

Viverra zibetha, *Linn. Syst. Nat.* 1, p. 65 (1766); *Flower, P.Z.S.* 1900, p. 327; *Bonhote, op. cit.* p. 873.

a. ♀ imm. Kampong Jalor. 28th October, 1901.

Precisely similar to the specimen brought home by the 'Skeat' Expedition, and described in my paper quoted above.

There are also three specimens of a very young *Viverra*, procured at Mabek, on the 28th July, 1901, which I would also refer to this species.

They are of a uniform dark-brown colour, and the tail is indistinctly ringed with white, which is most easily seen on the under surface. The large white mark across the throat is plain and conspicuous, but the other two light transverse bands are only faintly visible. The anterior one is dull but uniform in colour, while the posterior one is pure white but somewhat irregular and broken up. The under parts are slightly lighter in tone at the bases of the limbs. Above, the hair on the anterior surface of the ear is conspicuously lighter, but, apart from this, no other markings are easily seen. By close inspection, however, the light markings on the side of the neck may be made out and also traces of light markings on the flanks.

8. *Viverricula malaccensis* (Gmel.)

Viverra malaccensis (Gmel.), *Linn. Syst. Nat.* 1, p. 92 (1788).

Viverricula malaccensis (Gmel.), *Flower, P.Z.S.* 1900, p. 328.

♂ ad. skull. Patani. 15th June, 1901.

‘The above specimen, which was brought to us in too decomposed a state to preserve the skin, was greyish-brown in coloration, with black lateral stripes and ill-defined side stripes on the belly. Tail with greyish-brown and white bands and a broad white tip, the white bands broader than the others.

The vernacular name is *musang bulan* (moon civet), and immature specimens are very frequently seen in captivity, becoming very tame and following their owners about the village.’

9. *Paradoxurus minor* sp. nov.

General appearance of *P. niger*, but only half the size. Colour above, pale fulvous, showing on the back five longitudinal black stripes, of which the two outer ones tend to break up into spots. These stripes converge anteriorly to form one broad black stripe, which arises from the crown of the head, slightly anterior to the ears. Across the forehead the hairs have white tips, giving it a grizzled appearance, while the muzzle, limbs, and under part of the throat are very dark brown. There is a small white crescent below, and slightly anterior to the eye, and a few irregular white spots on the chin. The remainder of the under parts are of a dull brownish-grey, while the flanks show a few irregular black spots. The tail is black throughout its length, with the exception of the terminal three or four inches which are of a dirty white. The hairs throughout the tail have light coloured bases which are most conspicuous at its roots, while the light hairs on the body have dark ash-coloured bases.

The skull, which, except for its size is that of a typical paradoxure, most nearly resembles one marked *P. typus* in the National Collection. The edge of the bony palate is hardly posterior to the posterior angle of the last molar. The audital bullae are placed wide apart and are more rounded on the inferior surface. In other respects, however, the skull hardly differs from that of most species of the genus.

Dimensions (measured in the flesh). Head and body, 450 mm.; Tail, 460 mm.; Hind foot, 64 mm.; Ear, 39 mm.

Skull. Greatest length, 96 mm.; Length of palate, from 43 mm.; Zygomatic breadth, 53 mm.; Breadth of palate, between canines, 10 mm.; Between inner roots of carnassials, 14 mm.; Greatest width of brain-case, 32 mm.

Habitat. State of Jalor (Kampong Jalor), Malay Peninsula.

Type. ♀ adult, collected on the 3rd November, 1901, by Messrs. H. C. ROBINSON and N. ANNANDALE.

The small size of this paradoxure will be quite sufficient to enable it to be at once distinguished from any of the other species known to inhabit the Peninsula. There is a second skull that agrees with that of the type in all respects.

10. *Paradoxurus hermaphroditus*, Schreb.

Paradoxurus hermaphroditus, *Schreb. Sauge*, p. 346 (1778); *Flower, P.Z.S.* 1900, p. 329; *Bonhote, op. cit.* p. 873.

a. ♀ ad. Kampong Jalor. 13th November, 1901.

b. ♀ imm. Kampong Jalor. 29th October, 1901.

In both of these examples the ground colour is very light, and the three dark dorsal stripes clearly cut and well marked.

11. *Paradoxurus* sp. (?)

a. ♂ juv. Near Ban Sai Kau, Nawngchik. 12th September, 1901.

The above specimen, which is very young, is uniform brownish-grey throughout, except for the head and face which are whitish, especially that portion immediately anterior to the ears. The two fore feet and tail are also white; the ears and a small patch over the anterior half of the eye, dark brown. I am not able, from the material available, to make out its specific identity.

'This specimen was found by our Malays in a nest in a hollow tree, and was said to be the young of a species of which the vernacular name is *Musang tagalung*, and which lives largely on fish. In appearance it closely resembles a specimen associated with an adult *Paradoxurus leucomystax* in the Selangor State Museum, Kuala Lumpur.'

12. *Putorius nudipes*, F. Cuv.

Putorius nudipes, F. Cuv. *Mamm.* III, p. 149 (1823); *Flower, P.Z.S.* 1900, p. 334.

a. ♂. Kuala Lumpur, Selangor. April, 1902.

13. *Lutra cinerea*, Illiger

Lutra cinerea, Illiger, *Abb. Akad. Berl.* 1811, p. 99; *Flower, P.Z.S.* 1900, p. 334; *Bonbote, op. cit.* p. 874.

a. ♀. ad. Ban Sai Kau, Nawngchik. 25th May, 1901.

b. ♀. imm. Biserat, Jalor. 13th July, 1901.

Measurements in flesh of the adult:—Head and body, 445 mm.; Tail, 273 mm.; Hind foot, 85 mm.; Ear, 10 mm.

'Otters, probably of more than one species, are common in the Patani States, both high up the rivers, in estuarine waters, and even in Patani Bay, the coast form attaining a very large size. The people of the fishing village of Tanjong Budi, on Patani Bay, told us that the species was polygamous, and that the old dog otter always endeavoured to destroy the male pups, the usual number of a litter being four. It was very abundant in this locality, and was often to be seen along the edge of the mangroves at low tide, or swimming in the waters of the bay. Travelling down the Patani River, above Biserat, in very rainy weather, we surprised a party of four on a shingle bank, who sat up on their hind legs and watched us, rubbing their faces with their paws. Native name, *Brang brang*, or *Anjing ayer* (water dog).'

14. *Ursus malayanus*, Raffles

Ursus malayanus, Raffles, *Trans. Linn. Soc.* XIII, p. 254 (1822); *Flower, P.Z.S.* 1900, p. 335.

One skin (purchased from natives). Ban Sai Kau, Nawngchik.

'From what we heard the sun-bear was by no means uncommon on the slopes of Bukit Besar, and, on one or two occasions, we came upon fallen tree trunks which had been pulled to pieces in the search for honey and grubs. The species has usually the reputation of being harmless and inoffensive, but in the Patani States, at any rate, it is considered "more wicked than the tiger."'

'In the mountains of South Perak we obtained, through the Sakais, the skull and bones of a very old male, which seems to have attained an exceptional size, but from native testimony (and Malays have a keen zoological instinct) it seems very probable that another species remains to be discovered in the Peninsula, which is perfectly well-known to the natives as the 'bruang bukit' (mountain bear),¹ and which lacks the yellowish-white on muzzle, paws, and breast, which is so characteristic a feature in *Ursus malayanus*.

'By some Malay systematists *Nycticebus* is considered a bear, just as for some occult reason the gibbons are classed as squirrels.'

***Cyon rutilans*, S. Mûll.**

'Near Jarum, in the north-west of Rhaman, I disturbed a pack of either five or six hunting dogs, which were resting at mid-day under a large tree, in the centre of an open space overgrown with long grass, and surrounded with thick jungle. The dogs walked off quite slowly into the jungle, at a distance of not more than thirty yards in front of me, and, as I heard from a man who followed me, returned very shortly to continue their siesta under the tree. They were absolutely silent, a fact on which my Malay followers congratulated themselves, it being considered most unlucky, in fact, a certain omen of death, to meet the *srîgâla* (as the Malays call it), if it barks. So far as I could see, the body, head, and limbs of the individuals of this pack were of an almost uniform bright rufous, the hair being rather longer than that of the Malay pariah, but closely resembling that of the Sakai domestic dog; while the tail, which was carried hanging down, was almost entirely black and moderately bushy. The head was held erect, and the animals walked high on their feet. The Malays of Rhaman state that there are two species of *srîgâla* not uncommon in the Jarum district, the larger and redder species—that which I saw—being called *srîgâla bukit* (mountain jackal), and not venturing near the villages, though it always goes about in packs; while the smaller variety, which may very well be a true jackal, goes solitary or in pairs, and frequently steals sickly lambs, kids, or calves. In Nawngchik and Jalor the same two species are said by the natives to occur, coming down in early spring into the plains near the villages.'—N. A.

'On Bukit Besar, on a bright moonlight night at the end of April, we were disturbed, towards dawn, by a hideous yelping and yelling, probably produced by a large pack of hunting dogs. It passed along close to our hut and then came to a standstill, continuing for some time, some distance away in the jungle; and on several succeeding occasions we heard the sound about the

1. In Hulu Rhaman this hypothetical bear, without the pale markings on the breast, but with spectacled eyes, is known as *bruang anjing* (dog bear) as distinct from the common species, *bruang orang* (man bear), which it is said to exceed in size.—N. A.

same time of night, or rather early morning. The Malays hold the same belief with regard to the urine of the *śrīgāla* as that held by the Ghonds and other Indian tribes regarding that of the dhole (*Cyon rutilans*), viz., that it causes blindness, and that the dogs make use of this quality by urinating against the trunks of trees on which their prey is likely to rub itself.'

15. *Tupaia belangeri* (Wagn.)

Cladobates belangeri, *Wagner, Schreb. Saugth. Suppl.* 11, p. 42 (1841).

Tupaia belangeri (Wagner), *Bonhote, P.Z.S.* 1900, p. 192.

a. ♀ ad. Biserat, Jalor. 4th July, 1901.

T. ferruginea is the southern form of this species and, judging by recent collections, it does not appear to go very far north.

16. *Tupaia malaccana*, Anders.

Tupaia malaccana, *Anders. Zool. Res. Yunnan.*, p. 134 (1879).

Tupaia javanica, *Horsf., Flower, P.Z.S.* 1900, p. 336.

a. ♂ ad. Telôm, Perak-Pahang boundary, alt. 4000'. 25th January, 1902.

17. *Crocidura murina* (Linn.)

Sorex murinus, *Linn. Syst. Nat.* 1, p. 74 (1766).

Crocidura murina (Linn.), *Flower, P.Z.S.* 1900, p. 337; *Bonhote, loc. cit.* p. 874.

a. ♀ ad. Alor Stah, Kedah. 17th December, 1901.

Although perfectly adult this is a small specimen, being about the same size as the one noted by BLANFORD (*Faun. Brit. Ind. Mamm.*, p. 235 (1888)). The measurements in the flesh were as follows:—Head and body, 97 mm.; Tail, 55 mm.; Hind foot, 18 mm.; Ear, 8 mm.

'It is probable that this musk shrew is an introduction into the Peninsula, and not an indigene. We never met with it in the Patani States, though it is not a mammal that is likely to escape notice, and if it occurs at all it must be decidedly rare and local. On the other hand, it was extremely common at Kuala Lumpur, where I saw several specimens which were captured under the houses, and it is well-known both in Penang and Singapore. The specimen in the collection was captured by one of our men on the curb of a well in the early morning; it appeared to be quite blind, as it actually ran over his foot. The eyes were very small and almost unpigmented.'

18. *Crocidura fuliginosa* (Blyth)

Sorex fuliginosus, *Blyth, J. A. S. B.* xxiv, p. 362 (1856).

1 ♀ spm. in alc. Biserat, Jalor. 19th July, 1901.

Measurements in the flesh:—Head and body, 74 mm.; Tail, 63.5 mm.; Hind foot, 15 mm.; Ear, 9 mm.

‘The single specimen obtained was found caught by the tail in one of our rat traps, near the entrance of a limestone cave in fairly thick jungle.’

19. *Pteropus vampyrus* (Linn.)

Vespertilio vampyrus, *Linn. Syst. Nat.* 1, p. 31 (1758).

Pteropus edulis (Geoffr.), *Flower, P.Z.S.* 1900, p. 339.

Pteropus vampyrus (Linn.), *Bonhote, P.Z.S.* 1900, p. 875.

a. ♀ ad. Patani. 15th June, 1901.

b-c. ♀ ad. Biserat, Jalor. July, 1901

f. ♂. Kampong Bayu, nr. Biserat. 9th July, 1901.

‘This big fruit bat, or *kluang*, the largest of all the Chiroptera, is very common in every locality in the Peninsula visited by us. Just before sunset, especially in the fruit season, flights of them are to be seen making their way to the nearest orchard, where they commit great depredations. The line of flight is very direct and usually at a great height, and appears curiously deliberate and raven-like, though the pace at which they travel is really considerable. We noticed them in immense numbers in the estuary of the Klang River, and they were also very numerous on Bukit Besar during our second visit in September, 1901. Some Siamese eat them readily, though no Malay would touch them.’

20. *Cynopterus sphinx* (Vahl)

Vespertilio sphinx, *Vahl, Scrivten af Naturhistorie-Selskabet* 4te Bind, 1ste Heft p. 123 (1797).

Cynopterus marginatus (Geoffr.), *Flower, P.Z.S.* 1900, p. 349; *Bonhote, loc. cit.* p. 875.

♀. Patani. 17th June, 1901.

2 ♀. Biserat, Jalor. 7th July, 1901.

Several specimens in alcohol from Biserat and from the Batang Padang district, South Perak.

‘Very common in the houses wherever we went. The specimen from Patani was shot hanging to the under surface of the mid-rib of a cocoanut palm.’

21. Cynopterus ecaudatus (Temm.)

Pachysoma ecaudatum, Temm. *Mon. Mamm.* 11, p. 94 (1839).

Megaera ecaudata, Temm. *Mon. Mamm.* 11, p. 359 (1841).

Megaerops ecaudatus (Temm.), Matschie, *Megachir. Berl. Museum*, p. 79 (1899).

Cynopterus ecaudatus (Temm.), Dobs. *Cat. Chir. Brit. Mus.* p. 87 (1878).

a. ♀ ad. in alc. Bidor, South Perak. January, 1902.

Very few specimens of this rare bat have hitherto been obtained. The type was procured at Padang, Sumatra, and the remaining few examples known (with the exception of the present one) have all come from Borneo. This species differs from the other members of the genus *Cynopterus* by having only two incisors in the lower jaw.

Measurements of the above specimen:—Head and body, 78 mm.; Forearm, 53 mm.

The total absence of the tail, the long nostrils, short muzzle, and presence of but two incisors in the lower jaw, enable this species to be easily recognized.

‘Shot under the eaves of the rest-house, Bidor.’

22. Macroglossus minimus (Geoffr.)

Pteropus minimus, Geoffr., *Ann. Mus.* xv, p. 97 (1810).

Carponycteris minima (Geoffr.), Flower, *P.Z.S.* 1900, p. 341.

Kiodotus minimus (Geoffr.), Bonhote, *P.Z.S.* 1900, p. 875.

a. ♀ ad. Patani. 22nd April, 1901.

23. Rhinolophus affinis, Horsf.

Rhinolophus affinis, Horsfield, *Zool. Res. Java* (1824); Miller, *Proc. Acad. Nat. Sci. Philad.* 1898, p. 319; Flower, *P.Z.S.* 1900, p. 342.

1 spm. in alc. Biserat, Jalor. 16th July, 1901.

The forearm of this specimen measures exactly 50 mm.

24. Rhinolophus malayanus, sp. nov.

Nearly allied to *R. affinis*, Horsf., but much smaller, only slightly exceeding *R. minor*, Horsf., in size.

Ears sharply pointed, and when laid forward reach to the extremity of the muzzle. The outer margin is concave immediately below the tip, and then slightly convex and separated from a large antitragus by a deep notch.

The horseshoe, which is moderately broad and sharply cleft in front, is large enough just to conceal the nostril anteriorly. Sella of moderate width, the erect transverse portion being of equal width throughout its length and

slightly narrower than the horizontal part. The connecting process behind the sella hardly rises above the vertical part of the same and is rounded off. The posterior leaf is of moderate size, the tip elongate, and the margins slightly concave. Lower lip with three vertical grooves. Wing membranes from the ankles; interfemoral membrane nearly straight; only the extreme tip of the tail projects.

Fur moderately long, sepia brown above, lighter beneath.

Dimensions of type.—Head and body, 46 mm.; Tail, 20 mm.; Forearm, 41 mm.; Ear (from base of antitragus to tip), 14 mm.; Tibia, 16 mm.; Greatest width of horseshoe, 8 mm.; Length from tip of posterior leaf to anterior edge of horseshoe, 13 mm.; Total expanse, 227 mm.

Habitat. Biserat, Jalor.

Type. Adult female in spirit collected on the 8th August, 1901.

There are some specimens in the British Museum collected by Signor L. FEA in the Karin Hills, Burmah, and recorded by THOMAS,¹ under the name *R. affinis rouxi*² (TEMME.) These specimens, though slightly larger and somewhat more rufous in body colour, belong undoubtedly to the species just described, or are, at most, only subspecifically distinct. As regards the name *rouxi*, TEMMINCK states that it is a bat similar in all respects to *R. affinis*, and gives the length of the forearm as '1 ponce, 10 lignes,' or 50 mm. HORSEFIELD'S type from Java has a forearm of 49.5 mm.; there can, therefore, be little doubt that TEMMINCK'S *rouxi* is a synonym of *affinis*.

The present species may be at once distinguished from *R. affinis* by its smaller size, and from *R. minor* by the shape of the connecting process between the sella and the posterior leaf, which, in this latter species, ends in a point well above the vertical portion of the sella.

Rhinolophus spadix, Mill. (Proc. Wash. Acad. Sci. III, p. 136 (1901)) from Sirhassen Id. is closely allied to this species.

25. *Rhinolophus minor*, Horsf.

Rhinolophus minor, Horsfield, Zool. Res. Java (1824); Flower, P.Z.S. 1900, p. 342.

2 spms. in alc. Biserat, Jalor. 8th August, 1901.

26. *Hipposiderus armiger*, (Hodgs.)

Rhinolophus armiger, Hodgson, J. A. S. B. IV, p. 699 (1835).

Hipposiderus armiger (Hodgs.), Flower, P.Z.S. 1900, p. 342; Bonhote, loc. cit., p. 875.

a. ad. Biserat, Jalor.

1. Thomas, *Viaggio di Leonardo Fea*, p. 15, Genoa, 1892.

2. Temminck, *Mon. Mamm.* II, p. 306 (1835).

27. *Hipposiderus larvatus* (Horsf.)

Rhinolophus larvatus, *Horsfield, Zool. Res. Java* (1824).

Hipposiderus larvatus (Horsf.), *Miller, Proc. Acad. Nat. Sci. Philad.* 1898, p. 319; *Flower, P.Z.S.* 1900, p. 343.

1 spm. in alc. Biserat, Jalor. 10th August, 1901.

28. *Hipposiderus bicolor* (Temm.)

Rhinolophus bicolor, *Temminck, Mon. Mamm.* 11, p. 18 (1835-41).

Hipposiderus bicolor (Temm.), *Flower, P.Z.S.* 1900, p. 343.

4 spms. in alc. Biserat, Jalor. 10th August, 1901.

29. *Nycteris javanica*, Dobs.

Nycteris javanica, *Dobs. Mon. As. Chir.*, p. 81 (1876); *id. Cat. Chir. Brit. Mus.*, p. 164 (1878); *Flower, P.Z.S.* 1900, p. 345.

1 spm. in alc., imm. Biserat, Jalor. August, 1901.

The occurrence of this specimen confirms BLYTH's statement that the species is found in the Peninsula.

30. *Scotophilus castaneus*¹ (Horsf.)

Nycticejus castaneus, *Horsf. Cat. Mamm. E. Ind. Coll.*, p. 38 (1851).

Scotophilus castaneus (Horsf.), *Bonhote, P.Z.S.* 1900, p. 192.

a, b. 2 ♀. Patani. 22nd April, 1901.

c, d. 2 imm. Patani. 2nd June, 1901.

10 spms. in alc. Biserat, Jalor. June, 1901.

I have previously noted the differences between the present species and *S. kubli*, and this series entirely bears out my former notes. As regards coloration, it is not strictly accurate to state that the under parts are not lighter, for although, as a rule, the colour is very uniform, some specimens are decidedly paler below. The general colour also varies from smoky-brown to bright chestnut.

I can find no description of this bat by GRAY, and it is certainly not in the 'Illustrations of Indian Zoology,' which has been quoted by several authors as containing the original description of the species. It is very closely allied to, if indeed it be not identical with, *S. temminckii* (Horsf.) from Java, but owing to paucity of material the matter cannot be decided at present.

'We found this bat to be the common house bat of the Eastern Malay States. It was exceedingly abundant in the roofs of the houses at Patani, and the specimens from Biserat were obtained in the hollow of the flagstaff facing the government offices.'

1. For an account of the parasites, taken on this and other bats, see Dr. Speiser's subsequent paper on the Diptera Pupipara.

31. Myotis muricola (Gray)

Vespertilio muricola, Gray, *Nat. Mamm. Nepaul. and Thibet*, p. 4 (1846);
Flower, P.Z.S. 1900, p. 347; *Bonhote, loc. cit.* p. 876.

Myotis muricola (Hodgson), *Miller, Proc. Acad. Nat. Sci. Philad.* 1898, p. 321.

1 spm. in alc. Bukit Besar, Nawngchik, 2500'. 1st September, 1901.

'This species was not uncommon on Bukit Besar, especially during our second visit in August and September. It appeared in great numbers in the half-hour preceding sunset, flying very much in the manner of the common British serotine. In the jungle it was frequently to be seen up to about 10 a.m., but during the daytime it retired to the young rolled-up leaves of musaceous and zingiberaceous plants, from which the individual recorded above was obtained.'

32. Emballonura peninsularis, Miller

Emballonura peninsularis, *Miller, Proc. Acad. Nat. Sci. Philad.* 1898, p. 328.

4 spms. in alc. Jeram Kawan, South Perak. 15th February, 1902.

As these specimens are practically topotypes¹ of Mr. MILLER's species, I have placed them under that name. According to Mr. MILLER, it is most nearly allied to *E. monticola*, Temm., from Java.

33. Taphozous longimanus, Hardwicke

Taphozous longimanus, *Hardwicke, Trans. Linn. Soc.* xiv, p. 535 (1823);
Flower, P.Z.S. 1900, p. 349.

a, b. ♂. Biserat, Jalor. 15th July, 1901.

'A cave species.'

Petaurista nitida, Desm.

'We were disappointed at not securing any specimen of flying squirrel, all the species of which are very largely nocturnal in their habits; one of a uniform foxy-red, which may be supposed to belong to this species, was shot at Sungkei, but stuck in the fork of a tree and could not be retrieved.'

34. Ratufa bicolor (Sparrm)

Sciurus bicolor, *Sparrm. Götheb. Vet. Svensk. Handl.* 1, p. 70 (1778).

Ratufa bicolor (Sparrm.), *Flower, P.Z.S.* 1900, p. 354; *Bonhote, Ann. Mag. Nat. Hist.* (7) vol. v, 1900, p. 493; *Id. P.Z.S.* 1900, p. 876.

Ratufa melanopepla, *Miller, Proc. Wash. Acad. Sci.* ii, p. 71 (1900).

a-c. ♂. Neighbourhood of Biserat, Jalor. July and August, 1901.

1. Jeram Kawan is, however, over two hundred miles from Trang, the type locality of the species. *Edd.*

I have very carefully compared these specimens with a series in the Museum from Java and Sumatra, as well as with a paratype of Mr. MILLER's *R. melanopepla*. Mr. MILLER states (*loc. cit.*) that *R. melanopepla* differs from true *R. bicolor* 'in the clear black of the upper parts,' which is by no means a constant feature, and I can match these individuals exactly with Javan specimens. Nevertheless, from what we already know of the variability of members of this group, I should not be surprised that, on comparison with a large series from Java, the Malay form should turn out to be distinct.

'Although only a few specimens were obtained, this giant squirrel, which is known locally as *Grabok*, is fairly common in Jalor, in the neighbourhood of Biserat, where it usually frequents the jungle, keeping to the topmost branches of lofty trees and taking a very heavy charge of shot to bring down. When the fruit is ripe it is often to be found in the orchards surrounding the villages, being like nearly all animals, from the tiger downwards, exceedingly fond of durians. In no instance did we observe any specimen of the fawn-coloured forms on the Eastern side of the Peninsula, although one or two were noticed in the high jungle near Sungkei, South Perak.'

35. *Sciurus hippurus*, Is. Geoffr.

Sciurus hippurus, Is. Geoffr. *Etudes Zool.* No. 6 pl. 6 (1832); *Anders. Zool. Res. Yunnan*, p. 241 (1879); *Flower, P.Z.S.* 1900, p. 356.

a. ♀ ad. Sungkei, South Perak. 10th February, 1902.

The occurrence of *S. hippurus* and *S. erythraeus* in the Peninsula proves the former to be a distinct species, and not merely the southern representative of the latter, as has been suggested.

'This was the only specimen seen, and was shot running along a fallen tree in deep jungle.'

36. *Sciurus erythraeus*, Pall.

Sciurus erythraeus, Pallas, *Glires*, p. 337 (1778); *Flower, P.Z.S.* 1900, p. 356; *Bonhote, loc. cit.*, p. 877; *id. Ann. Mag. Nat. Hist.* (7) III, p. 161 (1901).

a. ♂. Gunung Semangko, borders of Pahang and Selangor, alt. 4000'. 10th May, 1902.

The further occurrence of this species in the Malay Peninsula renders it certain that its range extends considerably further south than was formerly supposed, but possibly it is confined to the hills. In appearance this specimen most nearly approaches *S. erythraeus typicus* from Assam; the red tail is, however, lacking, being alternately ringed with black and rufous, and the rufous is more strongly developed on the head than elsewhere.

'From the fact that the only two specimens known from the Malay Peninsula have both been procured at altitudes exceeding 4000', it is, I should say, almost certain that the species in this region is a purely mountain form. Parallel instances occur among the birds, for such species as *Mesia argenteauris*, *Siva sordidior*, and *Brbinga remifer*, all forms of an Himalayan facies, are rarely, if ever, seen below an altitude of 3000'.'

***Sciurus finlaysoni*, Horsf.**

'On Bukit Besar Mr. ANNANDALE saw a party of four individuals of a species about the size of *S. concolor*, one of which was pure white, while the others were bright foxy-red. Afterwards, at the base of the hill, we examined two specimens in the possession of the Siamese magistrate of the district. One of these was bright red, but the other was pure white, with the iris pink, and the nails and skin devoid of pigment—in fact, the specimen was undoubtedly an albino.'

As a rule, white specimens of this species are not albinos, having black eyes and very dark nails.

37. *Sciurus concolor*, Blyth

Sciurus concolor, Blyth, *J. A. S. B.* xxiv, p. 274 (1855); Bonhote, *Ann. Mag. Nat. Hist.* (7) vii, p. 272 (1901).

Sciurus caniceps, Gray, *Flower, P.Z.S.* 1900, p. 356; Bonhote, *loc. cit.*, p. 877.

<i>a.</i>	♀.	Patani.	16th June, 1901.
<i>b, c.</i>	♂, ♀.	Patani.	16th and 19th June, 1901.
<i>d-h.</i>	♂, ♂.	Biserat, Jalor.	July, 1901.
<i>i-m.</i>	♀, ♀ imm.	Biserat, Jalor.	July, 1901.
<i>n.</i>	♀.	Biserat, Jalor.	10th August, 1901.
<i>o-p.</i>	♂ imm.	Biserat, Jalor.	October, 1901.
<i>q.</i>	♂.	Anak Bukit, Nawngchik.	25th April, 1901.
<i>r.</i>	♀.	Bukit Besar, do. 2500'.	2nd September, 1901.
<i>s-v.</i>	♂ imm.	Ban Sai Kau, Nawngchik.	September, 1901.
<i>w.</i>	♀.	Ban Sai Kau, Nawngchik.	19th May, 1901.
<i>x.</i>	♂.	Kuala Lumpur, Selangor.	October, 1900.

This series shows very little variation; most of the specimens are in their dullest pelage, but in a few the brown colour of the back is much more intense, though the annulations on the hairs are always plainly visible. The brightest specimens are all females, which would, therefore, appear to keep in their bright dress later than the males. The young are dull in colour, resembling their parents in their duller pelage.

'This species is emphatically the village squirrel of the Patani States, and it is very exceptionable to find it otherwise than in the immediate proximity of dwellings. It is exceedingly abundant in the cocoanut groves and orchards, and commits great ravages among the fruit, being particularly destructive to the jack fruit or *nangka* (*Artocarpus integrifolia*). It is commonly seen on the trees in the early morning, up till about 9 a.m., and after about 4 p.m., and in the heat of the day remains hidden in the crowns of the palms, where it also forms nests similar to the *drey* of the British species. In South Perak, if it occurs, it must be very rare, and we never saw a specimen, but in the neighbourhood of Kuala Lumpur it, or a closely allied species, is fairly abundant. An entirely black variety was seen at Biserat on several occasions.'

Mr. ANNANDALE also notes :—'On the upper reaches of the Patani River, the village squirrel was an almost uniformly grey species. A grey species very similar in appearance extended also, as far as I could see, from Lampam, in Patalung, to Trang, though it was absent, or very rare, in the Jarum district and in Upper Perak.'

38. *Sciurus maclellandi leucotis* (Temm.)

Tamias leucotis, *Temminck, Zool. sur la côte de Guinée*, p. 252 (1853).

Sciurus maclellandi, (Horsf.) *Flower, P.Z.S.* 1900, p. 357.

Sciurus maclellandi leucotis, *Bonbote, Ann. Mag. Nat. Hist.* (7) v, p. 53 (1900).

a-c. 2 ♂, ♀. Telôm, Perak-Pahang boundary, alt. 4000'. January, 1902.

d, e. ♂, ♀. Semangko Pass, Selangor, alt. 2700'. 10th May, 1902.

'This beautiful little species was not met with on the Eastern side of the Peninsula. In Perak and Selangor it is certainly a mountain form, and I do not think that it occurs much below 3000'. It was very common at Telôm, and was also very abundant on the mountains round the Semangko Pass. It is very largely an insectivorous species, and seems to keep chiefly to the trunk and main branches of the trees, running along them with its tail pressed close against the bark.'

39. *Sciurus tenuis surdus*, Miller

Sciurus tenuis surdus, *Mill. Proc. Wash. Acad. Sci.* 11, p. 80 (1900).

Sciurus tenuis, (Horsf.) *Flower, P.Z.S.* 1900, p. 357; *Bonbote, loc. cit.*, p. 878.

a-d. ♂, 3 ♀. Bukit Besar, Nawngchik, 2500'. May, 1901.

e-g. ♂. Bukit Besar, Nawngchik, 2500'. 26th August and 1st September.

h, i. ♀. Bukit Besar, Nawngchik, 2500'. 31st August and 1st September.

k, l. juv. Bukit Besar, Nawngchik, 2500'. 27th August.

m-q. 4 ♂, ♀. Telôm, Perak-Pahang boundary, alt. 4000'. January, 1902.

r. ♂. Semangko Pass, Selangor, alt. 2700'. 13th May, 1902.

I have assigned Mr. MILLER's name to these specimens as they are certainly somewhat duller than specimens from further south. At the same time, there are, in the British Museum, some bright specimens from Perak, so that the difference would appear to me to be rather individual than geographical or seasonal, but much larger series than I have at my disposal would be required before pronouncing a definite opinion.

'This is also a jungle species, and, as far as our observation goes, is not found in low country; wherever found it appears to be abundant, its habits being very similar to those of the preceding species. On Bukit Besar, in August, a nest was found in a clump of birds-nest fern growing on a tree-trunk some forty feet above the ground. The nest consisted of a globular chamber some four or five inches in diameter, and was lined with fine black vegetable fibre. It was approached by a slanting tunnel, and contained either two or three young ones, which were nearly half-grown.'

40. *Sciurus prevosti humei*, Bonh.

Sciurus prevosti humei, Bonhote, *Ann. Mag. Nat. Hist.* (7) VII, p. 170 (1901).
Sciurus prevosti, (Desm.) *Flower, P.Z.S.* 1900, p. 358.

a. ♂ ad. Sungkei, South Perak. 9th February, 1902.

A very typical example of the Malay race.

'A pair were shot for us by the Malay Pengghulu of Sungkei, who was a keen naturalist, and to whom we were indebted for much assistance in the way of collecting. Large numbers are always on sale in the bazaars of Singapore, but appear principally to belong to the Sumatran race.'

41. *Sciurus vittatus*, Raffles

(Plate IV, fig. 7)

Sciurus vittatus, Raffles, *Trans. Linn. Soc.* XIII, p. 259 (1822).
Sciurus notatus, (Bodd.) *Flower, P.Z.S.* 1900, p. 358; Bonhote, *loc. cit.*, p. 878.
Sciurus notatus miniatus, Mill. *Proc. Wash. Acad. Sci.* II, p. 79 (1900).
Sciurus vittatus typicus, Bonhote, *Ann. Mag. Nat. Hist.* (7) VII, p. 447 (1901).

<i>a.</i>	♀.	Bukit Besar, Nawngchik, 2500'.	7th May, 1901.
<i>b.</i>	♂.	Bukit Besar, Nawngchik, 2500'.	26th August, 1901.
<i>c.</i>	♂.	Jambu, Jhering.	7th June, 1901.
<i>d-g.</i>	♂, 3 ♀.	Gedong, Batang Padang, South Perak.	January, 1902.
<i>h, i.</i>	♀.	Sungkei, Batang Padang, South Perak.	7th and 8th February, 1902.
<i>k.</i>	♀.	Kuala Lumpur, Selangor.	27th October, 1900.

This series shows hardly any variation; the colour of the under parts is practically the same in all the specimens, the difference, if there be any, is a tendency among those from the Eastern States (Jalor and Jhering) to become

slightly lighter. Referring to a note¹ of Messrs. STONE and REHN in a recent paper on the red tip to the tail, this is not a *conspicuous* feature in the individuals of the present series, but the annulations of the hairs of the tip are red, although the colour does not spread throughout the whole length of the hair.

'The habits of this squirrel in different parts of its range are of considerable interest; in Perak, and also in Selangor, it is the common village squirrel, being abundant actually within the town of Kuala Lumpur, and also frequenting low country jungle, though it was not found by us at any elevation on the Western side of the Peninsula. On the East Coast, on the other hand, we never met with it near a village, nor, with a single exception, which was shot among the casuarinas on the sea-coast, did we come across it, except at a considerable elevation on Bukit Besar, where, together with the succeeding species, it was very common, though difficult to secure, as it only appeared for a short time in the early morning and late afternoon, and then kept to the highest branches of lofty jungle trees.

'Mr. ANNANDALE further notes that in Upper Perak squirrels were not numerous, and the only specimens seen belonged to the present form, which was the dominant species in the Jarum district of Rhaman, and occurred commonly in the villages, at least as far east as Betong.'

42. *Sciurus nigrovittatus*, Horsf.

(Plate IV, fig. 6)

Sciurus nigrovittatus, Horsfield, *Zool. Res. Java* (1824); Bonhote, *Ann. Mag. Nat. Hist.* (7) VII, p. 452 (1901).

Sciurus notatus, (Bodd.) Flower, *P.Z.S.* 1900, p. 358; Bonhote, *op. cit.*, p. 878.

a-c.	3 ♂ (1 imm.).	Bukit Besar, Nawngchik, 2500'.	May, 1901.
d, e.	♂, ♀ ad.	Bukit Besar, Nawngchik, 2500'.	28th August, 1901.
f.	♀.	Bukit Besar, Nawngchik, 2500'.	3rd September, 1901.
g.	♀.	Gedong, Batang Padang, South Perak.	10th January, 1902.
h.	♀.	Telôm, Perak-Pahang boundary, alt. 4000'.	22nd January, 1902.

Specimens from the Eastern States have the red on the face and throat very well marked, and produced, in some cases, into a narrow ventral line, an inch or more in length.

When I wrote my paper dealing with this group, the skulls at my disposal were so fragmentary that a thorough description and comparison of the cranial differences between this species and the foregoing was impossible.

1. Stone and Rehn, *Proc. Acad. Nat. Sci. Philad.* 1902, p. 132.

The skulls of the two species are easily distinguishable; that of the present species being larger and more robust.¹ The nasals are longer and broader at their anterior extremity, and the muzzle slightly more compressed laterally, especially noticeable when viewed from the under side. The postorbital processes are shorter and stouter, and do not taper to such a fine point. The most conspicuous and easily seen difference, however, is in the posterior nares, which, in the present species, are much broader and practically uniform in breadth throughout their length, whereas in *Sc. vittatus*, apart from being always narrower, they tend to contract posteriorly.

I append the average measurements of a series of six skulls of *nigrovittatus*, as compared with a series of eight of *vittatus* :—

	Greatest Length	Length of palate from hensenion	Zygomatic breadth	Interorbital breadth	Length of nasals	Greatest breadth of post. nares
<i>Sc. nigrovittatus</i> .	50.7 mm. (48-52)	21.5 (23-20)	31 (29-32)	17+ (17-18)	15.2 (14-16)	5.6. (5.5-6)
<i>Sc. vittatus</i>	48.5 mm. (48-49)	20.8 (20.5-21)	28.8 (28-29)	17+ (17-18)	13.5 (13-14)	4.3. (4-5)

‘In the East Coast States this species occurs under precisely the same conditions as *S. vittatus*, but in Perak, so far as our observation goes, it is never found in the villages and ranges higher up the mountains. A specimen shot at Telôm seemed to us a bulkier, more heavily built, animal, though there was little real difference in the measurements.’

43. *Sciurus robinsoni* sp. nov.

(Plate I).

General appearance similar to *Sciurus lowii*, Thos., from Borneo, but rather smaller.

Colour above a uniform grizzled black, and rufous becoming rather greyer and lighter on the flanks and sides of the face. Each hair is dark at its base, and has one or more rufous annulations and a black tip. Under parts and inner sides of the limbs buffy white, with a tendency to rufous on the hind limbs. Ears short and covered with short hairs similar in colour to the back. Muzzle, and a narrow stripe under the eye, fulvous. Tail above, similar in colour to the upper parts, but with light tips to the hairs, below rufous.

Skull. Similar in general shape and conformation to that of *S. lowii*, but much smaller, and the muzzle relatively rather shorter and narrower. On the under side the bony palate extends well back beyond the last molar, which is not the case with *S. lowii*, and the bullae are more flattened and rounded, and do not project so far downwards. The molar series is very much shorter and smaller, but the incisors are about the same size.

1. This exactly controverts the conclusion I came to before. My former remarks were, however, chiefly based on imperfect Javan skulls, whereas these must be considered as applying to the Mainland race.

Dimensions of type (measured in the flesh):—Head and body, 130 mm.; Tail, 95 mm.; Hind foot, 28 mm.; Ear, 12 mm.

Skull. Greatest length, 35 mm.; Basal length, 28 mm.; Length of palate from henselion, 15 mm.; Length of molar series, 5.5 mm.; Zygomatic breadth, 21.5 mm.; Interorbital breadth, 11 mm.; Length of ansals, 10 mm.

Habitat. Bukit Besar, Nawngchik, 2500'.

Type. Adult female, collected on the 30th August, 1901. Original number, 136.

The size of this squirrel suffices to distinguish it at once from *Sc. lowii*, the only species with which it might be confounded. In colour it is rather paler and lacks the warm tinge. One specimen only was obtained, so that it would not appear a very common species, though possibly occasionally confused with *Sc. tenuis*, from which it may be at once distinguished by the colour of the under parts. That another species of Bornean facies should occur on the Peninsula is by no means surprising, and we may soon expect to find most Bornean species with their Malay representatives.

'In the field this species might certainly be readily confounded with *Sc. tenuis*, but I find that this specimen is noted in my journal as possibly distinct.'

44. *Funambulus insignis jalorensis* subsp. nov.

Funambulus insignis (Cuvier) *Bombate*, *P.Z.S.* 1900, p. 878.

When working out the 'Skeat' collection I noted that the single specimen sent home differed from those hitherto described, and the advent of two more specimens exactly resembling it leave no doubt of the existence of a distinct race from the Eastern side of the Peninsula.

Differs from *S. insignis* of Sumatra in its much greyer coloration, the only rufous parts being the shoulders and thighs. The dorsal stripes are black and well marked, the centre one reaching as far as the back of the crown of the head. Under parts pure white, except the inside of the thighs, which are yellowish.

Skull. The skull is rather more slender than those from the West Coast of the Peninsula, and may be most easily recognized by the nasals, which are slightly shorter and taper off posteriorly to a much greater extent. The series of skulls is so imperfect that it is not possible to give a fuller description.

Dimensions of type (measured in the flesh):—Head and body, 183 mm.; Tail, 98 mm.; Hind foot, 38 mm.; Ear, 10 mm.

Habitat. Bukit Besar (Jalor'), 2500'.

1. Strictly speaking the side of Bukit Besar on which we collected is not in Jalor, but in the neighbouring petty State of Nawngchik. The boundary, however, was said to run along the crest of the hill barely half-a-mile from our encampment. *Edd.*

Type. Adult male, collected on the 9th May, 1901. Original number, 9.

The grey colour forms a very conspicuous difference by which this race may be readily recognized. Specimens from the West Coast do not appear to differ from those found in Sumatra. A second specimen was procured from the same locality in August.

Dimensions of skulls compared with one from the West Coast.

	Greatest length	Palatal length	Length of nasals	Least width of nasals	Zygomatic breadth	Interorbital breadth
Type of <i>jalorensis</i>	50 mm.	21 mm.	15 mm.	3 mm.	27.5 mm.	14
Co-type „	49.5 mm.	20 mm.	15 mm.	4 mm.	27.5 mm.	14.5
Spm. from W. Coast ...		21.5 mm.	15.5 mm.	4.5 mm.	29 mm.	16

‘Almost purely terrestrial in its habits; of the two specimens in the collection, one was shot on the ground and the other caught in a trap baited with melon rind.’

45. *Mus cremoriventer*, Miller

Mus cremoriventer, Miller, *Proc. Biol. Soc. Wash.* XIII, p. 144 (1900).

- a.* ♂ ad. Bukit Besar, Nawngchik, 2500'. 4th September, 1901.
b. ♂ ad. in alc. Bukit Besar, Nawngchik, 2500'. 18th May, 1901.

I have compared these specimens with some paratypes kindly lent me by Mr. MILLER, and with which they perfectly agree.

‘These two specimens were trapped in the jungle with traps baited with melon rind, whereas *Mus bukit* came into our hut and were caught by the cook in the rice-bags.’

46. *Mus surifer*, Miller

Mus surifer, Mill. *Proc. Biol. Soc. Wash.* XIII, p. 149 (1900).

- a-d.* 2 ♂, 2 ♀. Goah Tanah, Bukit Tapang, Biserat, Jalor. July, 1901.
e. ♀. Goah Tanah, Bukit Tapang, Biserat, Jalor. 10th July, 1901.
f. ♂. Bukit Besar, Nawngchik (at foot of hill). 17th September, 1901.
g. ♀. Jeram Kawan, South Perak. 15th February, 1902.
h. ♀ in alc. Biserat, Jalor. July, 1901.

This series, which is slightly duller in colour, shows less black on the back than a series of paratypes forwarded to me for comparison by Mr. MILLER. The species seems to be very largely an inhabitant of caves. The specimen brought home by the ‘Skeat’ expedition, and referred by me to *Mus cremoriventer*, belongs to the present species. Apart from other differences, *Mus cremoriventer* is much smaller and has a uniformly brown tail.

As pointed out by Mr. MILLER, the species bears a very close resemblance to *Mus rajab*, Thos., from which it only differs in external appearance by its smaller size. The skull, however, apart from its size, has a much more slender rostrum.

47. *Mus bukit*, Bonhote.

(Plate IV, fig 2).

Mus bukit, Bonhote, *Ann. Mag. Nat. Hist.* (7) XI, p. 125 (1903).

Similar in appearance to *Mus cremoriventer*, MILLER, and *Mus kina*, BONH., but larger than either.

General colour of a uniform pale ochreous, intermixed with short black hairs, which are nowhere so prominent as to unduly predominate. Sides paler and greyer, caused by an absence of black hairs and general shortness of fur, which enables the light-coloured spines to show through. Under parts yellowish-white, sharply defined from the colour of the upper parts. Feet with dark-brown centres and light toes and margins. Tail rather longer than the head and body, markedly bicolor and scantily clad with hairs.

Skull. Intermediate between those of *M. rapit* and *M. kina*. In size it approaches most nearly to that of *M. rapit*, but the muzzle is considerably shorter and broader in proportion, and the auditory bullae are larger. The anterior zygoma root is very large and solid, greatly exceeding in size that of *M. rapit*. The nostrils are long and taper greatly towards their posterior end. The supraorbital ridges are well marked, and extend right backwards to the posterior margin of the parietals. The bullae are large and well developed, but lie rather flatter than in *M. kina*.

Dimensions of the type (measured in the flesh):—Head and body, 121 mm.; Tail, 148 mm.; Hind foot, 24.5 mm.; Ear, 17 mm.

Skull. Greatest length, 37 mm.; Basal length, 28 mm.; Palatal length, 16 mm.; Diastema, 9.5 mm.; Length of incisive foramina, 6 mm.; Length of nasals, 15 mm.; Zygomatic breadth, 18 mm.; Interorbital breadth, 6 mm.; Greatest breadth of brain case, 15 mm.; Length of molar series, 6.5 mm.

Habitat. Bukit Besar, Nawngchik, 2500'.

Type. Adult male, collected 10th May, 1901. Original number, 11.

The series brought home by Messrs. ROBINSON and ANNANDALE, consisting of two males and three females, is very uniform, and presents no individual variation, whilst, at the same time, they exactly agree with several specimens sent home from Siam by Mr. LYLE, and recorded by me as *Mus jerdoni*¹. I have thought it well to name this species, though subsequent investigations may prove it to be a synonym of *M. jerdoni*.

1. P.Z.S., 1902, p. 39.

The specimen of *Mus pellax* in the British Museum is practically a topotype of *M. jerdoni*, but, as I have stated elsewhere, until the skin and skull of BLYTH'S *M. jerdoni* can be closely compared with specimens of *M. pellax* and *M. bukiti*, the matter cannot be definitely settled. The skulls, however, of these last two species being so distinct there should be no difficulty in deciding the question, even though the type is young.

48. *Mus rufescens*, Gray.

(Plate IV, fig. 3).

Mus rufescens, Gray, *Charlesw. Mag. Nat. Hist.* 1, p. 585 (1837); *Bonhote, P.Z.S.* 1900, p. 878.

Mus rattus, (Linn.), *Flower, P.Z.S.* 1900, p. 361.

a, b. ♂, ♀ ad. Biserat, Jalor. 4th July, 1901.

In external appearance these specimens agree well with the most common form of the *rattus* group found in the Peninsula; the skull, however, is distinguished by having very small teeth. As, however, I find a certain amount of variability in the size of the teeth in a series from Siam and the Peninsula, I presume it is merely a question of individual variation.

49. *Mus jalorensis*, sp. nov.

(Plate II, figs. 1 and 2, and Plate IV, fig. 4).

A medium sized short tailed rat of the *Mus rattus* group.

Fur moderately long and soft, thickly interspersed with very slender spines. General colour warm grizzled brown, becoming greyer on the flanks. Each hair is ashy-grey at the base with a broad brownish tip, the spines are whitish with a black tip, and there are also some long black hairs. Under parts pure white, sometimes with a slightly yellowish tinge, the line of demarcation between the upper and under parts being well marked. Feet, dark brown. The tail hardly exceeds the head and body in length, and is uniformly dark throughout, and scantily clothed with very short stiff hairs.

Skull. Similar to that of *Mus rufescens* from the Malay Peninsula, but smaller and narrower. The nasals taper greatly towards their posterior end. The supraorbital ridges end altogether or become inconspicuous about the middle of the parietals. Viewed from below, except for being narrower and more slender, the skull does not offer any very striking points of difference. The bullae are rather more rounded and do not appear to stand out quite so much from the base of the skull.

Dimensions of type (measured in the flesh :—Head and body, 144 mm.; Tail, 177 mm.; Hind foot, 31.5 mm.; Ear, 19 mm.

Skull. Greatest length, 40 mm. ; Basal length, 32 mm. ; Palatal length, 19 mm. ; Diastema, 11 mm. ; Length of incisive foramina, 7 mm. ; Length of nasals, 14 mm. ; Combined breadth of nasals: Anteriorly, 4 mm. ; Posteriorly, 1.5 mm. ; Zygomatic breadth, 19 mm. ; Interorbital breadth, 6 mm. ; Breadth of brain case at roots of zygomata, 14 mm. ; Length of molar series, 7 mm.

Habitat. Ban Sai Kau, Nawngchik, and in the neighbouring State of Jalor. Also found in Perak and Siam.

Type. Adult female, Ban Sai Kau, Nawngchik, collected on the 11th September, 1901. Original number, 148.

This rat may be easily recognized by its dark and uniform upper surface, short tail, black feet, and white under parts. In *Mus rufescens* the back is much lighter and not so uniform in colour, tail rather longer, and feet white. *Mus rufescens* has also a considerable longer ear.

The series of eight individuals in the present collection is very uniform, and the Museum also contains specimens from Siam, so that it would appear to range from Burmah eastwards.

Series received in present collection.

<i>a, b.</i> 2 ♀ ad.	Ban Sai Kau, Nawngchik.	11th September, 1901.
	(one of these is the type).	
<i>c.</i> ♀.	Biserat, Jalor.	17th July, 1901.
<i>d-h.</i> 2 ♂, 3 ♀.	Telôm, Perak-Pahang boundary, alt. 4000'.	January, 1902.

Average measurements compared with *M. rufescens* :—

Mus jalorensis. Head and body, 145 (137-152) mm. ; Tail, 165 (151-177) mm. ; Hind foot, 30 (29.5-31.5) mm. ; Ear, 17.5 (19-17) mm.

Mus rufescens (Siam). Head and body, 170 mm. ; Tail, 184 mm. ; Hind foot, 32 mm. ; Ear, 24 mm.

SKULL	Greatest length	Basal length	Palatal length	Diastema	Length of nasals	Breadth of nasals		Zygomatic breadth	Interorbital breadth	Breadth of brain case	Molar series
						Anterior	Posterior				
	MM.	MM.	MM.	MM.	MM.	MM.	MM.	MM.	MM.	MM.	MM.
<i>M. jalorensis</i> ... (Av. of 7 spms.)	38.5	31.7	18	10.2	13	4	2	18.5	6	14	7
<i>M. rufescens</i> ...	43	34	20	12	16	5	3	20	6.5	15	8

‘Not a house rat ; the Telôm specimens came from deep jungle ; and the others were trapped in the rice-fields.’

50. *Mus griseiventer*, sp. nov.

(Plate II, fig. 3, and Plate IV, fig. 5).

A species of the *Mus rattus* group. Fur soft, short, and close, containing a few slender and scattered spines.

General colour of upper parts very much as in the last species, but rather paler and more uniform in coloration throughout, being hardly, if at all, darker along the centre of the back. Under parts uniform dull grey, with a yellowish tinge caused by fulvous tips to some of the hairs. Feet, dark brown; ears short, naked, and rounded. Tail rather longer than the head and body, of a uniform black throughout, covered with numerous short stiff black hairs.

Skull. Similar to that of *Mus jalorensis*, but longer and narrower. The nasals do not appear to taper quite as much, and the supraorbital ridges are more strongly marked and inclined outwards. The bullae are slightly larger, not converging anteriorly quite as much, and the incisive foramina are also rather narrower.

Dimensions of type (measured in the flesh):—Head and body, 161 mm.; Tail, 212 mm.; Hind foot, 35 mm.; Ear, 19 mm.

Skull. Greatest length, 42 mm.; Basal length, 35 mm.; Palatal length, 20 mm.; Diastema, 12 mm.; Length of incisive foramina, 7 mm.; Length of nasals, 15 mm.; Combined breadth of nasals: Anteriorly, 4 mm.; Posteriorly, 2 mm.; Zygomatic breadth, 19 mm.; Interorbital breadth, 6 mm.; Breadth of brain case at roots of zygomata, 15 mm.; Length of molar series, 7 mm.

Habitat. Bidor, South Perak.

Type. Adult female, collected on the 3rd February, 1902. Original number, 215.

The size of the hind foot and comparative shortness of the ear form two features by which this species may be easily recognized. The uniform dull coloration and grey under parts enable it to be distinguished at a glance from *Mus jalorensis*. The tail in the type appears somewhat longer than that in the remainder of the series.

Four specimens, 2 ♂ and 2 ♀, were brought back, all from the same locality. The average measurements of the four are:—Head and body, 155 mm.; Tail, 177 mm.; Hind foot, 34 mm.

‘A house rat; very abundant in the Bidor rest-house.’

51. *Mus annandalei*, sp. nov.

(Plate IV, fig. 1).

A medium-sized rat, allied to *Mus neglectus*, JENT. Fur soft and moderately long; entirely destitute of spines.

General colour grizzled fulvous, having a slightly darker area from the nose and down the middle of the back. Under parts pure white, somewhat tinged with ochraceous, the line of demarcation not being very distinct. Outer sides of all four limbs greyish-brown, inner sides of fore limbs white, of hind limbs dark brown. Feet dark brown. Tail slightly longer than the head and body, uniform black in colour, and covered with short stiff hairs. Ears somewhat elongated and naked.

Skull. The skull, which is elongated, is chiefly noticeable for the large bullae. The nasals, which are of a fairly level breadth throughout their length, end in a line with the posterior margin of the praemaxillae. The supraorbital ridges, which are not well marked, end about half-way across the parietal. The anterior root of the zygoma bends abruptly outwards about its centre. Viewed from below the most conspicuous features are the audital bullae, which are very large and rounded, compressing the basioccipital and making it narrow.

Dimensions of type (measured in the flesh) :—Head and body, 151 mm. ; Tail, 196 mm. ; Hind foot, 35 mm. ; Ear, 17 mm.

Skull. Greatest length, 44 mm. ; Basal length, 33 mm. ; Palatal length, 19 mm. ; Diastema, 11 mm. ; Length of incisive foramina, 7.5 mm. ; Length of nasals, 16 mm. ; Zygomatic breadth, 19.5 mm. ; Breadth of brain case at posterior roots of zygomata, 15 mm. ; Length of molar series, 7.5 mm. ; Length of bullae, 8 mm. ; Length between external and internal auditory meatus, 7 mm. ; Breadth of basioccipital anteriorly, 8 mm.

Habitat. Sungkei, South Perak.

Type. Adult female, collected on the 8th February, 1902. Original number, 223.

This species must be considered as allied to the *Mus rattus* group, although the large size of the bullae give the skull a very distinct and easily recognizable appearance. Superficially it is somewhat like *Mus validus*, MILL., only considerably smaller ; whilst its nearest ally would appear to be *Mus neglectus*, from Borneo.

‘Trapped among old tree stumps near a patch of recently cleared jungle.’

I append a list of names with references to original descriptions and type localities, showing the main groups into which some of these Oriental rats may be classed. The list has no pretence at being complete or exhaustive, but it may, perhaps, by rough subdivision, enable more competent workers to attack and put in order the unwieldly genus *Mus*.

It has been found impossible to divide these species into groups of equal value. In the case of the *Jerdoni*, *Whiteheadi*, *Xanthurus*, and *Rattus* sections, these groups are so subdivided as to have become, for practical purposes, of almost generic value, although showing no characters of sufficient importance to enable them to be generically separated. The remainder are groups of slightly superspecific value, and equal to the subgroups of the more variable forms.

JERDONI GROUP

Moderate sized to large rats; fur as a rule thickly beset with spines. Colour above, brown or ochraceous, sharply marked off from pure white under parts. Tail long and generally bicolor.

WHITEHEADI GROUP

Similar to above but tail short, and the species all of moderate size. Colour of upper parts not sharply divided from that of lower parts, which are generally of a buffy white.

XANTHURUS GROUP

Large, soft-furred rats of brownish colour above, not sharply divided from that of the under parts, which are lighter in colour, sometimes white. The tail is of moderate length, naked, and its terminal portion white.

MUELLERI GROUP

Large grizzled rats with long black tail. Under parts white.

BOWERSI GROUP

Large rats of a silvery or brownish-grey colour minutely flecked with white. Tail long, unicolor.

RATTUS GROUP

The large and difficult group of *Mus rattus*, I propose, dealing only with Oriental specimens, to divide into three subgroups, viz. :—*Rufescens*, *Pyctoris*, and *Griseiventer*.

(a) Subgroup *Rufescens*

Hairs long, light coloured and yellowish, especially along the flanks, interspersed with longer black ones down the centre of the back. Ears large. Under parts white or yellowish-white. Tail slightly longer than head and body. Average measurements :—Head and body, 170 mm. ; Tail, 184 mm. ; Hind feet, 32 mm. ; Ear, 24 mm. A tree rat.

(b) Subgroup *Pyctoris*¹

Hair moderately long and soft; much darker and more uniform above than *rufescens*. Under parts white. Tail bearing about the same proportion to the head and body as in the former subgroup, possibly rather shorter. Whole animal smaller, especially the ear. Average measurements :—Head and body, 145 mm. ; Tail, 165 mm. ; Hind feet, 30 mm. ; Ear, 21 mm. A hill rat.

1. This is the *nitidus* group of Thomas and various authors; *Mus nitidus* belongs to my third subgroup, which I have called *griseiventer* to save confusion. The types of both *pyctoris* and *nitidus* are in the British Museum.

(c) Subgroup Griseiventer

Larger. Hairs short and close. General colour much more uniform. Under parts grey or yellowish-grey. Tail longer than head and body. Hind foot very large; ear small. Average measurements:—Head and body, 155 mm.; Tail, 177 mm.; Hind feet, 35 mm.; Ear, 19 mm. A house rat.

CHRYSOCOMUS GROUP

Small rats, of a dull uniform colour; tail short, not exceeding the head and body in length. They may most easily be recognized by their very soft, sooty fur.

I have endeavoured, as far as possible, in the following lists, to assign each name to a group, but, in some instances, this has been found impossible, and in others there has been only a very scanty description to go upon. A group has not always been called after the name of the oldest species it contains, but rather after a species which is fully described and can be easily identified.

JERDONI GROUP**Subgroup Edwardsi**

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|---|--------------------------|
| Mus edwardsi, <i>Thos. P.Z.S.</i> 1882, p. 587. | W. Fokien, China. |
| Mus siporanus, <i>Thos. Ann. Mus. Civ. Genoa</i> , xxxiv, p. 11 (1895). | Isle of Sipora, Sumatra. |
| Mus ciliatus, <i>Bonhote, P.Z.S.</i> 1900, p. 879. | Gunung Inas, Perak. |

Subgroup Sabanus

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|---|------------------------------|
| Mus sabanus, <i>Thos. Ann. Mag. Nat. Hist.</i> (5) xx, p. 270 (1887). | Kina Balu, Borneo. |
| Mus vociferans, <i>Mill. Proc. Biol. Soc. Wash.</i> xiii, p. 138 (1900). | Trang, Lower Siam. |
| Mus lancavensis, <i>Mill. Proc. Biol. Soc. Wash.</i> xiii, p. 188 (1900). | Pulau Lankawi, S. China Sea. |
| Mus strepitans, <i>Mill. Proc. Wash. Acad. Sci.</i> ii, p. 207 (1900). | Anambas Island. |
| Mus fremens, <i>Mill. Proc. Acad. Nat. Sci. Philad.</i> 1902, p. 154. | Sinkep Island. |

Subgroup Jerdoni

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| Mus pellax, <i>Mill. Proc. Biol. Soc. Wash.</i> xiii, p. 147 (1900). | Trang, Lower Siam. |
| Mus fulvescens, <i>Gray, Cat. Hodgr. Coll.</i> , p. 18 (1846). | Nepal. |
| Mus caudator, <i>Hodgr. Ann. Mag. Nat. Hist.</i> (2) iii, p. 203 (1849). | Nepal. |
| Mus jerdoni, <i>Blyth, J.A.S.B.</i> xxxii, p. 350 (1863). | Sikkim. |
| Mus coxingi, <i>Swinhoe, P.Z.S.</i> 1864, p. 185. | Formosa. |
| Mus rapit, <i>Bonhote, Ann. Mag. Nat. Hist.</i> (7) xi, p. 123 (1903). | Kina Balu, Borneo. |

Subgroup Niveiventer

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|--|-------------------------|
| Mus bukit, <i>Bonhote, Ann. Mag. Nat. Hist.</i> (7) xi, p. 125 (1903). | Jalor, Malay Peninsula. |
| Mus niveiventer, <i>Hodgr. J.A.S.B.V.</i> p. 234 (1836). | Nepal. |
| Mus confucianus, <i>M. Edw. Nouv. Arch. Mus.</i> vii, p. 93 (1871). | Moupin, China. |

Subgroup Rajah

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| Mus rajah, <i>Thos. Ann. Mag. Nat. Hist.</i> (6) xiv, p. 451 (1894). | Borneo. |
| Mus hellwaldi, <i>Jentink, Notes Leyden Mus.</i> p. 11 (1878). | Celebes. |
| Mus anambae, <i>Mill. Proc. Wash. Acad. Sci.</i> ii, p. 205 (1900). | Anambas Island. |
| Mus lingensis, <i>Mill.</i> " " " p. 206 (1900). | Linga Island. |

Subgroup Rajah—continued

<i>Mus surifer</i> , <i>Mill. Proc. Biol. Soc. Wash.</i> xiii, p. 148 (1900).	Trang, Lower Siam.
<i>Mus flavidulus</i> , <i>Mill.</i> „ „ „ p. 189 (1900).	Pulau Lankawi.
<i>Mus butangensis</i> , <i>Mill.</i> „ „ „ p. 190 (1900).	Butang.

Subgroup Cremoriventer

<i>Mus cremoriventer</i> , <i>Mill. Proc. Biol. Soc. Wash.</i> xiii, p. 144 (1900).	Trang, Lower Siam.
<i>Mus flaviventer</i> , <i>Mill. Proc. Wash. Acad. Sci.</i> ii, p. 204 (1900).	Anambas Island.
<i>Mus kina</i> , <i>Bonhote, Ann. Mag. Nat. Hist.</i> (7) xi, p. 124 (1903).	Kina Balu, Borneo.

WHITEHEADI GROUP

<i>Mus whiteheadi</i> , <i>Thos. Ann. Mag. Nat. Hist.</i> (6) xiv, p. 452 (1894).	Kina Balu, Borneo.
<i>Mus ochraceiventer</i> , <i>Thos.</i> , „ „ „ p. 451 (1894).	Kina Balu, Borneo.
<i>Mus musschenbroeki</i> , <i>Jentink, Notes Leyden Mus.</i> p. 19 (1878).	Celebes.
<i>Mus alticola</i> , <i>Thos. Ann. Mag. Nat. Hist.</i> (6) ii, p. 408 (1888).	Kina Balu, Borneo.
<i>Mus bacodon</i> , <i>Thos.</i> „ „ (6) xiv, p. 452 (1894).	Kina Balu, Borneo.
<i>Mus asper</i> , <i>Mill. Proc. Biol. Soc. Wash.</i> xiii, p. 145 (1900).	Trang, Lower Siam.

BOWERSI GROUP

<i>Mus bowersi</i> , <i>Anders. Zool. Res. Yunnan</i> , p. 304 (1879).	Yunnan.
<i>Mus latouchi</i> , <i>Thos. Ann. Mag. Nat. Hist.</i> (6) xx, p. 113 (1897).	Kuatun, China.
<i>Mus ferrocaneus</i> , <i>Mill. Proc. Biol. Soc. Wash.</i> xiii, p. 140 (1900).	Trang, Lower Siam.
<i>Mus berdmorei</i> , <i>Blyth, J.A.S.B.</i> xx, p. 173 (1851).	Mergui.

XANTHURUS GROUP

<i>Mus xanthurus</i> , <i>Gray, P.Z.S.</i> 1867, p. 598.	Celebes.
<i>Mus celebensis</i> , <i>Gray, P.Z.S.</i> 1867, p. 598.	Celebes.
<i>Mus meyeri</i> , <i>Jentink, Notes Leyden Mus.</i> i, p. 12 (1878).	Celebes.
<i>Mus everetti</i> , <i>Gunth, P.Z.S.</i> 1879, p. 75.	Luzon, Philippines.
<i>Mus macleari</i> , <i>Thos. P.Z.S.</i> 1887, p. 573.	Xmas Island.
<i>Mus luzonicus</i> , <i>Thos. Ann. Mag. Nat. Hist.</i> (6) xvi, p. 163 (1895).	Luzon, Philippines.

MUELLERI GROUP

<i>Mus muelleri</i> , <i>Jentink, Notes Leyden Mus.</i> , p. 16 (1879).	Sumatra.
<i>Mus palmarum</i> , <i>Zeilebor, Reise der Öst Fregat. Novara, Zool.</i> i, p. 26 (1869).	Nicobars.
<i>Mus validus</i> , <i>Mill. Proc. Biol. Soc. Wash.</i> xiii, p. 141 (1900).	Trang, Lower Siam.
<i>Mus integer</i> , <i>Mill. Proc. Wash. Acad. Sci.</i> iii, p. 111 (1901).	Sirhassen Island.
<i>Mus firmus</i> , <i>Mill. Proc. Acad. Nat. Sci. Philad.</i> 1902, p. 155.	Linga Island.
<i>Mus stoicus</i> , <i>Mill. Proc. U.S. Nat. Mus.</i> xxiv, p. 759 (1902).	Henry Laurence Island, Andamans.
<i>Mus taciturnus</i> , <i>Mill. Proc. U.S. Nat. Mus.</i> xxiv, p. 762 (1902).	S. Andaman Island.

INFRALUTEUS GROUP

<i>Mus infraluteus</i> , <i>Thos. Ann. Mag. Nat. Hist.</i> (6) ii, p. 409 (1888).	Kina Balu, Borneo.
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RATTUS GROUP

Subgroup Rufescens

<i>Mus rufescens</i> , Gray, <i>Charlesw. Mag. Nat. Hist.</i> i, p. 585 (1837).	India.
<i>Mus flavescens</i> , Elliot, <i>Madr. Journ.</i> x, p. 214 (1839).	Madras.
<i>Mus brunneusculus</i> , Hodg. <i>Ann. Mag. Nat. Hist.</i> xv, p. 267 (1845).	Nepal.
<i>Mus tetragonurus</i> , Kelaart, <i>Prodromus</i> (1850).	Ceylon.
<i>Mus nemoralis</i> , Blyth, <i>J.A.S.B.</i> xx, p. 168 (1851).	Ceylon.
<i>Mus robustulus</i> , Blyth, <i>J.A.S.B.</i> xxviii, p. 294 (1859).	Tenasserim.
<i>Mus andamanensis</i> , Blyth, <i>J.A.S.B.</i> xxix, p. 103 (1860).	Andamans.
<i>Mus flavipectus</i> , M. Edw. <i>Nouv. Arch. Mus.</i> vii, p. 93 (1871).	Moupin, China.
<i>Mus sladëni</i> , Anders. <i>Zool. Res. Yunnan</i> , p. 305 (1879).	Yunnan.
<i>Mus yunnanensis</i> , Anders. <i>Res. Yunnan</i> , p. 306 (1879).	Yunnan.
<i>Mus vicerex</i> , Bonhote, <i>Ann. Mag. Nat. Hist.</i> (7) xi, p. 473 (1903).	Simla.

Subgroup Pyctoris

(the nitidus group of Thomas, Sclater, and other authors.)

<i>Mus pyctoris</i> , Hodg. <i>Ann. Mag. Nat. Hist.</i> xv, p. 267 (1845).	Nepal.
<i>Mus aquicaudalis</i> , Hodg. <i>Ann. Mag. Nat. Hist.</i> (2) iii, p. 203 (1849).	Nepal.
<i>Mus rubricosa</i> , Anders. <i>Zool. Res. Yunnan</i> , p. 306 (1879).	Yunnan.
<i>Mus neglectus</i> , Jentink, <i>Notes Leyden Mus.</i> 1879, p. 14.	Borneo.
<i>Mus tiomanicus</i> , Mill. <i>Proc. Wash. Acad. Sci.</i> iii, p. 209 (1900).	Tioman Island.
<i>Mus jalorensis</i> , Bonhote, <i>antea</i> , p. 29.	Jalor.

Subgroup Griseiventer

<i>Mus indicus</i> , Desm. (<i>nec Bechst.</i>) <i>Mamm.</i> ii, p. 299 (1822).	Pondicherry.
<i>Mus asiaticus</i> , Gray, <i>Ann. Mag. Nat. Hist.</i> i, p. 585 (1837).	India.
<i>Mus rattoides</i> , Hodg. <i>Ann. Mag. Nat. Hist.</i> xv, p. 267 (1845).	Nepal.
<i>Mus nitidus</i> , Hodg. <i>Ann. Mag. Nat. Hist.</i> xv, p. 267 (1845).	Nepal.
<i>Mus kandianus</i> , Kelaart, <i>Prodromus</i> (1850).	Ceylon.
<i>Mus germaini</i> , M. Edw. <i>Rech. Mamm.</i> , p. 289 (1874).	Pulau Condor.
<i>Mus pannosus</i> , Mill. <i>Proc. Biol. Soc. Wash.</i> xiii, p. 190 (1900).	Butang.
<i>Mus tambelanicus</i> , Mill. <i>Proc. Wash. Acad. Sci.</i> ii, p. 212 (1900).	Big Tambelan Island.
<i>Mus siantanicus</i> , Mill. <i>Proc. Wash. Acad. Sci.</i> ii, p. 210 (1900).	Pulau Siantan.
<i>Mus atratus</i> , Mill. <i>Proc. U.S. Nat. Mus.</i> xxiv, p. 767 (1902).	Barren Island, Andamans.
<i>Mus flebilis</i> , Mill. <i>Proc. U.S. Nat. Mus.</i> xxiv, p. 762 (1902).	Henry Laurence Island, Andamans.
<i>Mus pulliventer</i> , Mill. <i>Proc. U.S. Nat. Mus.</i> xxiv, p. 765 (1902).	Great Nicobar Island.
<i>Mus griseiventer</i> , Bonhote, <i>antea</i> , p. 30.	Perak.

I have been unable to refer the following to either of the three subgroups.

<i>Mus decumanoides</i> , Hodg. <i>J.A.S.B.</i> x, p. 915 (1841).
<i>Mus ceylonus</i> , Kelaart <i>Prodromus</i> , (1850).
<i>Mus infralineatus</i> , Elliot ; Blyth, <i>J.A.S.B.</i> xxxii, p. 348 (1863).

CHRYSOCOMUS GROUP

<i>Mus chrysocomus</i> , Hoffm. <i>Abh. Mus. Dresd.</i> iii, p. 20 (1887).	Celebes.
<i>Mus ruber</i> , Jentink, <i>Notes Leyden Mus.</i> ii, p. 18 (1879).	New Guinea.
<i>Mus baluensis</i> , Thos. <i>Ann. Mag. Nat. Hist.</i> (6) xiv, p. 454 (1894).	Kina Balu, Borneo.
<i>Mus fratorum</i> , Thos. <i>Ann. Mag. Nat. Hist.</i> (6) xviii, p. 246 (1896).	Rurukan, Celebes.
<i>Mus datae</i> , Meyer, <i>Abh. Mus. Dresd.</i> vii, p. 25 (1899).	Phillipines.

The following six species are very distinct from all those that have gone before as well as from each other. They are merely noted here to show that they have been taken into consideration when making out the above list.

<i>Mus mettada</i> , Gray, <i>Charlsw. Mag. Nat. Hist.</i> i, p. 586 (1837).	Madras.
<i>Mus gleadowi</i> , Murray, <i>P.Z.S.</i> 1885, p. 805, pl. li.	W. India.
<i>Mus blanfordi</i> , Thos. <i>Ann. Mag. Nat. Hist.</i> (5) vii, p. 24 (1881).	S. India.
<i>Mus humei</i> , Thos. <i>P.Z.S.</i> 1886, p. 63, pl. v.	Manipur.
<i>Mus annandalei</i> , Bonhote, <i>antea</i> , p. 30.	S. Perak.
<i>Mus coelestis</i> , Thos. <i>Ann. Mag. Nat. Hist.</i> (6) xviii, p. 248 (1896).	S. Celebes.

I append a few notes to shew the distinguishing characters of some of the species and subgroups.

The **Edwardsi** group are large rats of a dark colour, their fur intermixed with spines of medium stiffness. In *M. edwardsi* and *M. siporanus* the tail is bicolor and has the terminal third white. In *M. ciliatus* it is uniformly dark. In the original description of *M. siporanus* Mr. THOMAS was inclined to consider it as allied to *M. macleari*; a comparison of the skulls, however, clearly shews it to belong to the *Jerdoni* group. I have pointed this out to Mr. THOMAS, who concurs in the view here expressed.

Sabanus group. *M. sabanus* is slightly smaller than the rats in the above group, and lighter in colour, especially about the shoulders. The tail is very long, bicolor, and with the tip white.

Jerdoni group. Smaller and much brighter in colour than individuals of the former groups. The fur in this group is much longer and softer than in all the others, being especially so in *M. fulvescens* and *M. caudatior*, which are synonyms. In *M. coxingi*, however, although the fur is very long it is very thickly interspersed with stiff spines. Tail moderately long and bicolor.

The **Niveiventer** group closely resembles the last, but the fur is shorter and very spiny, especially in the case of *M. niveiventer*, where it is of a dull greyish brown on the back. They are all slightly smaller than the *Jerdoni* group, and the tail is shorter in proportion and bicolor.

The **Rajah** group contains rats slightly paler in colour than those of the *Jerdoni* group. They are intermediate in size, between the *Jerdoni* and *Sabanus* groups, and the fur is thickly beset with spines. Tail only slightly longer than the head and body, bicolor, and white for about an inch at the tip.

The **Cremoriventer** group is composed of smaller rats than the previous ones. Fur light yellow, thickly interspersed with spines. Tail of moderate length, unicolor.

Whiteheadi group. *M. whiteheadi* and *M. asper* are very closely allied. *M. ochraceiventer* is larger, has deep ochraceous under parts, and is much darker above. *Mus alticola* is dark brown above, showing no trace of the fulvous tint; the under parts are dull white.

M. baedon is considerably smaller than *M. whiteheadi*, and has whitish under parts; it also differs in its cranial characters. With the exception of *M. musschenbroeki*, they are all spiny.

Bowersi group. The two specimens from the Hume Collection referred by Mr. THOMAS (*P.Z.S.* 1886, p. 62), to *Mus berdmorei*, БЛҮТН, resemble *Mus bowersi* so closely, except in size, that I have no hesitation in placing them in the same group. The hind feet of *M. berdmorei* measures 35 mm., and that of *M. bowersi* 52 mm.

Xanthurus group. The differences between the various species have been tabulated by Mr. THOMAS (*P.Z.S.* 1887, p. 573), who also, in his description of *M. luzonicus*, clearly distinguishes it from *M. everetti*.

Muelleri group. This group are large dark coloured rats, with long uniformly black tails. They are all grizzled to a greater or less extent with fulvous; the under parts are, in the case of *M. validus*, of a greyish-white, but in *M. muelleri* itself, yellowish-white.

Mus infraluteus is a fine and distinct species, but allied to the above group in size and cranial characters. It is of a uniform very dark brown above, some of the hairs having light, glistening tips. Under parts with dark grey under fur, and long, light, glistening stiff hairs, of a spiny character.

The divisions into which I have divided the rats of the **Mus rattus** group are, to a large extent, correlated with the habits and situations in which they are found. Those of the *Rufescens* subgroup are tree rats, although in many places they may also be found in houses, and at considerable elevations as well.

The *Pyctoris* subgroup contains hill rats which are not found in low lying land, and *Mus grieventer* represents the true house rat, its chief characters being the large feet, correlated with short ears. The great difficulty to be contended with in this group is the fact of their travelling about on ships, with the result that many varieties and forms occur which cannot be definitely assigned to any of the subgroups, and this has caused a great number of these varieties to be described. One finds, however, as in the case of most small mammals, that in localities away from the direct influence of imported specimens, individuals from any one district are remarkably constant in their characters. In working out this group, reference should be made to the following sources:—

OLDFIELD THOMAS. *P.Z.S.* 1881, p. 521, etc.

W. L. SCLATER. *P.Z.S.* 1890, p. 523.

Cat. Mamm. Ind. Mus., p. 62 (1891).

I have not gone into the Chinese forms of this group with the exception of *M. flavipectus*, which belongs to the *Rufescens* subgroup, differing therefrom only in having the under parts suffused with buffish.

M. vicerex, which I have recently described, is a very well-marked form of *M. rufescens*; its main point of distinction lies in its bicolor tail, which is also well-clothed with moderately long hair. In colour it is a pale-grey form of *M. rufescens*, the long black hairs having a greenish gloss, which, although present in *Rufescens*, is not nearly so conspicuous a feature.

Most of the specimens labelled *M. nitidus* in the Museum belong in reality to *M. pyctoris*, HOBBS., which is chiefly to be distinguished by its darker and warmer tints and its longer fur.

I have placed *M. neglectus* in the *Pyctoris* subgroup, as the most typical specimens certainly agree with the main features of that group. The series in the Museum, however, shews a wide range of variation, which, owing to lack of sufficient data, I have not been able to satisfactorily work out. Some specimens closely approach *M. flavipectus*, which undoubtedly belongs to the *Rufescens* subgroup, while others with their large feet and short ears approximate to the *Griseiventer* subgroup, and it is probable that all three subgroups are represented in Borneo.

Mus nitidus, HOBBS., which has been confounded with *Mus pyctoris*, is a large rat of the *Mus griseiventer* subgroup, resembling this last in the large feet and the comparatively small ears. On the back the type resembles *M. griseiventer*, except in being rather paler, the under parts being of a dirty yellowish-grey. Other specimens, however, from the same locality, are very much brighter on the back.

Mus germaini from Cochin, China, is another species of the *Griseiventer* subgroup, and except in its more fulvous colour is not unlike *M. nitidus*; the under parts, however, are yellowish white instead of yellowish grey, and the hind feet are also whitish.

I have not had time or material to go carefully into the *Chrysocomus* group, but have placed them together, as they may all be easily recognized by their extremely soft, woolly fur, entirely destitute of spines. The skulls of *M. fratrorum* and *M. datae* may be recognized by the long snout, flattened bullae, and large teeth. The skull of *M. baluensis* resembles more closely that of *M. neglectus*, but is somewhat intermediate, having the snout more attenuated and the bullae flatter than in the last named.

52. *Mus concolor*, Blyth.

Mus concolor, Blyth, *J.A.S.B.* xxviii, p. 295 (1859); Flower, *P.Z.S.* 1900, p. 361; Bonhote, *op. cit.*, p. 879.

a.	♀	Bukit Besar, Jalor.	10th May, 1901.
b-c.	3 ♂, 1 ♀	Biserat, Jalor.	3rd July, 1901.
f-i.	3 ♂, 1 ♀	Tojan, Nawngchik.	29th Nov., 1901.
k-m.	3 spms. in alc.	Biserat, Jalor.	July, 1901.

'The common house mouse of the Patani States.'

53. *Mus*, sp.

a. ♀ ad. Jeram Kawan, South Perak, 13th February, 1902.

This mouse is apparently closely allied, if not identical, with *Mus concolor*, but is slightly larger, and owing to the size of the skull I do not feel justified in assigning it to that species.

54. *Rhizomys sumatrensis* (Raffles)

Mus sumatrensis, Raffles, *Trans. Linn. Soc.* xiii, p. 258 (1822).

Rhizomys erythrogenys, Anders. *Zool. Res. Yunnan*, p. 324 (1879).

Rhizomys sumatrensis (Raffles), Flower, *P.Z.S.* 1900, p. 363; Bonhote, *loc. cit.*, p. 881.

a, b.	♀.	Kampong Jalor, Jalor.	4th November, 1901.
c.	♀.	Gedong, Batang Padang, South Perak.	12th January, 1902.

One of the Jalor specimens, while apparently fairly adult, is considerably smaller and darker than the other two. At first sight, small dark coloured examples of this species resemble *R. pruinosis*, but they may always be distinguished by the red on the face and the longer tail.

They are possibly referable to *R. erythrogenys*, ANDERS., which, on the material at my disposal, I can only consider as a colour phase of the true *R. sumatrensis*, depending on the individual rather than the locality whence it comes.

'We never met with the bamboo rat ourselves, all our specimens having been brought in by natives. With the larger of the Jalor specimens were four young ones, almost exactly resembling their parent in coloration.'

55. *Hystrix grotei* (Gray)

(Plate III)

Acanthochoerus grotei, Gray, *P.Z.S.* 1866, p. 310; *Sclater, loc. cit.*, p. 417.

Hystrix longicauda (Marsden), *Sclater, P.Z.S.* 1871, p. 234; *Flower, P.Z.S.* 1900, p. 364.

Hystrix yunnanensis (Anders.), *Bonbote, P.Z.S.* 1900, p. 881.

a-c. ♂, ♀ ad. Mabek, Jalor. 27th July, 1900.

d. ♂ imm. (skull only). 27th July, 1900.

The type of *H. grotei*, which is unfortunately a young specimen, and with which I have compared the above, leaves no doubt that these can be referred to that species. The only question about which doubt can exist is as to the advisability of using GRAY's name instead of the *H. longicauda* from Sumatra of MARSDEN¹; MARSDEN gives a plate but no description, and without specimens from Sumatra it is impossible to say whether the Sumatran animal is identical with that of the mainland or not.

GRAY's description of his type agrees well with the adult specimens, but in the skin the nuchal crest is not visible, as the spines forming it are hardly, if at all, longer than those on the surrounding parts, but a few of them have a conspicuous white tip. The narrow lunate half collar under the throat is also well marked in all the specimens.

The skull, which is large, approaches most nearly to that of *H. muelleri*, JENT, from Borneo, but is larger and has a much stouter muzzle. The nasals are long and of fairly uniform width throughout their length, their posterior margin being about level with the hinder edge of the first molar, and being longer than the greatest length of the frontals by about half-an-inch. The praemaxilla is of moderate breadth at its posterior end, which lies about level with the anterior margin of the premolar.

1. Marsden, *Nat. Hist., Sumatra* (3rd ed.), p. 118, pl. xiii (1818)

The measurements are as follows:—Greatest length, 140 mm.; Henselion to edge of occipital foramen, 113 mm.; Zygomatic breadth, 72 mm.; Length of nasals, 61 mm.; Greatest length of frontals, 51 mm.; Breadth of nasals at posterior edge of praemaxilla, 30.5 mm.; Ditto at tip, 23 mm.

It will be noticed that in these specimens the nasals are about 10 mm. longer than the greatest length of the frontals, whereas in *H. yunnanensis*, which was brought back by the 'Skeat' Expedition two years ago, the nasals are 4 mm. shorter than the frontals. I have, however, compared these skulls with that previously identified as *H. yunnanensis*, and consider that they all belong to the same species.

'Porcupines, presumably of this species, must have been exceedingly abundant round Biserat, especially in the caves, the floors of which were covered with innumerable tracks, but no trap that we could obtain proved effectual. The series in the collection were obtained for us by natives, and were dug from their holes in deep jungle. The immature specimen of which only the skull was preserved, was found in the same hole along with one of the females and an adult male, which escaped, and the remaining pair were captured together. Both the females contained a single fairly advanced embryo, so that it is evident that the young ones remain with their parents until the young of the succeeding year are born.

A wound from a porcupine's quill is considered by the Malays as very dangerous, and we were solemnly informed that if the quill penetrated as far as the first dark ring, the injury would inevitably prove fatal.

Locally this species is known as *landak*, the brush-tailed porcupine being called *landek*.'

56. *Atherura macroura* (Linn.)

Hystrix macroura, Linn. *Syst. Nat.* 1, p. 77 (1766).

Atheroura macroura (Linn.) *Flower, P.Z.S.* 1900, p. 364.

a. ♂. Kampong Jalor, Jalor. 14th November, 1901.

57. *Nemorhoedus swettenhami*, Butler

Nemorhoedus swettenhami, *Butler, P.Z.S.* 1900, p. 675.

Nemorhoedus sumatrensis (Shaw), *Flower, P.Z.S.* 1900, p. 370; *Bonhote, op. cit.*, p. 882.

2 ♀ (skins only). Biserat, Jalor. 30th July, 1901.

Frontlet. Purchased in Patani Town.

Frontlet. Purchased from Hill Sakais, Temongoh, Upper Perak.

In these skins the whole animal is jet black, with the exception of the hairs along the mane, which are tawny at their tips and dirty white at their bases.

'The *kambing gurun* is, speaking relatively, quite a common animal in suitable localities throughout the Peninsula, though no more than one specimen has ever been shot by a European. Its favourite haunts are the precipitous limestone hills, thickly clad with jungle, that form a very characteristic feature in the landscape of many parts of the Peninsula, both on the East and West coasts. It is, however, by no means confined to such localities, for it was not uncommon on Bukit Besar, more especially on the precipitous South-Western face, and even at our encampment above Ban Sai Kau we heard the curious call, half-way between a bleat and a roar, of the male. By offering a liberal reward we managed to persuade some of the Biserat natives to snare us two specimens.'

58. *Cervulus muntjac* (Zimm.)

Cervus muntjac, Zimm. *Geog. Gesch.* II, p. 131 (1780).

Cervulus muntjac (Zimm.), Flower, *P.Z.S.* 1900, p. 371.

Six pairs of horns, Tanjong Luar, Jalor-Rhaman border, and the Jarum district of Rhaman
(obtained from natives).

'The muntjac was evidently common on Bukit Besar, and its barking cry was often heard.'

59. *Cervus unicolor*, Bechst.

Cervus unicolor, Bechst *Allgem. Uebers d. vierfus, Thiere*, I, p. 112 (1700);
Flower, *P.Z.S.* 1900, p. 372; Bonbote, *op. cit.*, p. 882.

Frontlet. Tanjong Luar, Jalor-Rhaman border.

Frontlet. Hulu Sungkei, South Perak.

'Obtained from natives. At Jahar, some distance inland from Biserat, we saw a nearly adult female of this species in the possession of the Siamese magistrate of the district.'

60. *Tragulus javanicus canescens*, Mill.

Tragulus canescens, Mill. *Proc. Biol. Soc. Wash.* XIII, p. 185 (1900).

Tragulus napu (F. Cuv.), Flower, *P.Z.S.* 1900, p. 374.

a. imp. sk. and skull. Grit, Upper Perak, April, 1902.

'This form is also common in the Batang Padang district, South Perak, and we saw two or three specimens at Gedong in the possession of natives. Speaking generally, this species is everywhere rarer than the succeeding, or possibly is not so much esteemed for food.'

61. *Tragulus kanchil affinis*, Gray

Tragulus affinis, Gray, *P.Z.S.* 1861, p. 138.

Tragulus javanicus (Gm. nec Osbeck), *Flower, P.Z.S.* 1900, p. 374; *Bonhote, op. cit.*, p. 883, and of authors generally.

Tragulus rarus, *Miller, Proc. Biol. Soc. Wash.* xv, p. 173 (1902).

a.	♀.	Mabek, Jalor.	28th July, 1901.
b.	♀.	Biserat, Jalor.	14th July, 1901.
c.	♀.	Rhaman.	14th July, 1901.
d-e.	♂, ♀.	Kampong, Jalor.	October, 1901.

In my recent paper on the genus I have shewn the reason for adopting GRAY's name for this form of *T. kanchil*. It is, however, very closely allied to *T. fulviventer*, of which the exact locality is unfortunately doubtful. They may be distinguished from *T. fulviventer* by their slightly smaller size and paler coloration. The type of *T. fulviventer* has in addition a rufous transverse stripe under the throat at the apex of the triangular marking which connects the colour at either side of the neck.

'The Malays are acquainted with four species of *Tragulus*, which they state are quite distinct, viz.: the *Napu* (*T. javanicus*); the *Pelandok*, which is the present species; the *Pelandok angin* (*wind chevrotain*),¹ which is said to be very rare and which we have not been able to identify; and the *Kanchil*, which is much smaller than any of the other species, and may be the young of *T. kanchil*.

Throughout the Malay Peninsula *Traguli* of one species or another are extremely abundant, though so shy that they can rarely be captured, except by snaring. They do not seem to frequent nor seem to care for very thick jungle, frequenting by preference the bamboo forest that is very prevalent in certain localities, such as the Batang Padang Valley, between about 1500 and 3000 feet, and the country round Mabek, where we frequently saw specimens.'

62. *Sus cristatus*, Wagner

Sus cristatus, *Wagner, Munch. gel. Anz.*, p. 535 (1839); *Flower, P.Z.S.* 1900, p. 375.

Skin of head and skull, imm. ♀. Telôm, Perak Pahang boundary. January, 1902.

'This specimen was sold to us by some Sakais who had brought it up as a pet, and whom it followed about like a dog, coming to them when they called it, but foraging for itself in the jungle.'

63. *Orcaella brevirostris* (Owen)

Phocaena brevirostris, *Owen, Trans. Z.S.* vi, p. 24, pl. 4, figs. 1-3 (1866).

Orcaella brevirostris (Owen), *Anders. P.Z.S.* 1871, p. 143.

a. ♂ skeleton, nr. Patani. October, 1901.

1. Cf. *Fascic. Malay.—Anthropology—part 1*, p. 102.

'A school of five individuals of this species were enclosed in the fishermen's seine, on the sea face of Tanjong, Patani, and we secured two specimens. Unfortunately, one was washed away by an unusually high tide. The fishermen told us that they were often seen in Patani roads, and even crossed the bar of Patani River, but we never saw them except on this occasion. The specimens were both males, and were of a grey colour, between French grey and lead, slighter paler on the ventral surface.'

The dimensions, in millemetres, were as follows :—

	A	B
Length, snout to middle point of fluke	2200	2752
Breadth of fluke	600	657
Length of flipper	385	412
Anterior margin of flipper to anus	961	998
Anus to middle point of fluke	714	703
Girth at flippers	930	866
Girth at anus	714	760
Greatest Girth	1194	1250
From middle point of fluke to posterior margin of dorsal fin	938	922
Length of dorsal fin	144	182
Height of dorsal fin	64	70

'At Pak Yun, on the Taleh Sap (great lake), about half-way between Senggora and Lampam, I saw, on May 12, a school of five or six small cetaceans, apparently not much over four feet in length, and of an almost uniform rich chocolate brown (*Platanista* sp. ?). The water was here only very slightly brackish, the taste of salt being hardly perceptible. At the end of March, 1899, the 'Skeat' Expedition saw a school of similar cetaceans at almost exactly the same place, and the natives told me that it was always in the vicinity of the village, the lake being very narrow at this point.'—N.A.

'In the estuary of the Trang River, in salt water, I had a good view of a solitary cetacean, apparently about twice the size of those at Pak Yun, and of a uniform dead white colour. Its rostrum was only moderately elongated (*Sotalia sinensis* ?).—N.A.

64. *Manis javanica*, Desm.

Manis javanica, Desm. *Mamm.* p. 377 (1822); Flower, *P.Z.S.* 1900, p. 378; Bonhote, *loc. cit.* p. 883.

a. ♂ ad. Kampong Jalor, Jalor. 3rd November, 1901.
b, c. ♀ imm. Ban Sai Kau, Nawngchik. May, 1901.

In the two immature specimens the latter half, and in the adult the terminal third, of the tail is white.

Cattle

‘In addition to the buffalo (*Bubalus indicus*), which has become feral in parts of Legeh, and on the islands off the Trang coast, the Malays of the Patani States own two breeds of horned cattle—a small, short-horned variety of the zebu (*Bos zebu*), and a breed known in the Federated Malay States as Kelantan cattle, but called in Patani, *Lembu siam*. The latter are also small, and resemble the cattle of the Channel Islands in build and colouring, being generally dun with black points and ankles. The zebus are frequently black or red. The bulls of the latter breed are trained to fight with one another, by shoving with their heads, rarely using their horns, and large sums of money are lost and won in betting on a favourite bull. The ‘Siamese’ cattle are only used for ploughing, and for sale in the British States. The two breeds are allowed to mingle freely, and every gradation from one to the other, as far as hump, general configuration and colour, is frequently to be seen, but the hybrids show a curious tendency to develop depressed and somewhat corrugated horns like those of a buffalo.’

Elephants and Sheep

‘The captive elephants in the Patani States are allowed to wander freely in the jungle for a considerable proportion of the year, with hobbles shaped like a figure of eight on their forelegs. Some attention is paid to breeding them by the Rajas of Legeh and Jalor, and in each of these States there is an official known as Ku Chang, whose duty it is to superintend all matters of the kind. The Raja of Jalor told me that fully adult elephants breed once in five or seven years, and that the female went pregnant for from ten to twelve months,’ and also that the period of gestation was longer in the case of a bull calf. He also said that ordinary cattle bred every year, buffaloes once in three years, and sheep and goats twice in the year. He had never heard of a cow having more than one calf at a time.’—N.A.

‘At Kampong Budi, where a considerable number of sheep were pastured, we were told that they bred every seven months.’

Canis familiaris

In connexion with Mr. BONHOTE’s remarks in a former paper (*P.Z.S.* 1900, p. 874) it may be of interest to note that we examined a considerable number of pariah dogs’ skulls at Kampong Jalor, and found that the large proportion of them were asymmetrical in both jaws, there being frequently one tooth less than the normal number either on the left or right side indifferently.

1. Two years is usually believed to be the correct period.—N. A.

EXPLANATION OF PLATES

PLATE I

Sciurus robinsoni, Bonhote (p. 24)

PLATE II

FIGS. 1, 2. *Mus jalorensis*, Bonhote (p. 28)

FIG. 3. *Mus griseiventer*, Bonhote (p. 30)

PLATE III

Hystrix grotei, Gray (p. 39)

PLATE IV

FIG. 1. *Mus annandalei*, Bonhote (p. 30)

FIG. 2. *Mus bukit*, Bonhote (p. 27)

FIG. 3. *Mus rufescens*, Gray (p. 28)

FIG. 4. *Mus jalorensis*, Bonhote (p. 28)

FIG. 5. *Mus griseiventer*, Bonhote (p. 30)

FIG. 6. *Sciurus nigrovittatus*, Horsf. (p. 23)

FIG. 7. *Sciurus vittatus*, Raffles (p. 22)

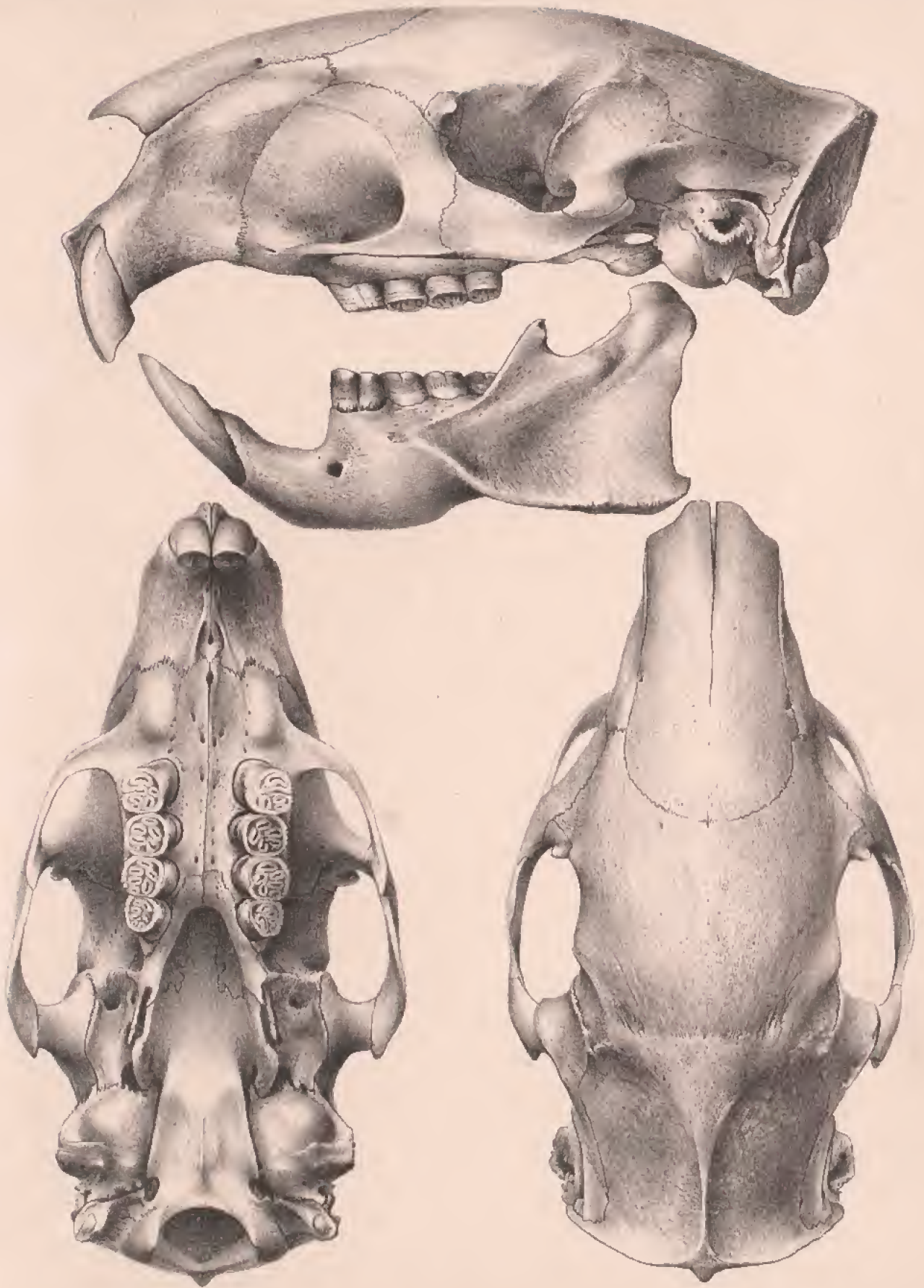




H Goodchild del et lith.

Mintern Bros imp.

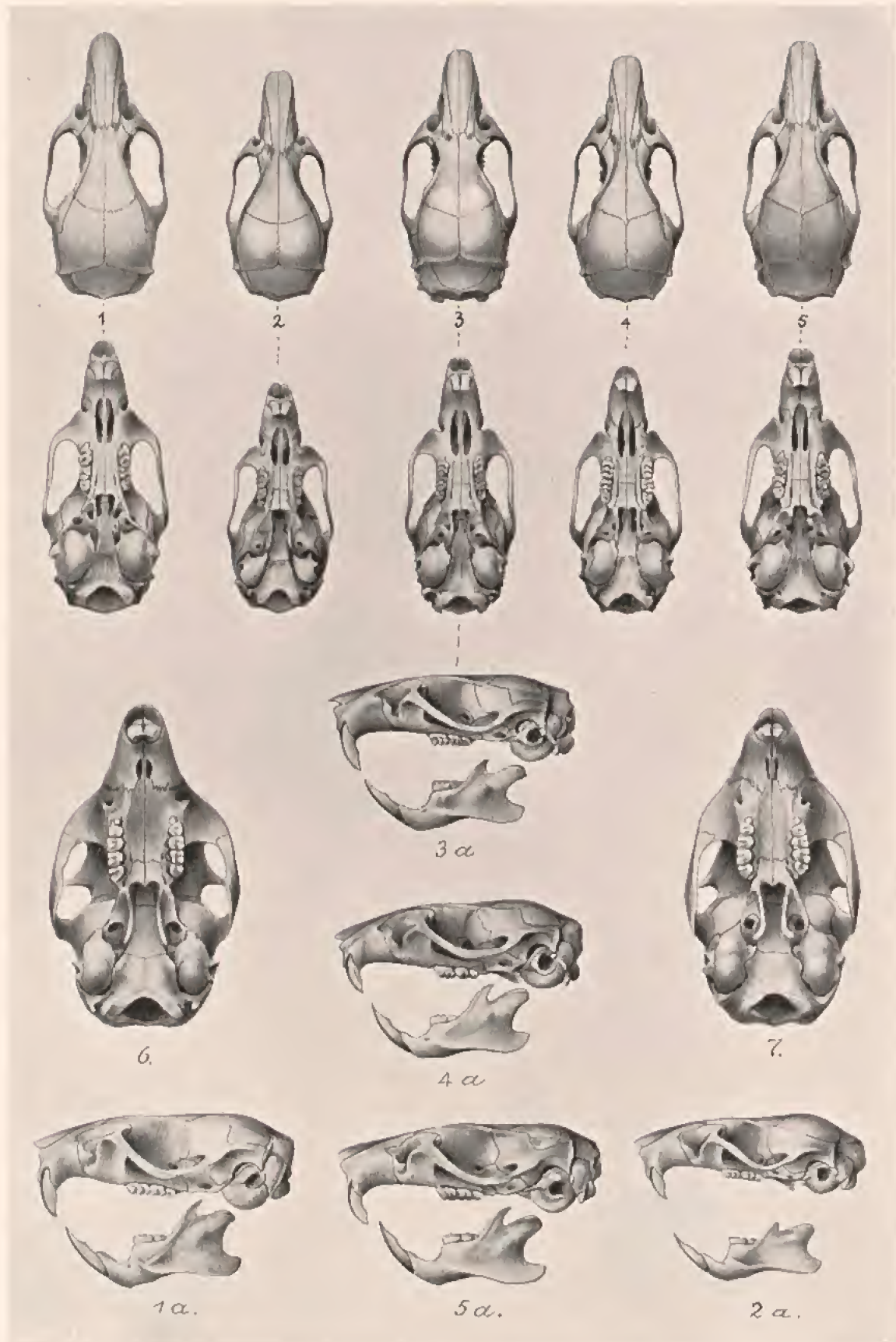
1. 2. MUS JALORENSIS.
3 MUS GRISEIVENTER.
¾ nat size.



H. Grönvold del. et lith.

Mintern Bros. imp.

HYSTRIX GROTEI, GRAY.
(NAT. SIZE).



Skulls of *Sciurus* and *Mus* from the Malay Peninsula.

REPORT ON THE BATRACHIANS AND
REPTILES

By G. A. BOULENGER, F.R.S.

INTRODUCTORY NOTE

THE Batrachians collected by Mr. ROBINSON and myself, on which, with the Reptiles, Mr. BOULENGER has been kind enough to furnish a report, were obtained in the Patani States, a few of the commoner species being also represented by duplicates from Perak or Selangor. The Reptiles are mostly from the same district, but some interesting forms were obtained in Selangor by Mr. ROBINSON, and the type of a new species of *Testudo* and several snakes and lizards were collected by us together in South Perak. In preparing the notes I have added to Mr. BOULENGER's report, I have used Mr. ROBINSON's observations as well as my own, some of the latter having been made as long ago as 1899; and the descriptions of the colour of the living animals were mostly our joint work. From a bionomical standpoint, two interesting features in the collection are the evidence it affords (1) of the superior conspicuousness of coloration possessed by *young* individuals of certain species of Reptiles, and (2) of the mimicry of the deadly *Naia bungarus* by a non-venomous snake.

It should be noted that while the 'Skeat' collection of Reptiles from the Patani States, which was made by myself, was peculiarly rich in snakes, our attempt in the present one was to obtain as representative a series of the lizards of the district as possible, so that the two collections supplement one another in a very interesting way.

NELSON ANNANDALE



REPORT ON THE BATRACHIANS AND REPTILES

By G. A. BOULENGER, F.R.S.

THE collection made by Messrs. ANNANDALE and ROBINSON, and kindly entrusted to me for study, affords a substantial supplement to our knowledge of the herpetology of the Malay Peninsula, recently enriched by the efforts of Messrs. S. FLOWER, A. L. BUTLER, and L. WRAY, and by the 'Skeat' Expedition, in which Mr. ANNANDALE himself took part, and the results of which have been reported upon by Mr. LAIDLAW. The present report contains descriptions of two new frogs, two new tortoises, a new lizard, and a new snake; whilst three lizards (*Mabuia siamensis*, *Lygosoma quadricittatum*, *Dibamus novae-guineae*) and one snake (*Ancistrodon rhodostoma*) are recorded for the first time from the Malay Peninsula.

BATRACHIA

ECAUDATA

PELOBATIDAE

1. *Megalophrys montana*, Kuhl

(Plate V, Fig. 1.)

A young specimen, 26 mm. from snout to vent, and numerous larvae from Bukit Besar (2,500 feet). A half-grown male from Jalor.

The curious larvae, with their enormous funnel-shaped lips, were first described and figured by Professor MAX WEBER,¹ and further specimens from Bukit Besar, obtained by the 'Skeat' Expedition, and identified by me, have been noticed by Mr. LAIDLAW,² and figured by Dr. GADOW, in the Reptile volume of the *Cambridge Natural History*, p. 60.

1. *Ann. Jard. Bot. Buitenzorg*, xv, Suppl. ii, 1898, p. 5.

2. *Proc. Zool. Soc.* 1900, p. 889.

The superciliary 'horns' are merely indicated in the half-grown specimen and in a young perfect specimen, and no trace of them is to be seen in one, only half as long, which has retained the tail fully developed. The tympanum is distinct. Until more specimens have been examined, it is, in my opinion, safer to designate this frog by the varietal name *aceras* than to describe it as a new species.

'The adult appears to be nocturnal, and all the specimens that I have seen under natural conditions have been taken in dead tree-trunks lying on the jungle floor. The larvae were obtained from a pool, not more than a foot-and-a-half square, in a little watercourse of partially artificial origin. I took a number of specimens in the same pool at the beginning of May, in 1899. They occupy the extreme edge, where the water is so shallow that their tails almost touch the bottom when they are suspended from the surface film; and when the pool dries up, as it does in comparatively dry weather, they conceal themselves among the mud and dead leaves that remain, living, at any rate for some days, under such conditions. Nevertheless, we were unable to keep them alive in captivity for more than a day or two, probably because we did not put them in sufficiently shallow water. Their food, judging from the contents of their intestines, consists of algae and minute organisms, both animal and vegetable. I do not believe that it is possible for them to rasp the leaves of water-plants, as Dr. GADOW suggests. As a rule, they hang from the surface film, as in Dr. GADOW's figure, but occasionally they sink to the bottom, where they often lie on one side for a few minutes before returning to the surface. The moment that they commence to sink, the funnel round the mouth collapses, taking on the form of a pair of horns, curling backwards along the side of the head; but, as they touch the surface again, it re-expands into a regular parachute form: I was able to obtain photographs illustrating this action. It is probable that development is liable to be protracted by drought, as we found specimens in the same pool both at the end of April and again in September and October, and those taken in the autumn were, with a few exceptions, only a very little further advanced than those taken in spring, an unusually dry summer having intervened. It is, however, possible that they may have belonged to different broods, and I am only led to make the suggestion that this was not so, by the fact that on one occasion, even in September, when the rains should be commencing, the pool dried up almost completely, and the tadpoles took refuge in the mud. The funnel round the mouth exhibits some curious histological features, which will, I hope, be described in a subsequent paper.'

BUFONIDAE**2. *Bufo asper*, Gravenh.**

Bukit Besar, 2,500 feet, and Sungkei, Batang Padang, South Perak.

'A common species, both in Perak and in the Siamese States. It is generally found near human dwellings or in secondary jungle, but occasionally penetrates into thick forest country.'

3. *Bufo parvus*, Blgr.

Sungkei, South Perak.

4. *Bufo melanostictus*, Gthr.

Jalor and Selangor.

'Probably the commonest terrestrial Batrachian in most parts of the Peninsula, but I have never seen it in thick jungle. In the town of Senggora it issues forth from holes in the city wall every evening, or after a shower, in enormous numbers.'

ENGYSTOMATIDAE**5. *Callula pulchra*, Gray**

Jalor and Selangor.

'Common in the Patani States and Senggora, apparently less so on the west side of the main range. It is chiefly nocturnal in its habits, often hiding during the day among the cocoanut-husks and other refuse under native houses. I have seen a specimen seated in the hollow of a dead branch, surrounded by what appeared to be the remains of an ants' nest; but all the ants were dead, whether killed by contact with the Batrachian or not, I cannot say, though it seems probable that this may have been the case. I have noted elsewhere, how the way in which this toad inflates itself on being disturbed causes its conspicuous coloration to be displayed.'

6. *Microhyla ornata*, D. & B.

Mabek, Jalor.

'Not uncommon in the long grass of clearings surrounded by jungle.'

RANIDAE

7. *Oxyglossus lima*, Gravenh.

Cape Patani.

‘Common in the freshwater pools among the sandy Casuarina woods on Cape Patani ; appears to be largely an aquatic species. Local in distribution.’

8. *Rana macrodon*, D. & B.

Bukit Besar, 2,500 feet ; and Telôm, Perak-Pahang boundary, 4,000 feet (young specimen).

‘Both specimens were taken hiding under stones at the edge of jungle streams.’

9. *Rana tigrina*, Daud.

Jambu, Jhering.

‘The specimen was taken on the mud of the brackish mangrove swamp at the mouth of the Jambu River. In such environment it is not uncommon, occupying holes exactly similar to those of the mangrove crabs. I have seen a specimen dive into a strongly saline pool and remain under the surface for some minutes. It is also abundant, judging from its characteristic croaking, in the swamps of the Taleh Sap at Lampam, in Patalung, these swamps being possibly brackish at certain seasons of the year.’

10. *Rana limnocharis*, Boie

Jalor.

‘The common rice-field frog, both of the Patani and the Federated Malay States. In dry weather it is occasionally found in the jungle, and it is generally common on elephant tracks in all places where the ground is sufficiently soft to retain impressions wherein water may collect. Puddles thus formed are a favourite spawning-place, but the eggs are also frequently laid in ditches and pools. They form a feebly coherent, one-layered mass of no great size that floats on the surface of the water, which oftens becomes quite hot under the mid-day sun. The ova appear to have about half the diameter of those of *R. temporaria*, and to hatch within a week. In Jalor, spawning takes place throughout the summer months, but most frequently in June or July, apparently reoccurring after every heavy fall of rain. *R. limnocharis* sits in great numbers along the edges of the embankments of flooded rice fields, and when a person or large animal approaches, leaps hurriedly, with a splash, into the water. It swims away for a yard or two, and then returns

abruptly to the embankment, only a few feet in front of its former station. So rapidly is this manoeuvre executed, that the frog is often re-established on dry land before the cause of its disturbance comes on a level with it, in which case it again leaps off and acts as before. At night and during breeding times in summer, the rice-field frogs (in Malay *berkatak bendang*) are very noisy, their croaking somewhat resembling the syllables 'gông-gông, gông-gông,' repeatedly and monotonously reiterated. In Jalor, Malay children imitate it very accurately by means of an ingenious toy. They take a narrow strip of rattan or other flexible but fairly stiff material, and split it for about half its length; on each section they fasten a large *Ampullaria* shell, and then draw a stick rapidly backwards and forwards between the two shells.

'In a number of specimens of *R. limnocharis*, taken from the same field and on the same day, the colour variation is considerable, some being devoid of a pale mid-dorsal line, which in some is white, in some green, in some pink, and in some tinged with yellow; while, occasionally, the whole of the dorsal surface, which is usually of a dull mottled-grey, is suffused with bright green. This frog forms a very important item in the diet of several reptiles and of the numerous wading birds that collect in the rice fields during the rains of autumn and winter.'

11. *Rana erythraea*, Schlg.

Mabek, Jalor.

'I do not remember having seen this frog either in the coast lands of the Patani States, in the rice fields of Jalor and Nawngchik, or in the comparatively dry jungle on the limestone hills of the former state; but it is not uncommon at Mabek, sitting on bushes at the edge of the stream, into which it leaps as soon as any disturbance occurs in its vicinity. Several may sometimes be seen on one bush. Near Kuala Lumpur, as Mr. ROBINSON has pointed out to me, it is common in the rice fields.'

12. *Rhacophorus leucomystax*, Gravenh.

Kampong Bayu and Biserat, Jalor.

'This species is fairly common in the neighbourhood of human dwellings, both in the Patani States and other parts of the Peninsula, though being largely nocturnal, it is not very often seen. Its spawn is never, so far as I am aware, deposited in the water, but is either suspended from the leaves of trees, the eaves of houses, or some other point projecting over water or damp soil, or else is laid on the edge of buffalo-wallows or the embankments of

rice fields. The larvae appear to be able to develop considerably, at any rate to assume an elongate form, before the froth, in which they are enveloped, comes in contact with water ; but if the direct rays of the sun fall upon them, as is often the case, and if they are not washed into some pool or puddle within a week or so, they perish. The frog is by no means sagacious in placing its spawn.¹

Rhacophorus leucomystax has greater powers of colour change than any other frog with which we met, the changes being due partly to changes in the surroundings, or perhaps rather to variations in the intensity of reflected light, and partly to its own emotions. A specimen sitting among green leaves in the open is usually of a yellowish-green shade, while one confined in a comparatively dull environment becomes darker ; but sluggish specimens, which may be diseased, are generally dark ; and if a green specimen is handled, it also becomes dark, the bars on its hind legs being very conspicuous. We saw one specimen, which, seated on a withered banana leaf and surrounded with other withered trunks and foliage, had assumed the dull grey of such surroundings exactly ; even the iris, which is habitually yellow or brown, having become of this colour. This was at mid-day, in fairly bright light, but the individual appeared to be unusually comatose.²

13. *Rhacophorus robinsonii*, sp. nov.

(Pl. V, Fig. 2).

Vomerine teeth in two strong and oblique series touching the inner front edge of the choanae. Snout narrow, as long as the diameter of the orbit ; loreal region nearly vertical, slightly concave ; nostril a little nearer the end of the snout than the eye ; interorbital space a little broader than the upper eyelid ; tympanum very distinct, two-thirds the diameter of the eye. Fingers rather short, much depressed, entirely webbed, the disks as large as the tympanum ; toes webbed to the disks, which are a little smaller than those of the fingers ; subarticular tubercles small but very prominent ; a very small inner metatarsal tubercle ; no tarsal fold. Tibio-tarsal articulation reaching between the eye and the tip of the snout. Skin smooth, granulate on the belly and under the thighs ; no dermal flaps at the heels or above the vent ; a strong fold above the temple. Pinkish-brown above, bluish-grey on the sides of the body and limbs ; sides of head darker purplish-grey, which above is sharply defined on the canthus rostralis ; ill-defined dark spots on the back ; limbs with greyish-brown cross-bars ; interdigital webs blackish, with light veins ; whitish beneath, throat mottled, belly marbled with grey. From snout to vent, 73 mm.

1. Cf. Gadow's *Amphibia and Reptiles*, p. 247.



J. Green del. et lith.

Miner Bros. imp.

1. *MEGALOPHRYS MONTANA*, var. *ACERAS*. 2. *RHACOPHORUS ROBINSONII*.

3 4. *IXALUS LARUTENSIS*.





J. Green del. et lith.

1. RHACOPHORUS NIGROPALMATUS.

2a.

2. IXALUS HORRIDUS.

Mintern Bros imp

This fine new *Rhacophorus* is very near *R. fasciatus*, BLGR., from Sarawak. It differs in the more rounded snout, the more anterior nostril, a larger tympanum, and strikingly in colouration. *R. shelfordi*, BLGR., also from Sarawak, which agrees very closely in most respects with this species and with *R. fasciatus*, is distinguished by having the disks of the fingers considerably smaller than the tympanum.

A single specimen, from Bukit Besar. 2,500 feet.

The specimen was taken in the morning, seated, a foot or two above the ground, on the leaf of a herbaceous plant growing in thick jungle. It was very sluggish, making no attempt to escape, though considerable disturbance had been caused by our passage in its immediate neighbourhood. The fore-legs were folded beneath the chest, and the hind legs were pressed close to the sides of the body, beneath which the feet were partially concealed; the snout was somewhat depressed. The colour of the whole of the dorsal surface was a pale coffee, which so closely resembled the shade assumed by many dying leaves that the frog, with its leaf-like outline in the attitude described, was, at first sight, mistaken for a leaf that had fallen from the trees above and had accidentally lodged on the plant; Mr. ROBINSON, a Malay who accompanied us, and I were all completely deceived. At this time the purplish-grey of the side of the head was black, and extended in a well-defined band down each side. When the specimen was handled, its colour became darker, and mottlings of an ill-defined character, as well as the cross-bars on the limbs, made their appearance, as they so often do in species of *Rhacophorus*. The specimen permitted itself to be captured almost without a struggle, after waiting while a camera was fetched and a photograph taken.

14. *Rhacophorus nigropalmatus*, Blgr.

(Pl. VI, Fig. 1).

This handsome frog, probably the very species alluded to by WALLACE¹ as the 'flying frog,' was first described from Sarawak. It has since been rediscovered in Sumatra² and in Upper Perak.³

A female specimen was obtained at Mabek, Jalor, on the 22nd July, 1901. Its colour in life was as follows:—'Dorsal surface pale grass green, powdered with white; a conspicuous white mark on the dorsal surface of the thigh; on the dorsal surface of the feet, the green changes gradually into orange; membrane of the feet, orange marked with black; sides of the body

1. *Malay Archipelago* I, p. 60.

2. F. Werner, *Zool. Jahrb. Syst.* XIII, 1900, p. 496.

3. S. Flower, *Proc. Zool. Soc.* 1899, p. 899.

orange, changing into deep salmon pink on the abdomen and under surface of digits ; throat and chest cream-colour.'

The specimen, a female, measures 88 mm. from snout to vent. The largest specimen, from Bidi, Sarawak, in the British Museum, measures 100 mm.

The male is still unknown.

' Mr. ROBINSON, who took the specimen, notes that it dropped almost vertically from a tall tree growing at the edge of a large clearing in the jungle, while the individual obtained by Mr. L. WRAY, in Upper Perak, was sitting on a tree-trunk.' Beyond the statement of the Chinamen who procured WALLACE his specimen, there appears to be no evidence to prove that the "flying frog" does use its enormous feet to support it in the air, and, so far as we could see, it did not appear likely, from the condition of the web in the living animal, that their purpose was that assigned to them by the discoverer of the species. The seemingly gorgeous coloration may very possibly be protective in its proper surroundings, for, with the exception of the black and orange on the feet, the colours are not arranged so as to contrast with one another, and, as I have pointed out elsewhere,² the most brilliant colours, provided only their arrangement be correct, may serve for concealment under conditions of light common in the Malay jungle. In the plate, our specimen of *R. nigropalmatus* is represented as it now is, for the marblings on its dorsal surface only became apparent after it was plunged into spirit. It is interesting to notice that markings of a similar character appear on the bodies of all the three species of *Rhacophorus* taken, if they are roughly treated, and probably also if they are in bad health. These markings are not conspicuous enough to be instances of warning coloration, but are rather analogous to the blushing or paling of a human being under the influence of emotion or in pathological conditions.

' Within the limits of the genus *Rhacophorus* we have the three main divisions, into which the phenomena of protective coloration may be divided, all well illustrated ; in the first place, there are species, like *R. leprosus*, which are coloured to suit their habitual environment, having little power of adapting their colour to any other environment ; in the second place, there are species, like *R. leucomystax*, which can, to a certain extent, adapt themselves so as to be concealed in environments of several different kinds ; while in the third, there are species, like *R. robinsonii*, which appear to resemble some definite object, in this case a dying leaf, not necessarily to be found in the environment in which they are seated for the moment, but which might very well occur in surroundings of the kind.'

1. *Proc. Zool. Soc.*, 1899, p. 899.

2. *Proc. Zool. Soc.*, 1900, pp. 849-852.

15. *Ixalus larutensis*, Blgr.

(Pl. V, Figs. 3 and 4)

Snout rounded or obtusely pointed, as long as the diameter of the orbit; canthus rostralis distinct; loreal region concave; nostril a little nearer the end of the snout than the eye; interorbital space as broad as the upper eyelid; tympanum moderately distinct in the adult, indistinct in the young, half the diameter of the eye. Fingers free, toes half webbed; discs of fingers as large as the tympanum; subarticular tubercles moderate; a small inner metatarsal tubercle. The tibio-tarsal articulation reaches between the eye and the tip of the snout. Upper parts smooth, or with small flat warts; throat, belly, and lower surface of thighs granulate. Grey brown or reddish-brown above, with dark brown symmetrical markings, a cross-band between the eyes being constant; usually a)(or)(—shaped marking on the anterior part of the body; sides of body and of thighs with white spots on a brown ground, or between a brown network; a dark-brown lumbar spot may be present; limbs with dark cross-bands; lower parts white, spotted or speckled with brown. One of the two young specimens from Jalor has a whitish vertebral line from end of snout to vent, a similar line along the upper surface of the thigh and leg and another from the chin to the breast; the lower parts are obscured by brown mottlings.

From snout to vent, 35 mm.

This species was described in 1900¹ from specimens obtained in the Larut Hills, between 4,000 and 4,500 feet altitude. Two young specimens from Bukit Besar (2,500 to 3,500 feet) are in Messrs. ANNANDALE and ROBINSON's collection, and are here figured.

'The specimens were found among dead leaves, to which they bore a remarkable resemblance, on the jungle floor.'

16. *Ixalus horridus*, sp. nov.

(Pl. VI, Fig. 2).

Very similar in general appearance to *Rhacophorus leprosus*, SCHLG., and *R. costalis*, BLGR. Head rather strongly depressed, the obtusely pointed snout a little longer than the diameter of the orbit; canthus rostralis obtuse; loreal region concave; nostrils close to the end of the snout; interorbital space a little narrower than the upper eyelid; tympanum distinct, as large as the eye. Fingers half webbed, with large terminal expansions which are broader than long, and as broad as the diameter of the tympanum; toes webbed to the disks, which are smaller than those of the fingers; terminal phalanx bifurcate; subarticular tubercles of fingers and toes very small; a small, oval,

1. *Ann. Mag. Nat. Hist.* (7) VI, p. 187 (1900.)

inner metatarsal tubercle. The tibio-tarsal articulation reaches between the eye and the tip of the snout. Upper parts with very prominent, irregular large warts, themselves studded with granular asperities in the adult; throat, breast, lumbar, and antero-femoral region and lower surface of limbs smooth; belly and anal region with large flat granules. Dark warm-brown above, with rather indistinct blackish spots on the body and regular cross-bars on the limbs; the granular asperities greyish; a large black lumbar spot; webs blackish; lower parts white ('bright blue-grey' in life), largely spotted and marbled with black. Male, with a large soft pad on the inner side of the first finger and an internal vocal sac.

From snout to vent, 40 mm.

Description of Tapole. Body much depressed, a little longer than broad, its length one and three-fifths to one and three-fourths in that of the tail. Eyes superior, two and one-half to three diameters apart; distance between nostrils about two-thirds interocular width. Mouth ranid in type, elliptical, its width a little greater than the interocular. Beak black, sides and lower edge of the lip fringed with papillae, upper lip with a long series of fine horny teeth, followed on each side by three series, three interrupted series of teeth on the lower lip. Spiraculum on the left side, in the posterior third of the body, directed straight backwards. Anus turned to the right, close to the lower edge of the tail. Tail two and two-thirds to three times as long as deep, rounded at the end, the depth of the muscular portion, in the middle of the length, about half the total depth, the upper caudal crest does not extend on the body.

The length of the numerous specimens, which are uniform dark-brown or blackish, with the lines of sensory organs distinct and whitish, varies between 15 mm. and 50 mm.

'A considerable number of adults of this species inhabited a tree in the jungle near our camp on Bukit Besar, occasionally manifesting their presence by low grunts or croaks, uttered singly at intervals. The tree was one of those from the lower part of whose trunk large buttresses project, and in its case these buttresses had coalesced in pairs, so as to form cavities, which contained several gallons of rain water and dead leaves. The frogs deposited their spawn on the trunk in frothy masses about the size of a cricket ball, a foot or two above the surface of the water in these cavities, which was of a deep brown colour. The masses resembled those produced by *Rhacophorus leucomystax*, but were rather smaller and paler in colour. I found that if they were not washed down by the rain into the water within three or four days, the froth dried up and the ova perished. The cavities

were haunted by a snake, *Tropidonotus chrysargus*, two specimens of which were taken feeding on the spawn, despite the froth in which it was embedded.

'The ova were quite devoid of colour, but the larvae soon assumed an almost uniform velvety black hue. The blue grey, so conspicuous on the belly of the adult, did not commence to make its appearance until the hind legs were fairly well developed, and was much less intense on the young frog than in the older specimens, being in very young individuals merely greyish-white. The dorsal surface of the adult so closely resembled the bark of the tree on which our specimens were taken, that I was unable to distinguish any of the individuals captured in the shadow of the buttresses, and only knew of their presence through their croaking or when they moved; they were caught with a net in the water in the cavities, into which they dived when the trunk was tapped.

'The resemblance, both above and below, between this species and *Rhacophorus leprosus*, known from the mountains of Perak, is very close indeed, and is probably an instance of adaptive resemblance or "convergence," though the two frogs belong to closely allied genera, seeing that they both differ widely in appearance from the typical members of their respective genera. Their habits appear to be identical,' and it is probable that a very close resemblance also exists between their larvae, which live under very similar conditions, but it is not known whether the species are found together. It would almost seem as if there was some physiological connexion in these genera between a warty, bark-like dorsal surface, and a blue-grey belly, mottled with black, as it is most improbable, in consideration of the conditions under which these frogs live, with their bellies closely pressed against the bark of trees, that the conspicuous coloration of the ventral surface is an advertisement to enemies. The coloration does not appear to be altogether parallel to that of *Bombinator*, as the species of the latter genus are said to display the brilliant orange or yellow of their bellies at the sides of the body, though the fable that they turn over on their backs to do so has been refuted.² It may be pointed out, however, as Dr. Gadow himself confesses, that it is not always possible to induce tame individuals of this genus to adopt the 'warning attitude,' and that it is just possible that the attitude has primarily no connexion with the coloration of the ventral surface, as it is one paralleled by the common attitude of alarm of many animals which are soberly coloured below, even by certain Orthoptera and Crustaceans. In this case, boldly contrasting patterns on the belly of these four Batrachians may very well have a common origin in each instance, though we cannot at present state their object.'

1. Cf. L. Weay, *Perak Museum Notes and Journ. Straits Branch Roy. Asiat. Soc.*, 1890, p. 144.

2. Gadow, *Amphibia and Reptiles*, pp. 156, 157.

REPTILIA

CHELONIA

TESTUDINIDAE

1. *Batagur baska*, Gray

A young specimen from the lower reaches of the Patani River.

2. *Damonia subtrijuga*, Schl.g. & Müll.

Lower reaches of Patani River.

3. *Cyclemys amboinensis*, Daud.

Kampong Jalor.

'Also common in the pools on Cape Patani, where it is frequently kept as a pet by the Malay children ; its fat is used as a medicine for fever.'

4. *Cyclemys platynota*, Gray

Kampong Jalor.

5. *Cyclemys annandalii*, sp. nov.

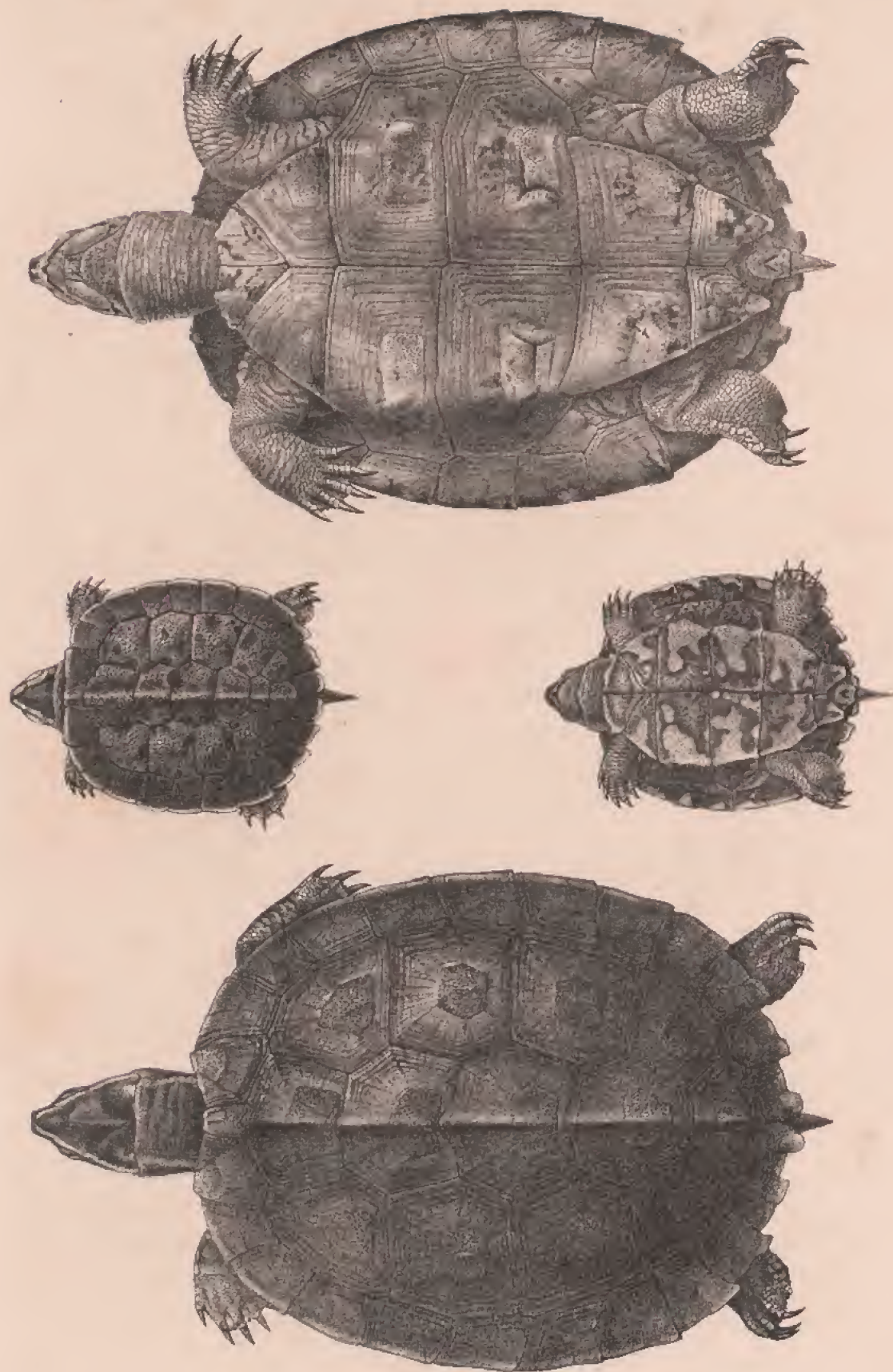
(Plates VII and VIII)

Belongs to the first section of the genus, including *C. platynota*, *dhor*, and *mouhoti*, characterized by the plastron not completely closing the shell and being emarginate posteriorly, and by the separated posterior margin of the carapace. Agrees with *C. platynota* in having the suture between the pectoral shield and the marginals longer than that between the abdominal and the marginals, but differs chiefly in the stronger bicuspid beak, the denticulate border of the upper jaw, the more slender zygomatic arch of the skull, the larger axillary shield, the smaller anal shields with a deeper notch between them, and, normally, in the absence of a sixth vertebral shield.

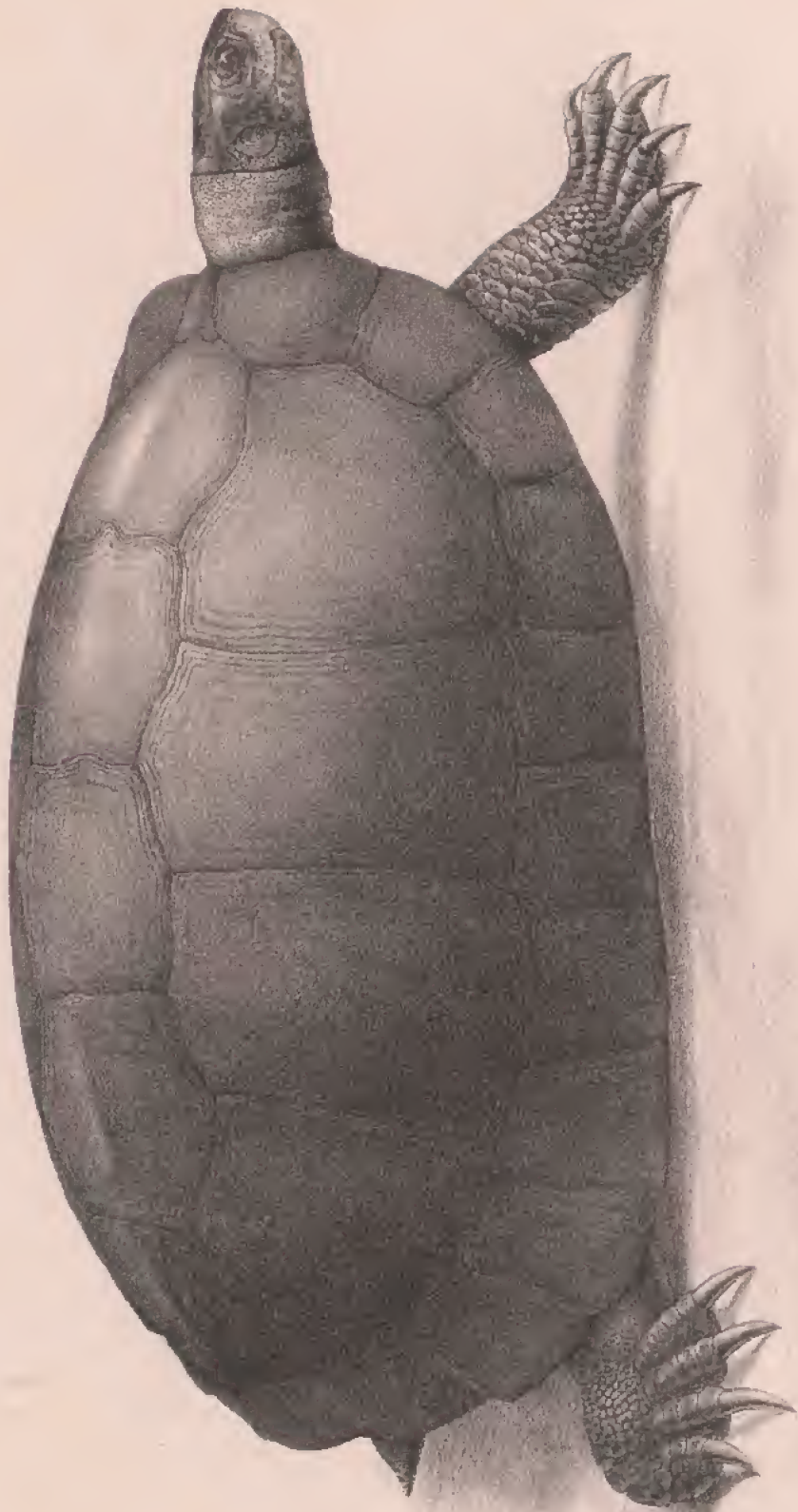
This species, with which I have much pleasure in connecting the name of Mr. ANNANDALE, is founded on three specimens from Kampong Jalor ; two young in spirit, and a large male, preserved dry, with skin and skeleton.

A. *Description of the Young.*

Carapace depressed and unicarinate, with serrated posterior margin, vertebral shields broader than long, as broad as or a little narrower than the costals, first as broad, or nearly as broad, as the second. Plastron narrower than the opening of the shell, with deeply notched hind



CYCLEMYS ANNANDALII, YOUNG. ($\frac{2}{3}$ NAT. SIZE).



CYCLEMYS ANNANDALII ($\frac{2}{3}$ NAT. SIZE).

lobe, and connected with the carapace by a distinct bridge, the width of which is contained twice-and-a-half in the length of the plastron; axillary and inguinal shields large, the suture between the pectoral shield and the marginals longer than that between the abdominal and the marginals, the suture between the pectoral shields as long as or a little shorter than that between the abdominals, the suture between the humeral shields shorter than that between the gulars, and that between the anals shorter than that between the femorals. Hook of the upper jaw bicuspid. Digits extensively webbed, claws long, curved, sharp. Front part of the jaw with broad, band-like transverse shields. Carapace dark brown, spotted with black in the young, plastron and lower surface of marginal shields yellowish, with symmetrical dark-brown markings in the young. Head and upper surface of the neck dark-brown; a yellowish streak on each side of the head, from the upper surface of the snout to the neck, passing above the eye and the tympanum, another, higher up, and parallel with the lower, on the temple, on the neck, lower jaw and edge of upper jaw, yellowish.

Of the two specimens, one (*a*) is newly born, the other (*b*) considerably older.

(*a*) Length of shell, 60 mm.; width, 55 mm.; depth, 28 mm. Shields rugose; an additional shield intercalated between the fourth and fifth vertebrae, and another between the fourth costal and the fifth vertebral. Vertebral keel and edge of marginals yellow; roundish black spots irregularly disposed on the vertebral and costal shields; marginal shields blackish above, speckled with lighter in their proximal third. Plastron with a complicated dark pattern with rounded outlines, between which are dark vermiculations; similar markings cover the bridge and the greater part of the lower surface of the marginals.

(*b*) Length of shell, 145 mm.; width, 117 mm.; depth, 67 mm. Shields with concentric grooves and radiating ridges around the rugose portion.

Traces of the symmetrical dark markings of the younger specimen can be observed on the plastron.

B. Description of the Adult Male.

Shell three times as long as deep, once and two-thirds as long as broad; its posterior border much less strongly serrated than in the young; shields nearly smooth, with the vertebral keel merely indicated on the fourth and fifth vertebral shields; second and third vertebral shields as long as broad, about two-thirds the width of the corresponding costals; plastron deeply concave, the relative proportions of the shields as in the young. Upper jaw with two very strong median cusps, and a very distinct denticulation

along the whole border. The interdigital web appears to have been less developed than in the young. Tail nearly as long as the head. Shell black, with yellow markings over the marginal shields and on the plastron, the latter forming a broad median band; head blackish, vermiculate with yellowish, but without longitudinal bands.

Length of shell, 380 mm., width, 245 mm., depth, 130 mm.

'Numerous specimens were brought to us at Kampong Jalor by natives, who frequently keep this tortoise in captivity, boring a hole in the posterior margin of the carapace, and tying a string, passed through this, to their house-posts. We were prevented from preserving more than one large specimen by the bulk, and by the difficulty experienced in killing tortoises. The adult appears to be largely terrestrial in habits, but it is probable that the young are aquatic. The species probably attains a bulk considerably greater than that of our adult specimen.'

6. *Cyclemys dhor*, Gray

A young specimen from Kampong Jalor.

7. *Geoemyda spinosa*, Gray

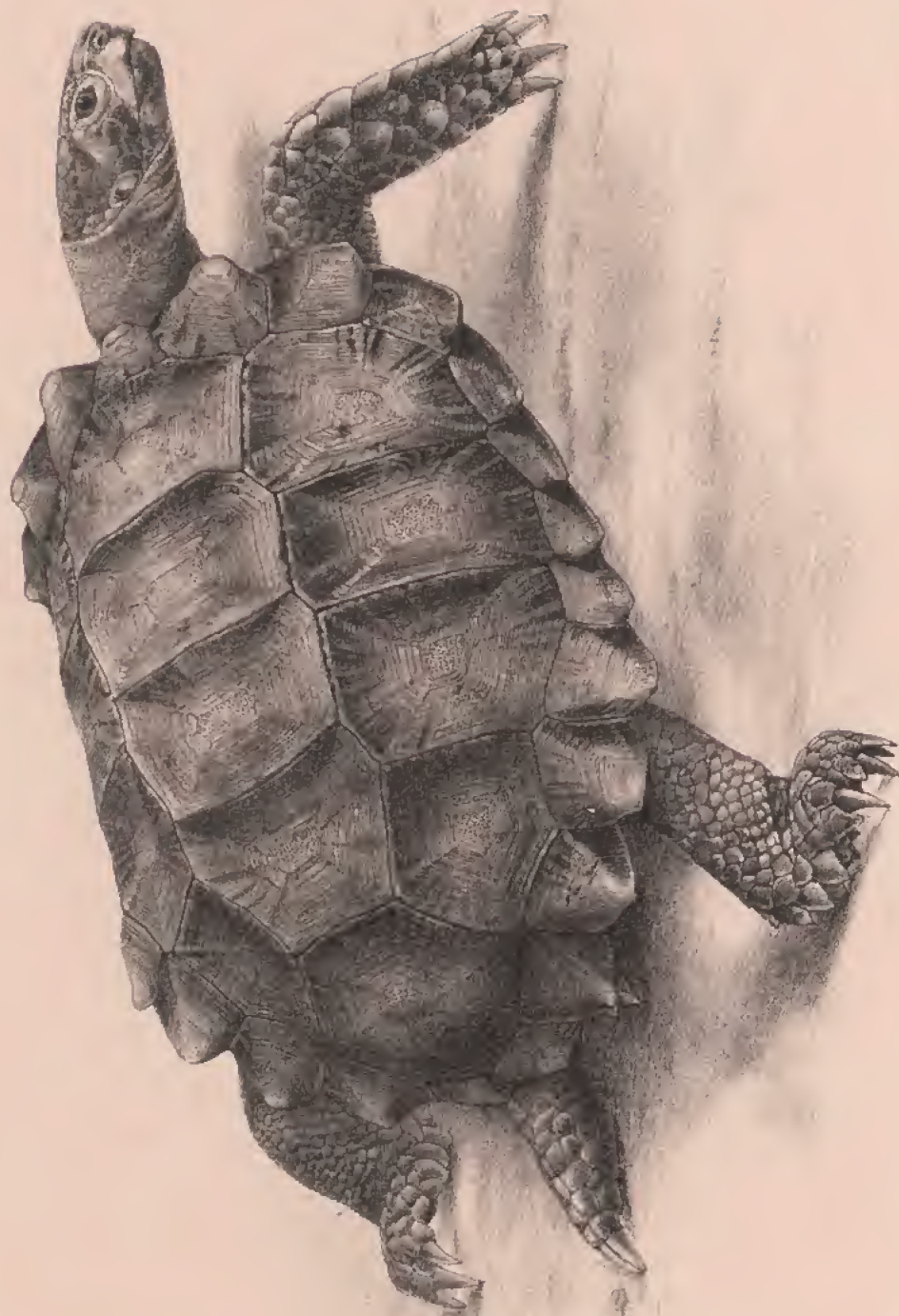
A young specimen from Kampong Jalor, another from the Batang Padang district.

'Common in the flooded rice fields of the Patani States.'

8. *Testudo pseudemys*, sp. nov.

(Pl. IX)

Shell much depressed, its depth one-third to two-fifths its length; anterior and posterior margins reverted and strongly serrated; nuchal shield present, rather large, broader than long; supracaudal shields two, embracing a deep notch; discal shields concentrically striated and more or less concave; vertebrals much broader than long, at least as broad as the costals, the second, third, and fourth, with the antero-lateral side not half as long as the postero-lateral. Plastron large, gular region more or less produced and notched, hind lobe deeply notched; width of the bridge one-third to two-fifths the length of the plastron; pectoral shields meeting on the median line, the suture between them measuring one-seventh to one-third the length of that between the humerals; axillary shield very small, inguinal large. Head rather small; temporal arch narrow, slender, its width not more than one-fifth the diameter of the orbit; two large praefrontal shields and a large frontal; jaws not hooked, not denticulate, the alveolar surface of the upper jaw with a feeble median ridge. Limbs with very large bony, imbricate tubercles, some of



TESTUDO PSEUDEMYIS. ($\frac{1}{2}$ NAT. SIZE).

which, on the front of the fore limb and on the heel, are pointed and spine-like ; a group of bony tubercles on the back of the thigh, the central ones very large and conical. Tail of male ending in a divided, claw-like bony tubercle. Yellowish or pale brown, dark brown or blackish on the periphery of the dorsal shields and on the anterior border of the marginals ; young with the carapace speckled with blackish ; plastron yellow or brown and yellow ; head and limbs yellow, more or less variegated with dark brown.



FIG. 1. Skull of *Testudo pseudemys*. Two-thirds natural size.

These tortoises agree in colour and general appearance with the shell from Siam described by Dr. GUNTHER as *Geoemyda impressa*, but they differ from it, as well as from all specimens of *Testudo emys* examined by me, in having the antelateral side of the vertebral shields so much shorter than the postero-lateral. The skull of *Geoemyda impressa* is unknown, but that of *Testudo emys* and that of *Testudo phayrii* differ from that of *Testudo pseudemys*

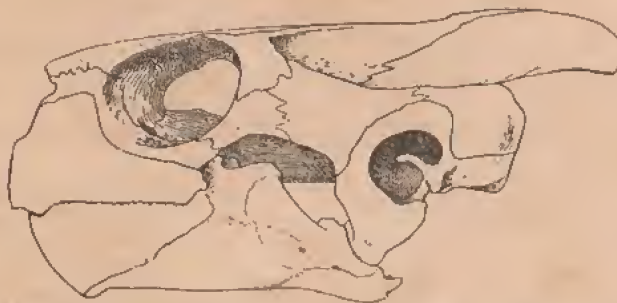


FIG. 2. Skull of *Testudo emys*. Two-thirds natural size.

in the much wider temporal arch, as may be seen by the annexed figure, taken from a specimen from Sarawak.

Two specimens, from the Batang Padang district, South Perak (1,000 feet to 2,000 feet), in the collection, the shell of the larger measuring 255 mm., that of the other 100 mm. I have besides examined a specimen from the Larut Hills, Perak (4,000 feet altitude), obtained by Mr. A. L. BUTLER in 1900, and a young specimen from Thao, Kasia Hills (3,200 feet

to 4,500 feet), collected by the late Mr. L. FEA, and which I first referred to *Testudo emys*.¹

I have lately examined a rather large number of specimens of *Testudo emys*, from the Malay Peninsula and from Borneo, and doubts, similar to those expressed by Dr. VON LIDTH DE JEUDE,² have arisen in my mind as to the specific identity of *Testudo phayrii* and *Geoemyda impressa*. The type of the former having been carefully figured by ANDERSON,³ and the skull of its co-type by GRAY,⁴ it is possible to form a correct idea of the specimens with which to compare the new material. Both the tortoises brought home by Messrs. ANNANDALE and ROBINSON agree with *Testudo phayrii* in the shape and proportions of the plastral shields, and in having the nuchal shield much wider than long, but the carapace is more flattened, more of the lateral marginal shields being visible when the shell is viewed from above, and the second and third vertebral shields have a different shape, their antero-lateral borders being much shorter than the postero-lateral. The greater depression might be merely due to age, the type of BLYTH's species measuring 510 mm. in shell-length. As to the second differential character, it appears to me to be of specific importance, and, coupled with the difference in the temporal arch, suffices to separate *T. pseudemys*.

In all the specimens,⁵ four in number, which agree with *T. emys* in having the pectoral shields of plastron more or less widely separated from each other, the antero-lateral border of the second and third vertebral shields is as long as the postero-lateral, or but slightly shorter; this is quite irrespective of the great difference in shape which these shields undergo with age, the shells at my disposal varying from 120 to 480 mm. in length. With one exception (the type of *Manouria fusca*, GRAY, from Penang), all these specimens have the nuchal shields as long as broad, or longer than broad.

Judging from the figure given by GRAY, the skull of *T. phayrii* is identical with that of *T. emys*; and as the extent of the pectoral shields is a character subject to considerable variations according to ANDERSON, whose figures show a gradual passage between the two extreme types, I think it best to provisionally maintain the species *T. emys* in the sense in which I have taken it in the *Catalogue of Chelonians* published in 1889.

'The two specimens of *Testudo pseudemys* were taken on a jungle path at dusk, within a few yards of one another. When alarmed they drew in their

1. *Ann. Mus. Genova* (2) xiii, 1893, p. 312.

2. *Notes Leyd. Mus.* xvii, 1895, p. 197.

3. *Proc. Zool. Soc.*, 1871, p. 426.

4. *Proc. Zool. Soc.*, 1869, p. 470 (*Scapia falconeri*).

5. Mostly from Borneo; three from Penang, two from the Larut Hills, Perak.

heads, but when lifted from the ground became very vicious, hissing, stretching out their necks and attempting vigorously to bite, their whole demeanour differing from that of specimens of *T. emys* I have seen in captivity in the Malay Peninsula.'

9. *Testudo elongata*, Blyth

Kampong Jalor.

'Several specimens were brought us by natives at Kampong Jalor, and they said it was common among the granite rocks of a hill in the neighbourhood, named Bukit Bubu (Bald Hill), never being found in the vicinity of water. They called it *kura-kura mas*, or 'gold tortoise,' because of the bright yellow colour of parts of the shell. In life the soft parts are of a pallid and slightly yellowish flesh-colour, and in all the specimens we saw, the nose was pink and inflamed, owing to the head and neck having been used as a lever to right the animal when it had been turned on its back.'

CHELONIDAE

10. *Chelone mydas*, L.

11. *Chelone imbricata*, L.

Both the green turtle and the hawksbill occur at the mouth of the Patani River. 'Their eggs, a perquisite of the Malay raja, are collected in enormous numbers, both on Cape Patani and more especially on certain small islands off the coast, a little to the north; but it is difficult to know what the turtles feed upon here, as the sea in these parts is almost devoid of sea-grass and large algae.'

EMYDOSAURIA

CROCODILIDAE

12. *Tomistoma borneensis*, Schlg. & Müll.

A gavial-like crocodilian was observed by Mr. ROBINSON, lying on a log in the Sungkei River, between Jeram Kawan and Sungkei, South Perak.

13. *Crocodilus porosus*, Schn.

Jambu, Jhering.

'The distribution of this crocodile in the Patani States is somewhat local, probably because it needs muddy banks on which to sun itself. It is abundant on the Jambu River, which is little more than a tidal creek, the larger specimens, as a rule, staying some distance up stream, but occasionally descending to the sea. On the lower reaches of the Patani River it is scarce,

1. *Kura-kura* is their general name for tortoises, but the large species of *Cyclemys* are called *telagu*, while land tortoises are known as *baning*, and the Trionychidae as *labi-labi*. N. A.

and the species which is abundant above Bendang Stah is very probably *C. palustris*; it occurs on the islands of the Taleh Sap and in the Lampam River, for a Siamese crocodile hunter at Lampam showed me a number of skulls, all of which appeared to be those of *C. porosus*. He told me, however, that about one individual in every hundred he killed had a very long nose, with a lump at the end, that is to say, probably, was a specimen of *Tomistoma borneensis*.

LACERTILIA

GECKONIDAE

14. *Gymnodactylus marmoratus*, Kuhl.

Bukit Besar. 2,500 feet.

‘Not uncommon on tree-trunks in the jungle. When disturbed it frequently runs down to the ground, and takes refuge in one of the rats’ holes common at the roots of trees.’

15. *Gymnodactylus pulchellus*, Gray

Bukit Besar, 2,500 feet, and Goah Tanah (Earth Cave), near Biserat.

‘The specimen from Bukit Besar was obtained from a hole in the trunk of a dying palm, about thirty feet above the ground. Those from the Jalor cave were found crawling on the sides and floor in absolute darkness; there are specimens, taken in a similar habitat in Selangor, both in the State Museum at Kuala Lumpur and in the Raffles Museum at Singapore.’

16. *Gonatodes affinis*, Stol.

Bukit Besar. 2,500 feet.

‘Dorsal surface dull grey, mottled with black and closely banded with yellow; mid-dorsal line slightly paler yellow; a large black spot, with a bright yellow “eye” in the centre, and bordered posteriorly with the same shade, just behind the base of the fore limbs, these markings being far more conspicuous in the male than in the female; three faint yellowish lateral bars.’

‘Common on tree-trunks in the jungle, especially on the one on which the frog *Ixalus horridus* was taken. The gecko was generally found between the upper part of the buttresses of this tree, but when it was disturbed it slipped down into the water in the cavities, beneath the surface of which it remained for some minutes, finally pushing out its head at one side so carefully that not the slightest commotion was caused. The roughness of its integument caused it to be covered with a film of air while beneath the surface of the

water, but it is doubtful whether this was anything but adventitious. Besides these geckos and frogs, and also snakes, the pools in the cavities were inhabited by numerous insects—Hemiptera and larval Diptera, Beetles and Odonata.'

17. Hemidactylus frenatus, D. & B.

Patani ; Gedong and Tapah, South Perak ; Kuala Lumpur, Selangor.

18. Hemidactylus platurus, Schn.

Patani ; Bukit Besar.

19. Gehyra mutilata, Wieg.

Bidor, South Perak.

'The three preceding species are all common in houses, both in the Patani States and in Perak. They all exhibit considerable power of colour change, becoming at night, under the influence of strong light reflected from whitewashed walls, of a peculiar translucent pale yellowish brown. If, however, they run across any dark object on the walls, they immediately become darker.'

20. Gehyra butleri, Bigr.

Kuala Lumpur.

Described in 1901' from three specimens obtained by Mr. A. L. BUTLER, at Kuala Lumpur, the largest measuring 32 mm. from snout to vent. The specimen brought home by Mr. ROBINSON measures 35 mm. from snout to vent, and has six lamellae under the inner toe, and eight under the fourth. Reddish above, speckled with brown and with yellow dark-edged ocelli, the ocelli closely approximating in pairs on the tail.

'I obtained several specimens of this species in Selangor, which, so far as my observation goes, is rarely found in houses. All my specimens were captured among the fibre at the base of the leaves of cocoanut palms, where they seem to feed largely on the small centipedes and millipedes found in such situations.' H.C.R.

21. Gecko verticillatus, Laur.

Jalor.

'This species is common on the trunks of cocoanut palms in the Patani States, but does not live in the houses either in this district or in Senggora,

where there are many large brick and plaster buildings, as it does in Bangkok,¹ where I have seen it commonly in European dwellings. It appears to have no power of colour change.'

22. *Gecko stentor*, Cant.

Batang Padang.

'Though somewhat scarce in collections, this gecko is really common in the Malay jungle, especially in Upper Perak and the adjacent parts of Rhaman, where I heard its characteristic cry almost continuously. It is usually a jungle species, frequenting the upper branches of high trees, but a large specimen, now in the State Museum at Taiping, Perak, was taken in a hospital (built at the edge of the jungle), in the walls of which its cry had disturbed the patients for some time. Our specimens were shot on trees by the Sakais, with their blow-guns; they consider its flesh a delicacy. The changes of colour undergone by the individuals of this species are very slight, being confined to a slight paling or darkening.

'The characteristic note of this large gecko is often heard in certain bungalows in Kuala Lumpur.' H.C.R.

23. *Gecko monarchus*, D. & B.

Bidor, South Perak; Kuala Lumpur, Selangor.

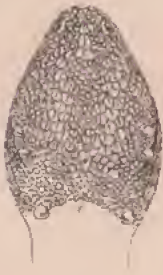
'The species appears to be somewhat particular as to its environment, occurring abundantly on the walls and ceilings of some houses, but avoiding others close to them. It has very little power of colour change.'

24. *Ptychozoon homalocephalum*, Gray

Two newly hatched young, from eggs obtained on Bukit Besar.

'The eggs, of which several sets, hatched and otherwise, were noted on Bukit Besar, are deposited in pairs, on the lower surface of leaves or on tree-trunks, sometimes quite near the ground. They have brittle calcareous shells, but must be soft when laid, as they are flattened where they come in contact with one another, the outline of the two together forming a figure of eight, and as the lower surface, which is also flattened, retains an impression of the surface to which it clings and on which the eggs have been laid. The eggs measure about 13 mm. in diameter, and 11 mm. in depth. The period of incubation is long for so small an animal; in the case of the eggs of a captive specimen

1. Cf. S. Flower, *P.Z.S.* 1899, p. 632.



1b.



1a.



3a.



2.



1.



3.

J. Green del et lith.

1. DRACO PUNCTATUS. 2. LIOLEPIS BELLII.
3. LYGOSOMA MIODACTYLUM.

Miner Bros. imp.

in Java, F. H. BAUER¹ found that it lasted from November to May ; specimens obtained by ourselves in May, in which the embryos were already far advanced, hatched a month later, and we found others, some advanced and some in an early stage of development, in September. When the young geckos emerged they were covered with a delicate membrane, which they cast immediately, rubbing it off against sticks and pulling it from the hind limbs with their mouths, and then devouring it. One specimen was kept alive for about a fortnight, during which it evinced not the slightest tendency to make use of the fold of skin along its side as a parachute. Indeed, this fold, except when accidentally displaced by coming in contact with some foreign substance, was always kept closely tucked round the body, so that it was hardly apparent. The young gecko, which was coloured so as to exactly resemble the bark of a tree, was slightly darker by night than by day, a white bar across the tail becoming more conspicuous in the evening ; otherwise the colour changed very little.'

AGAMIDAE

25. *Draco fimbriatus*, Kuhl.

Sungkei, South Perak, and Semangko Pass (2,700 feet), Selangor-Pahang boundary.

'General colour above greyish, brown on head and neck, with irregular spots of black, tail banded with blackish brown and clay colour ; lower surface of body uniform dirty grey, chin dusky grey, spotted with black and white on jaws, gular pouch salmon pink, lateral folds more orange.'

26. *Draco punctatus*, Blgr.

(Pl. X, fig. 1)

Head rather large ; snout as long as the diameter of the orbit ; nostril lateral, directed upwards ; tympanum naked, nearly as large as the eye-opening. Upper head-scales small, keeled ; a distinct **A**-shaped series of enlarged scales on the forehead ; a conical, spine-like tubercle at the posterior corner of the orbit and another in front of it ; ten upper labials. The male's gular appendage hardly as long as the head. A short and strong denticulate nuchal fold. Dorsal scales a little smaller than ventrals, feebly keeled ; a lateral series of enlarged scales. The fore limb stretched forwards extends a little beyond the tip of the snout ; the adpressed hind limb barely reaches the axil. Tail with a very strong crest of long pointed scales. 'Greyish above, tinged with rusty on the crown and on the middle line of the back, with numerous small black spots ; four large dark blotches forming a cross between the shoulders ; alar

1. Gadow's *Amphibia and Reptiles*, p. 512

membrane blackish above, streaked with whitish, uniform whitish beneath ; lower parts bluish, throat and breast with small blackish spots ; gular appendage and inner side of lateral wattles bright chrome-yellow.'

Total length, 230 mm. ; head, 17 mm. ; width of head, 12 mm. ; body, 67 mm. ; fore limb, 37 mm. ; hind limb, 43 mm. ; tail, 145 mm.'

This species was known from one specimen from the Larut Hills, Perak, and a second from Sarawak.

A single male was obtained on Bukit Besar, 2,500 feet ; shot on a tree in the clearing.

Draco punctatus is most nearly related to the Bornean *D. cristatellus*, GTHR., from which it differs in the stronger caudal crest, in the presence of a dorso-lateral series of enlarged scales, in the shorter gular appendage, in the rather larger upper head-scales, and in the perfectly lateral nostril.

27. *Draco melanopogon*, Blgr.

Bukit Besar. 2,500 feet.

This species is now known to have a wide distribution, as it has been recorded from various localities in the Malay Peninsula (Malacca, Singapore, Ulu Selama, Bukit Besar) and from Borneo, Sumatra, and the Natuna Islands.

The specimens from Bukit Besar (males) are described as having in life the dorsal surface moss-green and black, the ventral surface cream, marked with dark brown ; gular pouch black and white ; alar membrane black, spotted with golden yellow.

28. *Draco formosus*, Blgr.

Bukit Besar, 2,500 feet ; and Patang Padang, South Perak.

'Sides of throat deep claret-colour ; upper surface of alar membranes pale gamboge, with five irregular bars of blackish mottling, becoming claret-colour towards the outer edge ; a broad subterminal zone of paler claret and dull yellow mottled with black.'

'A pair of this species, probably a male and female, sailed into our clearing from the jungle and alighted on a large tree-trunk on several occasions, generally towards evening. The last to alight was once or twice secured, but the first always escaped. If unmolested, the former chased the latter up the tree in a spiral course, until they disappeared among the branches.

'The common *D. volans* has the same habit, and in its case it is easy to distinguish the sexes by the colour of their gular appendages. *D. volans*,

of which we did not obtain a specimen, is somewhat sporadically distributed in the Patani States, occurring in fair numbers on the trunks of the cocoanut and betel palms in some villages, while apparently absent from others. When seated on the trunks of these trees, however, its coloration and the immovability of its pose render it practically invisible. On the coast of Trang it is very abundant in the villages, as it is in many parts of Perak—though we did not happen to see it in that state—and Selangor, as well as in Singapore and Penang.'

29. *Draco blanfordii*, Blgr.

Bukit Besar. 2,500 feet.

30. *Gonyocephalus borneensis*, Schlg.

Semangko Pass, Selangor-Pahang border. 2,700 feet.

'I took the specimen representing this species; it was seated on a chair in the Government Resthouse, on the Semangko Pass, and was very sluggish. I have noticed the same sluggishness in the case of the North Australian *G. boydi*. Young individuals were not uncommon in the neighbourhood, and were exceedingly active and difficult to capture.' H. C. R.

31. *Gonyocephalus herveyi*, Blgr.

Batang Padang, South Perak.

32. *Gonyocephalus grandis*, Gray

Batang Padang, South Perak.

'The specimens in our collection of this and the preceding species were shot by the Sakais with their blowguns. For one of them we are indebted to Mr. G. B. CERRUTI, late Superintendent of Sakais, who also presented us with other zoological specimens from the same district.'

33. *Acanthosaura armata*, Gray

Bukit Besar; 2,500 feet.

'I found the specimen digging for earth worms in a small bare patch in the jungle. It had evidently been successful, as its stomach was full of earth. Apparently only its fore limbs were used in digging. When disturbed it rushed into a hole in a tree trunk. Another specimen was seen on Bukit Besar, clinging to the stem of a sapling. When a hand was stretched out to seize it, it dropped rather than leaped into the undergrowth.'

'When first seen, the specimen taken was almost black, with only small blotches of green on the body ; there was a distinct division in the coloration a little behind the fore limbs, and in front of this the shade was much duller than it was on the tail and the hind quarters. When the animal was handled, the green blotches began gradually to expand, until, finally, the comparative extent of green and black was completely reversed. This is remarkable as being exactly the opposite of what takes place when *Calotes cristatellus* is roughly treated.'

34. *Calotes cristatellus*, Kuhl.

Jalor, Batang Padang

'This lizard is the most common Agamid in South Perak and Selangor, and though it is, perhaps, less abundant in the Patani States, it is far from being scarce ; I have seen specimens in Patalung. Though essentially a brush-wood species, it penetrates into high jungle on Bukit Besar. It is rather less active than *C. versicolor*, and often sits quite motionless on tree-trunks, with its head and forequarters raised from the surface to which it clings. It is usually of a bright green colour in life, but if ill-used becomes almost black, the green only remaining in the form of small blotches and veinings, which, however, re-expand if the animal is killed or narcotized.'

35. *Calotes versicolor*, Daud.

Jalor and Batang Padang, South Perak.

'*Calotes versicolor*, the 'chamaeleon' of the Europeans of the Malay Peninsula, is very abundant in the northern parts of the Patani States, in Senggora, on the shores of the Taleh Sap, and also in Upper Perak ; but is rare in South Perak. It is an extremely active form, principally found in the neighbourhood of human dwellings. Mr. ROBINSON has watched a specimen seated on a tree trunk, up which a stream of leaf-sewing ants (*Oecophylla smargadina*) were making their way to their nest. It devoured many as they passed, and there is reason to believe that they form an important item in the food of the species. When this lizard is very much excited and in rapid motion, the locomotion becomes, at any rate for short distances, bipedal.' I have published an account of the nuptial dance of the Malay 'chamaeleon' elsewhere,² which is of interest as showing that the changes of colour which have given the lizard its English name proceed, like those of the

1. Cf. E. Green, N. Annandale, and W. Saville Kent ; *Nature*, 1902, vol. lxvi, pp. 492, 577, and 630.

2. *Proc. Zool. Soc.* 1899, p. 858.

true chamaeleon,' very largely from a psychological or psychico-physiological stimulus. The same view is illustrated by the fact that dark vertical bars, which are a fairly conspicuous feature in the young at all times, only become apparent in the adult when it is annoyed. My note on *Calotes emma* in Dr. GADOW's *Amphibia and Reptiles* (pp. 518, 519) should refer to this species.'

36. *Calotes emma*, Gray

Bukit Besar and Jalor

'General colour pale sage green; a broad longitudinal band of dirty white on each side; irregular transverse markings of sienna brown, becoming darker where they cross the longitudinal band; dorsal and nuchal crests pale sage green; lateral surface of head bright green, with a dark bar running backwards from the angle of the eye. Skin and base of scales on gular pouch dark crimson lake; a triangular sooty pouch immediately in front of fore limbs.

'Jalor is, so far as is known, the southern limit of this species, which is quite common in the interior of Patalung; but it is a jungle-loving form, and, as such, liable to escape detection. Its powers of colour change are slight, consisting chiefly in an accentuation of the darker markings on annoyance or irritation.'

37. *Liolepis bellii*, Gray

(Pl. X, Fig. 2.)

Patani and Jalor.

The young from Patani recall, by their livery, the young of various Lacertids of the genera *Acanthodactylus* and *Eremias*. The following notes on their life coloration were taken by the collectors:—'Tail bright brick-red; median and lateral stripes on body lemon-yellow; pale yellow spots and faint traces of cross-bars occur between the stripes on the sides. In the adult, the tails become dull grey, and the pale yellow spots and traces of cross-bars increase in size and become orange and purple respectively, more brilliant in the male than the female, while bright blue markings, also more brilliant and more extensive in the male, make their appearance on the ventral surface.

'In the Patani States, and apparently also in Kelantan, Trengganu, and Pahang, *Liolepis bellii* is confined to sandy localities, almost bare of vegetation, between the foot hills and the sea. On the West Coast, it is common on the coast and islands of Trang, and has been recorded from other localities, but

want of suitable habitats makes its occurrence sporadic, and renders it generally rare in the south of the Peninsula. I am now certain that it is monogamic, a single pair inhabiting a burrow, which is shared by several young ones, probably hatched in March or April, at least for some weeks. If an individual is surprised away from home, it does not bolt down the nearest burrow, but makes its way to its own, running with the fore part of the body somewhat depressed and the tail raised high in the air. Within the mouth of its burrow it often turns to view the cause of its disturbance, before disappearing. Mr. LAIDLAW has found vegetable matter in the stomach of specimens from Trengganu,¹ but the ordinary food of the species consists largely of the small Acridiids common in the localities it frequents. A specimen was taken by Mr. ROBINSON climbing a tree-trunk at Sai Kau ; but this is a most unusual position.

‘I have already commented upon the purple and orange cross-bars on the sides of this species at some length ;² but I may add, that when the males are fighting they make themselves as flat as possible, thus, incidentally, displaying the brilliant coloration on their sides. They stand facing one another, with the forequarters and head raised as high as possible, and each tries to slip past his adversary’s guard and seize him by the shoulder. At last one catches the other with his jaw, either on the shoulder or the snout, and commences to worry him. If the individual so seized can shake himself free, he bolts. The victor does not pursue, but stands with uplifted head, which he bows repeatedly in the direction of his adversary’s flight, for some minutes, and then makes off in the opposite direction.

‘The brilliant coloration of the young of this lizard affords a good instance of a phenomenon which has not received the attention it merits among students of animal coloration, I mean the fact that young reptiles are very often more brilliantly or more conspicuously coloured than adults of the same species. To give other examples from species actually collected by Mr. ROBINSON and myself in the Malay Peninsula, the young of *Cyclemys annandalii* has yellow streaks on the head, as well as markings on the carapace, which disappear in the adult ; the young of *Crocodilus porosus* and *Varanus salvator* exhibit greater contrasts of colour on their dorsal surface than do the adults ; many Malay Scincidae (e.g., *Mabuia multifasciata*) have longitudinal pale stripes on the dorsal surface of the young that become broken up into inconspicuous spots or blotches, or altogether disappear, in the adults ; the young of the snake *Hypsirhina bocourti* are marked with black and yellow

1. *Proc. Zool. Soc.* 1900, p. 309.

2. *Proc. Zool. Soc.*, 1900, pp. 857, 858.

where the adult only displays different shades of inconspicuous brown ; the dorsal cross-bars of black or dark green on several of the Hydrophinae disappear with age, leaving an almost uniform dull green or grey coloration. These are only a few instances, taken from a comparatively small number of species from a very limited area ; but, even from them, it is clear that the young of reptiles lose their characteristic juvenile coloration in one of two ways, either by the fading of brilliant or intense colours, or by the growth of dark pigment, which encroaches upon pale areas, either obliterating them altogether or breaking them up in such a way that they are no longer conspicuous. In some genera the conspicuous coloration persists, in a more or less marked way, through life in certain species, being confined to the young in others, so that it is more probably a vestigial character than a new development ; for example, the yellow streaks on the head which disappear in the adult of *Cyclemys annandalii*, normally persist through life in *C. amboinensis*, while the lateral bars in *Calotes versicolor* are only occasionally visible in this species in the adult (when it is in a state of irritation), generally present in the young, and at any rate closely paralleled in the adult of *C. emma* even when the animal is undisturbed. Of course, sexual coloration, such as the cross-bars on the sides of *Liolepis bellii*, has no connexion with this phenomenon of the juvenile livery, and, equally of course, there are many reptiles which retain a conspicuous or intense coloration, however old they may be, and others which develop such a coloration after their extreme youth is past, for reasons possibly other than sexual. Among Batrachians, conspicuous coloration is rare in youth ; frogs and toads endowed with bright pigment, like *Ixalus horridus*, do not possess it when first they lose their tails, though its extent in later development may be indicated, while almost adult specimens of *Ichthyophis glutinosus*, which I have seen alive in a stream in the Malay Peninsula, have had both the yellow and the black of their characteristic coloration less intense than was the case with larger individuals.'

VARANIDAE

38. *Varanus nebulosus*, D. & B.

✓ Jalor, and Batang Padang, South Perak.

39. *Veranus salvator*, Laur.

Jalor.

'On the coast of the Patani States both *Varanus nebulosus* and *V. salvator* are very common, especially on the mud-flats near Jambu, where they stalk

the mangrove crabs and the different "mudhoppers" (*Periophthalmus*, *Boleophthalmus*, and the like), which bask in the sun in such localities. About Biserat and Kampong Jalor, *Varanus nebulosus* is the commoner of the two near the villages; but *V. salvator* is abundant on the limestone hills and in the pools at their base. In the interior of Rhaman and Kelantan, the former species is comparatively rare. Neither species, as a rule, penetrates into deep jungle, where their place is taken by *V. rudicollis* and other scarcer species. In the sheltered waters of Patani Bay, *V. salvator* may occasionally be seen swimming in the sea. It seems to find water more necessary than *V. nebulosus*, which, on the other hand, is more frequently observed on tree-trunks and branches, though both are aquatic and arboreal on occasion. The food of both species includes almost every kind of small animal and carrion. The yellowish markings of the dorsal surface of *V. salvator* are more brilliant and conspicuous in the young than in the adult.'

LACERTIDAE

40. *Tachydromus sexlineatus*, Daud.

Biserat, Jalor

'I have only seen this species in the neighbourhood of Biserat (the one recorded locality in the Malay Peninsula), where it lives among long grass, along the top of which the great length of its tail and the slenderness of its body permit it to run without bending the blades. In life, its tail is very brittle.'

SCINCIDAE

41. *Mabuia macularia*, Blyth.

Biserat, Jalor.

42. *Mabuia rugifera*, Stol.

Muar River, Selangor

43. *Mabuia multifasciata*, Kuhl.

Jalor, Bukit Besar, Batang Padang (South Perak), and Selangor.

'Probably the common skink of all cultivated parts of the Malay Peninsula.'

44. *Mabuia siamensis*, Gthr.

Jalor.

This is an addition to the herpetological fauna of the Malay Peninsula, the species being previously known from Southern China and Siam.

45. *Lygosoma praesigne*, Blgr.

Semangko Pass, Selangor-Pahang border.

The single specimen agrees very closely in size, scaling, and coloration, with the type from the Larut Hills, altitude, 4,000 feet, which I described in the *Annals and Magazine of Natural History* (7) vi, 1900, p. 191.

'The specimen was captured in a crevice in a tree-trunk, and many others were noted in the vicinity, which I neglected to secure, mistaking them for the immature stage of the common *Mabuia multifasciata*, to which *L. praesigne* bears a strong superficial resemblance.' H. C. R.

46. *Lygosoma bowringii*, Stwr.

Jambu, Jhering.

'The specimen was taken at dusk, on a sandy path. It progressed, rather slowly, by movements of the body, the limbs giving, apparently, very little aid.'

47. *Lygosoma quadrivittatum*, Ptrs.

Bukit Besar.

This skink was known from Celebes (Gorontalo) and the Philippines (Mindanaor); the British Museum has received it from Sandakan, North Borneo; and its range is now found to extend to the Malay Peninsula.

48. *Lygosoma chalcides*, L.

Batang Padang, South Perak.

'The limbs of this and similar slender forms are of more use in progression than their small size would indicate, at any rate upon the surface of the ground. The species are, however, burrowing forms, so often found associated with the Typhlopidae that the Malays regard them as the larvae of these snakes.'

49. *Lygosoma miodactylum*, sp. nov.

(Plate X, Fig. 3)

Section *Lygosoma*. Body much elongated, limbs minute, the anterior with toes rudimentary, bud-like digits with blunt claws; the posterior terminating in a single sharp claw. Snout short, obtuse; lower eyelids scaly, nostril pierced in the anterior lower part of the nasal; no supranasal; fronto-nasal twice as broad as long, forming sutures with the rostral and with the frontal;

praefrontals small ; frontal slightly longer than broad, broader than the supra-ocular region, in contact with the first and second supraoculars ; four supraoculars, six superciliaries ; fronto-parietals distinct ; interparietal longer than the fronto-parietals ; parietals forming a suture behind the interparietal ; first upper labials largest, fourth entering the orbit ; ear completely hidden ; twenty-two smooth scales round the middle of the body, equal ; a pair of enlarged precanals ; tail thick, dark-brown above, white beneath, sides white with longitudinal series of brown spots corresponding to the scales.

Total length, 152 mm. ; head, 11 mm. ; width of head, 7 mm. ; fore limb, 4 mm. ; hind limb, 6 mm. ; tail (regenerated), 65 mm.

A single specimen from Semangko Pass, Selangor-Pahang boundary. 2,700 feet.

Very closely allied to *L. larutense*, Blgr.,¹ from Larut, Perak (3,000 to 4,000 feet). Distinguished by the monodactyle hind limb, and the smaller number of scales round the body, viz., twenty-two instead of twenty-six.

DIBAMIDAE

50. *Dibamus novae-guineae*, D. & B.

An embryo from Bukit Besar.

New to the Malay Peninsula. Known from New Guinea, the Moluccas, Lombok, Celebes, Sumatra, and the Nicobars.

'The egg, which was found by a native in a dead tree-trunk, was broad in proportion to its length, but not circular ; it had a brittle and highly calcareous shell.'

OPHIDIA

TYPHLOPIDAE

51. *Typhlops braminus*, Daud.

Bukit Besar and Selangor.

52. *Typhlops nigroalbus*, D. & B.

Bukit Besar, Sai Kau, and Jalor.

'The distribution of the Typhlopidae in the State of Jalor is somewhat sporadic, but appears to coincide with that of burrowing lizards, such as *Lygosoma chalcides*, and of the burrowing Amphibian, *Ichthyophys glutinosus*. For instance, these forms are exceedingly rare, if they occur at all, in the

1. *Ann. and Mag. N. H.* (7) v, 1900, p. 306.

immediate vicinity of Biserat; while they are all abundant at the villages of Mata Rusa and Parang, which are four or five miles distant across the rice fields, and which stand in large and ancient orchards. The Malays, who delight in zoological theorizing, say that the "earth snakes" avoid the banks of the river because they are afraid of some particular ant, which is abundant there. This theory may be the correct one, but to myself, who have not had the opportunities of observation enjoyed by the natives, it seems more probably that they avoid a sandy soil, in which there are few earthworms, and prefer a rich leaf-mould in which earthworms abound.'

BOIDAE

53. *Python reticulatus*, Schn.

Batang Padang and Jalor.

Not uncommon in the Patani States and Lower Siam. The Malays have many superstitions regarding it.'

COLUBRIDAE

54. *Chrysodrus granulatus*, Schn.

Patani.

55. *Tropidonotus piscator*, Schn.

Jalor.

56. *Tropidonotus chrysargus*, Schlg.

Bukit Besar and Jalor.

'Two specimens were captured in pools of water in a tree-trunk, feeding on the spawn of the frog *Ixalus horridus*.'

57. *Macropisthodon rhodomelas*, Boie.

Batang Padang.

58. *Lycodon laoensis*, Gthr.

Jalor.

Was only known from Siam until discovered at Kota Bharu (Rhaman) by the 'Skeat' Expedition.

1. *Fascic. Malay., Anthropol.*, part 1, p. 88. See also Skeat's *Malay Magic*, pp. 302, 303

59. Zamenis korros, Schlg.

Jalor.

‘A very common snake in Jalor and Nawngchik, generally being found in or near brushwood. The Malays call it the “wild snake” (*ular liar*) on account of its vicious behaviour when captured. At Biserat a native brought us a male and female which he had taken paired. The male, which had evidently lost the tip of his tail, measured 174 cm., and the female 202 cm. in length. Both these specimens had the ventral surface of the neck of a bright chrome yellow, which was more intense in the male than the female. This brilliant colour is usually absent, and is probably assumed only at the breeding season. The large, black-edged scales of the tail of this species give large specimens a rather close resemblance to the Hamadryad (*Naia bungarus*) which has often an orange patch of considerable size on its throat. Consequently, the Malays often confuse the two species, the harmless with the venomous, and call large specimens of the former by the name that properly belongs to the latter.

‘A very large specimen, measuring 2,505 mm. in length, was brought us at Kampong Jalor, and was more variegated in coloration than were the smaller specimens commonly seen. Its general colour above was dark fuscous, with mesial and lateral black lines, joined by black cross-bars. The ventral surface was cream, vermiculated with slaty black, the sides of the scales being very dark lead-grey. The tail was almost entirely of the latter shade beneath; above it had a diamond-shaped pattern of black on a dark fuscous ground. The skin between the scales was pale yellow, producing zigzag markings along the sides. This specimen deceived not only the natives of the village, but also ourselves. We were about to start on a journey and merely examined the colour of the specimen, never doubting but that it was one of *Naia bungarus*.’

60. Coluber taeniurus, Cope

Goah Tanah, near Biserat, Jalor; and Batu Caves, near Kuala Lumpur, Selangor.

The large specimen from Jalor agrees with the definition of the var. *ridleyi*, BUTLER,¹ whilst the smaller specimen (97 cm.) from the Batu Caves is of a generally darker colour and shews faint traces of a reticulate pattern on the middle part of the body, whilst the dorso-lateral stripe is intensely black on the posterior part of the body and on the tail.

‘This snake, which is called by the Malays of Selangor and Patani “moon snake” (*ular bulan*), is not so common in the Jalor caves as in those near Kuala

1. *Journ. Bomb. Soc. N. H.* xii, 1899, p. 426.

Lumpur. In both localities its food consists entirely or principally of bats.¹ The sound it produces when disturbed is most peculiar, in no way resembling a hiss, but rather, as I find it described in my notebook, being midway between a mew and a squeal. The snake is usually found in the darkest parts of the cave, but though it seems dazed and purblind when suddenly brought out into a bright light, it soon regains normal vision. The difference between the young specimen and a much larger one, of the *ridleyi* variety, taken the same day as that on which we took the former, and within a few yards of its place of capture, was, perhaps, more marked in life than it would have been in preserved specimens, and the fact that the *ridleyi* variety departs further from the normal coloration of the species, makes it most improbable that the superior intensity of the pigmentation of the smaller individual was merely a juvenile livery. Mr. BOULENGER points out, that no very young specimen of *Coluber taeniurus* has been recorded from the Malay caves, and that it is very possible, on the one hand, that if young specimens were kept in total darkness, they would, so to speak, fade into the variety *ridleyi*, and, on the other, that older specimens of this variety, if kept in daylight, might possibly become darker and assume the typical markings of COPE's species; and the living specimens we have seen bear out this view. It is strange, however, how extremely rare specimens of *Coluber taeniurus* appear to be in the Malay Peninsula, except in the caves, in some of which they are quite abundant.'

61. *Coluber radiatus*, Schlg.

Jalor.

'This is the "rat snake" (*ular tikus*) of the Patani Malays, in whose houses it not infrequently takes up its abode, feeding on rats and on the sparrows,² which nest in the roofs of the larger buildings.'

62. *Dendrophis pictus*, Gmel.

Jalor.

'Probably the most abundant snake in the cultivated parts of the Patani States, where it is called *ular lidi*, that is, "midrib of the cocoanut-palm snake," a name the appropriateness of which is realized when one sees a leaf of this palm from below, with the midrib black against the sky, and an apparent light space on either side of it, due to the comparative narrowness of the leaflets where they leave it. The snake is generally found among bushes, often at the edge of rice fields.'

1. S. Flower, *Proc. Zool. Soc.* 1899, p. 668

2. *Passer montanus*.

63. Calamaria pavimentata, D. & B.

Jalor, Sai Kau (Nawngchik), and Batang Padang (South Perak).

The black line along the lower surface of the tail may be absent.

'Not uncommon among the rubbish under native houses in the Patani States, where small specimens are sometimes called *ular lima kendi*, "five kendi snakes," a *kendi* being three cents, or considerably less than a penny. This curious name is given them because it is believed that the effects of their bite can be remedied for medicine worth fifteen cents.'

64. Hypsirhina plumbea, Boie.

Jalor.

'Essentially aquatic, but often found under dead trees some distance from water. On Cape Patani it is common in the freshwater pools, on the bottom of which it may often be seen, lying stretched out almost straight.'

65. Hypsirhina bocourtii, Jan.

Jalor.

'Often found with *Acrochordus javanicus* in swamps and pools. The superior brilliance of coloration of young specimens is remarkable.'

66. Dipsadomorphus dendrophilus, Boie.

Jalor.

The specimens belong to the var. *melanotus* of BLEEKER.

'This nocturnal snake is very vicious, and drums with its tail on the ground when alarmed, but its food consists of small mammals, frogs, lizards, other snakes, fish, and, curiously enough, slugs.'

67. Dipsadomorphus cynodon, Boie.

Jalor.

'The specimen was taken coiled up on a bush about four feet above the ground. Unlike all the specimens of *D. dendrophilus* which I have seen in life, it was sluggish in demeanour, and made little attempt to escape, though it had evidently not had a recent meal.'

68. Dipsadomorphus pallidus, sp. nov.

Anterior palatine and mandibular teeth enlarged, but less than in *D. cynodon*. Rostral broader than deep, well visible from above, internasals

broader than long, shorter than the praefrontals ; frontal as long as broad, as long as the distance from the end of the snout, shorter than parietals ; loreal tapezoid, longer than deep ; one praeocular, in contact with the frontal ; two postoculars, in contact with the frontal ; temporals 2 + 3 ; eight upper labials, third, fourth, and fifth entering the eye ; four or five lower labials in contact

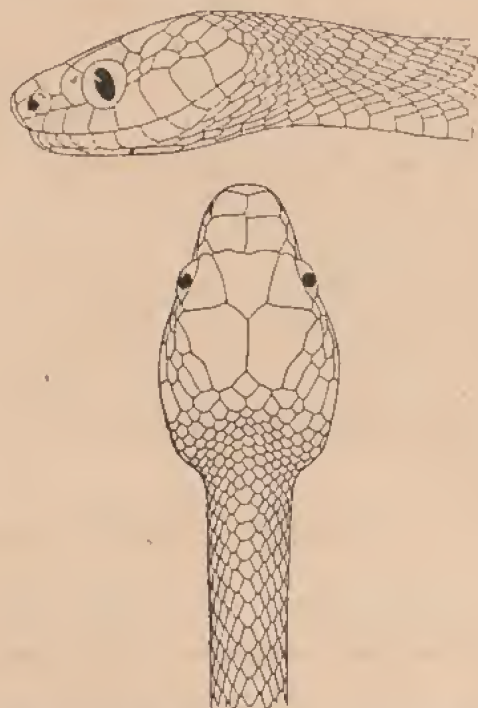


FIG. 3. Head of *Dipsadomorphus pallidus*. Two-thirds natural size.

with the anterior chin-shields, which are smaller than the posterior. Scales in twenty-one rows, vertebral row strongly enlarged. Ventrals, 256 mm. ; anal, entire ; subcaudals, 154 mm. Head and neck purplish-grey above, fading into a pale brown on the body ; no spots or markings of any kind ; upper lip and lower parts yellowish-white ; belly and tail speckled with grey. Total length, 1,580 mm. ; tail, 420 mm.

A single female specimen from Jalor.

69. *Psammodynastes pulverulentus*, Boie.

Jalor.

70. *Dryophis prasinus*, Boie.

Patani, Bukit Besar, and Jalor.

'Common throughout the Patani States, equally so in virgin jungle at 3,000 feet, and in the open casuarina woods on Cape Patani. It

feeds chiefly on skinks. On Bukit Besar, we watched a large specimen on the look-out for prey. It had its tail and the posterior half of its body coiled among the branches of a small shrub growing among long grass, while the anterior half of its body stretched outwards without support, the neck being arched. This position was retained for some minutes, and then an abrupt movement changed the direction of the head and neck, without an alteration in the position of the tail and that part of the body coiled in the shrub. The same movement was repeated at intervals, so that the snake viewed all quarters in turn. When annoyed, *D. prasinus* puffs out its slender neck so that it attains a girth approximately equal to that of the body, and by so doing causes the skin to be stretched and the black and blue-grey markings between the scales to be displayed. The three colour-varieties, the commonest of which has in life the general colour of the dorsal surface a bright leaf-green, while the others have it emerald green and golden brown respectively, are found together in the Patani States, and the difference in their appearance does not appear to be due either to age, to sex, or to environment.'

71. *Chrysopelea ornata*, Shaw

Jalor.

'Also a common species in the Patani States, Senggora, Patalung, and Trang, frequently entering native houses and lodging in the roof. The commonest coloration in these States is blackish, finely chequered and veined with greenish yellow. Individuals thus coloured are called *ular jelôtong* by the Malays of the Patani States, *jelôtong*, the colour of the *lôtong* monkey, *Presbytes (Semnopithecus) obscurus*, being a dark slaty grey. When a specimen has scarlet and black spots on the sides, it is called *ular batu daching*, or "balance-weight snake," because these spots resemble the little scarlet and black "crabs' eye" seeds, used as weights in the Malay goldsmiths' scales.'

72. *Thalassophis annandalii*, Laidlaw

Distira annandalii, Laidlaw, *P.Z.S.*, 1901, ii, p. 579, pl.xxxv.

Head moderate, body short and stout, strongly compressed behind the neck. Rostral broader than deep; nasals small, separated by a pair of large internasals, which widen in front, upper head shields more or less broken up, the parietals small and separated from each other, and sometimes also from the frontal, by very small scales; frontal and supraocular unusually large, well developed, eye separated from the upper labials by one or two suboculars, one or two prae-, and one or two postoculars; temporal scales small, numerous;

nine to twelve upper labials, chin-shields usually broken up into scales. Scales extremely small, ninety to one hundred round the middle of the body, juxtaposed, dorsals with a more or less distinct central tubercle or short keel. Ventrals, 350-370 mm., very feebly enlarged. Pale greyish olive above, white below; back with dark cross-bars, narrower than the interspaces, tapering to a point on the sides.

Total length, 600 mm.; Tail, 80 mm.; Greatest depth of body, 43 mm. Several specimens from Patani.

This is a very remarkable sea snake, distinguished from all other Hydrophinae by its extremely small scales. As the nasal shields are distinct from the internasals, it is better placed in *Thalassophis* than in *Distira*, if, however, the former deserves to rank as a valid genus.

73. *Hydrophis caeruleus*, Shaw

Patani.

74. *Distira wrayi*, Blgr.

Patani.

75. *Distira jerdonii*, Gray

Patani.

76. *Enhydria hardwickii*, Gray

Patani.

77. *Enhydria valakadien*, Boie.

Patani.

‘ This appears to be by far the commonest species in Patani Bay, in the shallow and muddy waters of which sea snakes literally swarm, while they appear to be very little less common in the open sea on the other side of Cape Patani. A very large proportion of the fish on which they feed in the bay are Silurids and others provided with long, sharp spines, and the manner in which these spines are eliminated from the snakes’ bodies is curious, for they appear to pass out through the walls of the alimentary canal and through the body wall to the exterior. I have frequently found specimens of the Hydrophinae with fish spines actually protruding from within through the integument, without, apparently, causing any inflammation or inconvenience. Sea snakes cannot hiss, but produce a low gurgling sound when annoyed. During the fishing season at Patani, in the spring and summer months, they are comparatively harmless, being inoffensive except when injured, and never, it is said, biting men wading in the sea with their nets; but during the north-east monsoon, in November, December,

and January, when a tremendous surf breaks all along the shore and practically blocks up the mouths of the rivers, the sea snakes, battered in the waves, often cast up on the beach torn and wounded, naturally lose their temper, and bite anything in contact with which they come. We have seen them in this condition, and can well believe, as we were told, that several deaths are annually caused by their bites among the fishermen of every little community by the sea, who take the opportunity to go out shrimping whenever a break in the weather occurs. It is said, too, that numbers of the snakes are shut up in the river mouth, where they have taken refuge from the storm, and that when in fresh or brackish water their bite is most dangerous. The Malays say that when a person is bitten blood starts out from his eyes and ears, and he dies in high fever within twenty-four hours.'

78. *Naia tripudians*, Merr.

Jalor. Belongs to the var. *fasciata*, Gray.

'The cobra is rare throughout the Patani States, but is said to be more abundant on Cape Patani than elsewhere. We could not hear of a single death from its bite. The only specimen which we saw in nine months, except the specimen preserved, belonged to the same variety, and was brought to us at Sai Kau. A very beautiful variety of an almost uniform yellowish colour, known to the Malays as "turmeric ladle-hood snake" (*ular tedong sendok kunyit*), is, apparently, not very uncommon in Rhaman, where, in 1899, I saw two specimens in one day.'

At Kuala Lumpur, cobras were very common, and numerous specimens were brought to me at the Museum. They belonged without exception to the black variety, *N. sputatrix*, BOIE, which is the prevalent form in the southern half of the Peninsula.

79. *Naia bungarus*, Schleg.

Ban Sai Kau, Nawngchik.

'General colour fuscous, some of the scales with a yellow base; skin of the neck irregularly blotched with black and yellow; top of the head sienna brown; under surface dirty white, with a fuscous bar on the neck followed by a patch of dull orange; scales on the tail paler in colour and broadly edged with black. Total length, 3,317 mm.'

'The Hamadryad seems to be commoner in the Patani States than the cobra, but the specimen preserved was the only one examined, and it is very easy to confuse with it a large specimen of *Zamenis korros* hastily seen. Our specimen was shot by Mr. ROBINSON, under a native house in the

village of Sai Kau. It had taken refuge in a pile of cocoanuts, from which it was persuaded to come out by a Chinaman armed with a long pole; it attempted to crawl away, making no movement in our direction, though we were within a few yards of it. This was said to be the same individual which had bitten a man on the shin a day or two previously. According to this man's own story, he had been passing along a path close to the house under which the specimen was shot, when an "*ular selor*, as big as a cat," leaped out from behind a log and bit him. We were asked to see him the next day, and found him apparently dying of pain and fright; his leg was tremendously swollen but not above the knee, and had a slightly bluish tinge, and he felt pain in the glands under the arm-pits and elsewhere. We applied such remedies as we were able, and, what was more important, persuaded him and his friends that we could cure him. When we left Sai Kau, a week later, he was well on the way to recovery. I have described this incident, because I think that there is strong circumstantial evidence that the man actually had been bitten by a Hamadryad. It was certain that he had been bitten by a large poisonous snake, for the marks of the fangs, which were just visible, were far apart. I do not know of any poisonous snake "as big as a cat," except a Hamadryad or a large cobra, for the Malays gauge the size of an animal by its girth, rather than its length or height, and the bite was rather high on the limb for it to have been that of a species that lies on the ground like *Ancistrodon rhodostoma*. It is not at all improbable that poisonous snakes¹ are less deadly in the Malay Peninsula than the representatives of the same species in India, except, perhaps, the Hydrophinae.

80. *Callophis gracillis*, Gray

Batang Padang, South Perak.

81. *Doliophis bivirgatus*, Boie.

Jalor. The typical form.

82. *Doliophis intestinalis*, Laur.

Bukit Besar and Batang Patang (vars. *annectens*, Belgr. ; and *lineata*, Gray).

The Malays of Patani say that both *D. bivirgatus* and *D. intestinalis*, which share the name of "sunbeam snake" (*ular sina mata-bari*), frequently progress with the bright coral-red part of their tails held upright, apparently in very much the same manner as *Cylindrophis rufus*, as figured by Captain

1. The proper Malay name of this snake is *ular selor*, and it is through a mistake of my own that it is called *ular selor* (egg snake), in Mr. Laidlaw's report on the snakes of the 'Skeat' Expedition. N. A.

FLOWER.¹ Moreover, they assert that all red-tailed snakes are very poisonous, believing that the "sunbeam snakes" flourish their tails in the air as an advertisement of the fact. It is probable that the observation that they flourish their tails is a true one, but it is very doubtful whether the species of *Doliophis* can be reckoned, practically, as dangerous forms, in spite of the enormous size of the poison glands in *D. bivirgatus*. *Cylindrophis rufus* is a most inoffensive and feeble snake, and many specimens are devoid of the red mark on the tail; indeed, it is probable that the whole theory of warning coloration, as far as the Patani Malays are concerned, rests on the fact that the readiest way of distinguishing between the venomous *Lachesis gramineus* and the harmless *Dryophis prasinus*, when the shape of the head cannot be seen, is the reddish tail of the former species.'

AMBLYCEPHALIDAE

83. *Haplopeltura boa*, Boie.

Bukit Besar, 2,000 feet.

'A specimen was taken lying almost straight along the midrib of the leaf of a small palm in the jungle. The whole coloration and attitude suggested a stick that had fallen from above, and the blunt snout and buff markings on the head appeared to represent that part of the stick which had been broken from its parent branch.'

84. *Amblycephalus moellendorffii*, Bttg.

Jalor.

VIPERIDAE

85. *Ancistrodon rhodostoma*, Boie.

Jalor.

This large and deadly Crotaline snake was only recorded with certainty from Java, and with doubt from Siam. I have, however, been recently shown a specimen from Puket,² Siam, received by the Christiania Zoological Museum. The distribution is the same as that of the Chelonian *Damonia subtrijuga*.

'*A. rhodostoma* cannot be scarce in the neighbourhood of Biserat and K. Jalor, as several specimens, of which we did not keep all, were brought us at both of these places. The Jalor Malays call it *ular kapak daun*, or "leaf axe-

¹ P.Z.S., 1899, pl. XXXVII.

² Puket is the chief place in the Siamese island of Junk Ceylon or Selangka, which lies off the west coast of the Malay Peninsula, south of the Isthmus of Kra. N. A.

snake," but, as Mr. LAIDLAW¹ has pointed out, the term *ular kapak* is of wide application, while the present species certainly shares the name of "leaf axe-snake" with *Lachesis gramineus*, and probably with other forms that resemble leaves living or dead. The persons who brought us specimens of *Ancistrodon rhodostoma* denied that its bite was fatal, though they said that it made a man very ill. This is curious, as peasants, whether British or Malay, have usually a tendency to exaggerate the dangerous qualities of animals with which they are liable to come in contact, and I do not think there was any superstitious reason² why they should speak no ill of this snake, for I asked them, on several occasions, after the specimen was dead and in spirit. They say that the "leaf axe-snake" lies about among dead leaves and is very sluggish, as its figure would suggest.'

APPENDIX

LIST OF THE BATRACHIANS AND REPTILES RECORDED FROM THE MALAY PENINSULA, SOUTH OF TENASSERIM

NUMEROUS additions have been made to our knowledge of the Batrachians and Reptiles of the Malay Peninsula, since the publication of Capt. S. S. FLOWER's useful list in the *Proceedings of the Zoological Society* in 1896 (p. 856). A second list given by Capt. FLOWER, in 1899 (pp. 600 and 885), is obscured by the fact that Siam is included. I therefore gladly fall in with the suggestion that a complete list should now be given, embodying the additions made by the 'Skeat' Expedition, the reptiles of which were described by Mr. F. F. LAIDLAW (*Proc. Zool. Soc.* 1900, p. 883, and 1901, i, p. 301, and ii, p. 575); and by the collections of Messrs. L. WRAY and A. L. BUTLER, and described by me (*Ann. Mag. N. H.* (7) v, 1900), and *Journ. Bomb. N. H. Soc.* xiii, p. 333 (1900), or listed by Mr. BUTLER (*Proc. Zool. Soc.* 1902, ii, p. 188).

In this list the names of species not in Capt. FLOWER's list of 1899 are marked with an asterisk (*).

1. *Proc. Zool. Soc.* 1901 (2), p. 576.

2. Cf. *Fascic. Malay. Anthropol.*, part I., pp. 83, 104.

BATRACHIA

APODA

Caeciliidae

1. *Ichthyophis glutinosus*, Linn.
2. *Ichthyophis monochrous*, Blkr.

ECAUDATA

Pelobatidae

3. *Megalophrys montana*, Kuhl.
- *7. *Leptobrachium heteropus*, Blgr.
Larut, Perak (A. L. Butler).
4. " *nasuta*, Schleg.
- *8. " *pelodyoides*, Blgr.
Larut, Perak (L. Wray).
5. " *longipes*, Blgr.
6. *Leptobrachium hasseltii*, Tsch.

Bufonidae

9. *Bufo penangensis*, Stol.
14. *Bufo quadriporcatus*, Blgr.
- *10. " *jerboa*, Blgr. Gunung Inas,
Perak (Laidlaw).
15. " *divergens*, Ptrs.
11. " *asper*, Gravh.
16. *Nectophryne guentheri*, Blgr.
12. " *melanostictus*, Schn.
- *17. *Nectes subasper*, Tsch. Selangor
(A. L. Butler).
13. " *parvus*, Blgr.

Engystomatidae

18. *Calophryne pleurostigma*, Tsch.
25. *Microhyla pulchra*, Hallow.
19. *Phrynella pulchra*, Blgr.
26. " *achatina*, Boie.
20. " *pollicaris*, Blgr.
- *27. " *annectens*, Blgr.
Larut, Perak (A. L. Butler).
21. *Microhyla ornata*, D. & B.
28. " *berdmorii*, Blyth.
22. " *inornata*, Blgr.
29. *Callula pulchra*, Gray.
23. " *leucostigma*, Blgr.
- *24. " *butleri*, Blgr.
Larut, Perak (A. L. Butler).

Ranidae

30. *Oxyglossus lima*, Gravh.
- *47. *Rana signata*, Gthr. Gunung Inas,
Perak (Laidlaw).
31. " *laevis*, Gthr.
48. " *glandulosa*, Blgr.
32. *Rana cyanophlyctis*, Schn.
- *49. " *livida*, Blyth. Larut, Perak
(L. Wray).
33. " *kuhlii*, D. & B.
50. " *larutensis*, Blgr.
34. " *laticeps*, Blgr.
51. *Rhacophorus leprosus*, Tsch.
35. " *macrodon*, Kuhl.
52. " *leucomystax*, Gravh.
- *36. " *doriae*, Blgr. Larut, Perak
(L. Wray).
53. " *bimaculatus*, Blgr.
Larut, Perak (L. Wray).
37. " *plicatella*, Stol.
- *54. " *robinsonii*, Blgr.
Supra p. 136
38. " *hascheana*, Stol.
55. " *nigropalmatus*, Blgr.
39. " *tigrina*, Daud.
- *56. *Ixalus larutensis*, Blgr. Larut, Perak
(A. L. Butler). Supra p. 139
40. " *limnocharis*, Boie.
57. " *pictus*, Ptrs.
41. " *macrodactyla*, Gthr.
- *58. " *vermiculatus*, Blgr. Larut,
Perak (A. L. Butler)
42. " *erythraea*, Schleg.
59. " *asper*, Blgr.
43. " *labialis*, Blgr.
- *60. " *horridus*, Blgr. Supra p. 139
- *44. " *jerboa*, Gthr. Batu Caves,
Selangor (A. L. Butler).
- *45. " *lateralis*, Blgr. Kuala Aring,
Kelantan (Laidlaw).
46. " *luetuosa*, Ptrs.

REPTILIA

CHELONIA

Sphargdiae

1. *Dermochelys coriacea*, Linn.

Testudinidae

- | | |
|--|---|
| 2. <i>Callagur picta</i> , Gray. | *9. <i>Cyclemys annandalii</i> , Blgr. Supra p. 142 |
| 3. <i>Batagur baska</i> , Gray. | 10. „ <i>dhori</i> , Gray. |
| 4. <i>Hardella thurgi</i> , Gray. | 11. <i>Geomyda spinosa</i> , Gray. |
| *5. <i>Damonita subtrijuga</i> , Schleg. & Müll.
Supra p. 142 | 12. „ <i>grandis</i> , Gray. |
| 6. <i>Bellia crassicolis</i> , Gray. | 13. <i>Testudo emys</i> , Schleg. & Müll. |
| 7. <i>Cyclemys amboinensis</i> , Daud. | *14. „ <i>pseudemys</i> , Blgr. Supra p. 144 |
| 8. <i>Cyclemys platynota</i> , Gray. | 15. „ <i>elongata</i> , Blyth. |

Chelonidae

- | | |
|---|--------------------------------------|
| 16. <i>Chelone mydas</i> , Linn. | 17. <i>Chelone imbricata</i> , Linn. |
| 18. <i>Thalassochelys caretta</i> , Linn. | |

Trionychidae

- | | |
|--|--|
| 19. <i>Trionyx subplanus</i> , Geoffr. | 22. <i>Trionyx cartilagineus</i> , Bodd. |
| 20. „ <i>hurum</i> , Gray. | 23. <i>Pelochelys cantori</i> , Gray. |
| 21. „ <i>phayrii</i> , Gray. | |

EMYDOSAURIA

Crocodilidae

- | | |
|--|---------------------------------------|
| 24. <i>Tomistoma schlegelii</i> , S. Müll. | 25. <i>Crocodilus porosus</i> , Schn. |
| 26. <i>Crocodilus palustris</i> , Less. | |

LACERTILIA

Geckonidae

- | | |
|---|---|
| 27. <i>Gymnodactylus marmoratus</i> , Kuhl. | 39. <i>Hemidactylus platyurus</i> , Schn. |
| *28. „ <i>peguensis</i> , Blgr.
Patalung (Laidlaw). | 40. <i>Mimetozoon craspedotus</i> , Mocq. |
| 29. „ <i>pulchellus</i> , Gray. | 41. <i>Gehyra mutilata</i> , Wiegman. |
| 30. <i>Gonatodes kendalli</i> , Gray. | *42. „ <i>larutensis</i> , Blgr.
Larut, Perak (A. L. Butler). |
| 31. „ <i>affinis</i> , Stol. | *43. „ <i>butleri</i> , Blgr.
Kuala Lumpur, Selangor (A. L. Butler). |
| 32. <i>Aeluroscalobates felinus</i> , Gthr. | 44. <i>Lepidodactylus ceylonensis</i> , Blgr. |
| 33. <i>Hemidactylus frenatus</i> , Schleg. | 45. „ <i>lugubris</i> , D. & B. |
| 34. „ <i>brookii</i> , Gray. | 46. <i>Gecko verticillatus</i> , Lawr. |
| 35. „ <i>depressus</i> , Gray. | 47. „ <i>stentor</i> , Cantor. |
| 36. „ <i>leschenaultii</i> , D. & B. | 48. „ <i>monarchus</i> , Schleg. |
| 37. „ <i>flaviviridis</i> , Rüpp.
(coctaei, D. & B.) | 49. <i>Psychozoen homalocephalum</i> , Crev. |
| 38. „ <i>garnoti</i> , D. & B. | 50. „ <i>horsfieldii</i> , Gray. |

Agamidae

- | | |
|---|---|
| 51. <i>Draco volans</i> , Linn. | 59. <i>Draco quinquefasciatus</i> , Gray. |
| 52. „ <i>maculatus</i> , Cantor. | 60. <i>Aphianotis fusca</i> , Ptrs. |
| 53. „ <i>simbratus</i> , Kuhl. | 61. <i>Gonyocephalus herveyi</i> , Blgr. |
| *54. „ <i>punctatus</i> , Blgr. Larut, Perak
(A. L. Butler). Supra p. 151 | 62. „ <i>borneensis</i> , Schleg. |
| *55. „ <i>formosus</i> , Blgr. Larut, Perak
(A. L. Butler). Supra p. 152 | 63. „ <i>grandis</i> , Gray. |
| *56. „ <i>blanfordii</i> , Blgr. Larut, Perak
(A. L. Butler). Supra p. 153 | 64. <i>Acanthosaura armata</i> , Gray. |
| *57. „ <i>microlepis</i> , Blgr. Larut, Perak
(A. L. Butler). | 65. <i>Calotes cristatellus</i> , Kuhl. |
| 58. „ <i>melanopogon</i> , Blgr. | 66. „ <i>versicolor</i> , Daud. |
| | *67. „ <i>emma</i> , Gray. Patalung
(Laidlaw). |
| | 68. <i>Liolepis bellii</i> , Gray. |

Varanidae

- | | |
|---------------------------------------|---------------------------------------|
| 69. <i>Varanus flavescens</i> , Gray. | 71. <i>Varanus rudicollis</i> , Gray. |
| 70. „ <i>nebulosus</i> , Gray. | 72. „ <i>salvator</i> , Laur. |

Lacertidae

- *73. *Tachydromus sexlineatus*, Daud. Biserat, (Laidlaw).

Scincidae

- | | |
|---|--|
| 74. <i>Mabuia novemcarinata</i> . And. | 85. <i>Lygosoma anomalopus</i> , Blgr. |
| 75. „ <i>macularia</i> , Blyth. | 86. „ <i>olivaceum</i> , Gray. |
| 76. „ <i>rugifera</i> , Blgr. | 87. „ <i>atrocostatum</i> , Less. |
| 77. „ <i>multifasciata</i> , Kuhl. | 88. „ <i>singaporense</i> , Sldr. |
| *78. „ <i>siamensis</i> , Gthr. Supra p. 158 | *89. „ <i>bampfylidii</i> , E. Bartl.
Larut, Perak (A. L. Butler). |
| *79. <i>Lygosoma stellatum</i> , Blgr. Larut, Perak
(S. Flower, A. L. Butler). | 90. „ <i>bozoringii</i> , Gthr. |
| *80. „ <i>praesigne</i> , Blgr. Larut, Perak
(A. L. Butler). | 91. „ <i>albopunctatum</i> , Gray. |
| *81. „ <i>scotophilum</i> , Blgr. Batu caves,
Selangor (A. L. Butler). | *92. „ <i>quadrivittatum</i> , Ptrs.
Supra p. 159 |
| *82. „ <i>malayanum</i> , Doria. Larut,
Perak (A. L. Butler). | *93. „ <i>surdum</i> , Blgr. Selangor
(A. L. Butler). |
| *83. „ <i>floweri</i> , Laidlaw. Gunung
Inas, Perak (Laidlaw). | 94. „ <i>chalcides</i> , Linn. |
| 84. <i>Lygosoma maculatum</i> , Blyth. | *95. „ <i>larutense</i> , Blgr. Larut, Perak
(L. Wray, A. L. Butler). |
| | *96. „ <i>miodactylum</i> , Blgr. Supra p. 159 |

Dibamidae

- *97. *Dibamus novae-guineae*, Blgr. Supra p. 160

OPHIDIA

Typhlopidae

- | | |
|---|--|
| 98. <i>Typhlops lineatus</i> , Boie. | 101. <i>Typhlops bothriorhynchus</i> , Gthr. |
| 99. „ <i>braminus</i> , Daud. | 102. „ <i>nigroalbus</i> , D. & B. |
| *100. „ <i>albiceps</i> , Blgr. Larut, Perak
(A. L. Butler). | |

Boidae

103. *Python reticulatus*, Schn. 104. *Python molurus*, Linn.
105. *Python curtus*, Schleg.

Illysiidae

106. *Cylindrophis rufus*, Laur. 107. *Cylindrophis lineatus*, Blanf.

Xenopeltidae

108. *Xenopeltis unicolor*, Reinw.

Colubridae

109. *Acrochordus javanicus*, Hornst. 143. *Gonyophis margaritatus*, Ptrs.
110. *Chersydrus granulatus*, Schn. 144. *Dendrophis pictus*, Gm.
111. *Xenodermus javanicus*, Reinw. 145. „ *formosus*, Boie.
112. *Polyodontophis geminatus*, Boie. 146. *Dendrelaphis caudolineatus*, Gray.
113. „ *sagittarius*, Cantor. 147. *Simotes purpurascens*, Schleg.
114. *Xenochrophis cerasogaster*, Cantor. 148. „ *cyclurus*, Cantor.
* 115. *Tropidonotus inas*, Laidlaw. 149. „ *octolineatus*, Schn.
Gunung Inas, Perak (Laidlaw). 150. „ *signatus*, Gthr.
116. „ *trianguligerus*, Boie. 151. „ *cruentatus*, Gthr.
117. „ *piscator*, Schn. 152. *Ablabes tricolor*, Schleg.
118. „ *stolatus*, Linn. 153. „ *baliodirus*, Boie.
119. „ *vittatus*, Linn. 154. „ *longicauda*, Ptrs.
120. „ *subminiatus*, Schleg. 155. *Macrocalamus lateralis*, Ptrs.
121. „ *chrysargus*, Schleg. 156. *Pseudorhabdion longiceps*, Ptrs.
122. „ *maculatus*, Edel. * 157. *Calamaria vermiformis*, D. & B.
123. *Macropisthodon flaviceps*, D. & B. Larut, Perak (A. L. Butler).
124. „ *rhodomelas*, Boie. 158. „ *albiventer*, Gray.
125. *Helicops schistosus*, Daud. 159. „ *sumatrana*, Edel.
126. *Lycodon aulicus*, Linn. 160. „ *leucocephala*, D. & B.
* 127. „ *laevis*, Gthr. Khota Bharu, 161. „ *pavimentata*, D. & B.
Rhaman (Laidlaw). 162. *Hypsirhina indica*, Gray.
* 128. „ *butleri*, Blgr. Larut, Perak 163. „ *plumbea*, Boie.
(A. & L. Butler). 164. „ *enhydriis*, Schn.
129. „ *effrenis*, Cantor. 165. „ *becourtii*.
130. „ *subcinctus*, Boie. 166. „ *sieboldii*, Schleg.
131. *Dryocalamus subannulatus*, D. & B. 167. *Homalopsis buccata*, Linn.
132. *Zaocys carinatus*, Gthr. 168. *Cerberus rhynchops*, Schn.
133. „ *fuscus*, Gthr. 169. *Fordonia leucobalia*, Schleg.
134. *Zamenis korros*, Schleg. 170. *Cantoria violacea*, Gir.
135. „ *mucosus*, Linn. 171. *Hipistes hydrinus*, Cantor.
136. „ *fasciolatus*, Shaw. 172. *Dipsadomorphus multimaaculatus*, Boie.
137. *Xenelaphis hexagonotus*, Cantor. 173. „ *gokool*, Gray.
138. *Coluber porphyraeus*, Cantor. 174. „ *dendrophilus*, Boie.
139. „ *taeniurus*, Cope. 175. „ *jaspideus*, D. & B.
140. „ *oxycephalus*, Boie. 176. „ *drapiezii*, Boie.
141. „ *melanurus*, Schleg. * 177. „ *pallidus*, Blgr.
142. „ *radiatus*, Schleg. Supra p. 164.
178. „ *cynodon*, Boie.

Colubridae—continued

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|--|---|
| 179. <i>Psammodynastes pulverulentus</i> , Boie. | *198. <i>Distira torayi</i> , Blgr. Perak Coast
(L. Wray). Patani (Laidlaw). |
| 180. <i>Dryophis xanthozona</i> , Boie. | 199. „ <i>cyanocincta</i> , Daud. |
| 181. „ <i>prasinus</i> , Boie. | 200. „ <i>jerdoni</i> , Gray. |
| 182. <i>Dryophis rubescens</i> , Gray. | *201. <i>Enhydryis curtus</i> , Shaw.
Patani (Laidlaw). |
| 183. <i>Chrysopseia ornata</i> , Shaw. | 202. „ <i>hardwickii</i> , Gray. |
| 184. „ <i>chrysochlora</i> , Boie. | 203. <i>Enhydrina valakadien</i> , Boie. |
| 185. <i>Hydrus platurus</i> , Linn. | 204. <i>Aipysurus eydouxi</i> , Gray. |
| *186. <i>Thalassophis annandalii</i> , Laidlaw.
Patani (Laidlaw). | 205. <i>Platurus laticaudatus</i> , Linn. |
| 187. <i>Hydrophis caeruleus</i> , Shaw. | 206. „ <i>colubrinus</i> , Schn. |
| 188. „ <i>nigrocinctus</i> , Daud. | 207. „ <i>fasciatus</i> , Schn. |
| 189. „ <i>gracilis</i> , Shaw. | 208. „ <i>candidus</i> , Linn. |
| 190. „ <i>cantori</i> , Gthr. | 209. <i>Bungarus flaviceps</i> , Reinw. |
| 191. „ <i>fasciatus</i> , Schn. | 210. <i>Naia tripudians</i> , Merr. |
| *192. „ <i>rhombifer</i> , Blgr.
Coast of Perak (L. Wray). | 211. „ <i>bungarus</i> , Schleg. |
| 193. „ <i>torquatus</i> , Gthr. | 212. <i>Callophis gracilis</i> , Gray. |
| 194. „ <i>obscurus</i> , Daud. | 213. „ <i>maculiceps</i> , Gthr. |
| 195. <i>Distira stokesii</i> , Gray. | 214. <i>Doliophis bivirgatus</i> , Boie. |
| 196. „ <i>ornata</i> , Gray. | 215. „ <i>intestinalis</i> , Laur. |
| 197. „ <i>brugmansii</i> , Boie. | |

Amblycephalidae

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|--|--|
| 216. <i>Haplopetura boa</i> , Boie. | 218. <i>Amblycephalus laevis</i> , Boie. |
| *217. <i>Amblycephalus vertebralis</i> , Blgr.
Larut, Perak (A. L. Butler). | 219. „ <i>malaccanus</i> , Boie. |
| | *220. „ <i>moellendorffii</i> , Btgr.
Biserat, Jalor (Laidlaw). |

Viperidae

- | | |
|--|--|
| *221. <i>Ancistrodon rhodostoma</i> , Boie.
Supra p. 170. | 224. <i>Lachesis gramineus</i> , Shaw. |
| 222. <i>Lachesis monticola</i> , Gthr. | 225. „ <i>sumatranus</i> , Raffles. |
| 223. „ <i>purpureomaculatus</i> , Gray. | 226. „ <i>swagleri</i> , Boie. |

REPORT ON THE BIRDS

BY

W. R. OGILVIE-GRANT

BRITISH MUSEUM (NATURAL HISTORY), CROMWELL ROAD, LONDON

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INTRODUCTORY NOTE

THE most noteworthy point brought out by the present collection is the complete absence of any of the higher mountain birds from Bukit Besar. That this cannot be due to altitude alone is proved by the fact that the mountain fauna is strongly represented on the Selangor Hills at a height considerably less than that of our encampment on Bukit Besar (2,500 feet).

From Mr. OGILVIE-GRANT's paper it is evident that the avifauna of the Patani States is on the whole more Burmese than Malayan, as is shown by the occurrence of *Gecinus viridanus* instead of *G. vittatus* and by the presence of such species as *Coracias affinis* and *Crypsirhina varians*.

The affinities of the high mountain fauna are puzzling, and both Bornean and Sumatran forms seem to be represented, though as might be expected the latter are predominant. The existence of a species of *Chlorura* is interesting as this genus has not hitherto been recorded from continental Asia.

Taking the Peninsula as a whole, three very distinct faunal zones can be recognized which may be called :—

I. The Indo-Burmese zone : occupying the whole of the coastal districts as far south as Penang on the west coast, and extending to the Pahang River on the eastern side of the Peninsula. This zone is coterminous in range with that of *Thereiceryx lineata*, *Parus cinereus*, and, among plants, with *Casuarina equisetifolia*.

II. The Malayan zone : including the remainder of the Peninsula with the exception of the high mountains. The characteristic forms are *Nyctiornis amicta*, *Cymborhynchus macrorhynchus*, *Hemixus cinereus*.

III. The Himalayo-Sundaic zone : covering the mountains of the main range above three thousand feet as far south as Southern Selangor, and also certain of the loftier isolated massifs. The characteristic forms are *Rhinocichla mitrata*, *Sibia simillima*, etc.

Speaking generally there seems but little more to do on the western side of the Peninsula, even in the mountains, as assiduous collecting for the last year has only resulted in the discovery of one new species and the addition of some five or six others to the list of birds found in the Peninsula.

Gunong Tahan in Pahang may, however, be expected to yield a considerable number of novelties, while it is highly important that the lofty mountains north of Senggora on the east coast, which are as yet absolutely virgin ground, should be thoroughly explored in order to ascertain whether the fauna occurring on Mooleyit in Tenasserin extends so far south.

In the present paper my own notes are distinguished by being enclosed within inverted commas.

HERBERT C. ROBINSON

SELANGOR STATE MUSEUM
KUALA LUMPUR
24th November, 1904

REPORT ON THE BIRDS

By W. R. OGILVIE-GRANT

BRITISH MUSEUM (NATURAL HISTORY), CROMWELL ROAD, LONDON

DURING their recent expedition to the Siamese Malay States and Perak Messrs. H. C. ROBINSON and NELSON ANNANDALE made a large collection of birds, which they have kindly placed in my hands for identification. Below will be found a complete list with notes. One species of Bulbul (*Pycnonotus robinsoni*) appears to be new. A female Green Weaver-finch of the genus *Chlorura* may likewise represent a distinct form near *C. borneensis*, but until the arrival of male examples I have refrained from naming it. The first set of this fine collection has been presented to the British Museum, the remaining specimens being given to the Royal Scottish Museum, Edinburgh. To save repetition, Mr. J. L. BONHOTE's report 'On the Birds collected during the Skeat Expedition to the Malay Peninsula' (*P.Z.S.*, 1901, pp. 57-81) is quoted as 'BONHOTE.' Mr. E. HARTERT's article 'On Birds from Pahang, Eastern Malay Peninsula' (*Nov. Zool.* ix, pp. 537-580 (1902)) is quoted as 'HARTERT.'

CORVIDAE

1. *Corvus enca*, Horsf.

Corone enca, Sharpe, *Cat. B. Brit. Mus.* iii, p. 43 (1877).

♂ ad. Jeram Kawan, South Perak. 13th February. (No. 663)

The Slender-billed Crow has the iris brown, and the bill and feet black. The Museum possesses only two examples from the Malay Peninsula, procured respectively at Johore and Malacca.

'The above locality is situated in deep jungle many miles from any considerable extent of open country, and I find that the individual secured is recorded in my journal as having a much more subdued and less raucous "caw" than the succeeding species.'

'Malay name, *Gagak hutan*.'

2. *Corvus macrorhynchus*, Wagl.

Corone macrorhyncha, Sharpe, *Cat. B. Brit. Mus.* iii, p. 38 (1877).

♂ ad. Ban Sai Kau, Nawngchik. 26th April. (No. 15)

♂ ad. Bayu, Jalor. 9th July. (No. 260)

♂ ad. Jambu, Jhering. 9th June. (No. 167)

The Jungle-Crow has the iris brown and the bill and feet black.

'In the Malay Peninsula at least, the trivial name of this species is somewhat misleading as it is rarely, if ever found far from open country. In Patani and other east coast districts, it is very abundant, roosting and nesting in the crowns of cocoa-nut and sugar palms, but in the Federated Malay States it is comparatively scarce. In Patani, on an easily understood homoeopathic principle, the ashes of a crow's wing-feathers are in great demand as a specific against grey hair, whilst in South Perak, oil in which the feathers have been boiled is used for a similar purpose. Malay name, *Gagak kampung*.'

3. *Platysmurus leucopterus*, (Temm.)

Platysmurus leucopterus, Bonhote, p. 59.

♂ ad. Sungkei, South Perak. 8th February. (No. 621)

The White-winged Jay has the iris red and the bill and legs black.

'Apparently rare; the above individual was shot in deep jungle. Malay name, *Gembala gajah* (Elephant herd).'

4. *Crypsirhina varians*, (Lath.)

Crypsirhina varians, Sharpe, *Cat. B. Brit. Mus.* iii, p. 83 (1877).

♂, ♀ ad. Patani. 30th May and 18th and 19th June. (Nos. 140, 198, 199)

The Racket-tailed Magpie has the iris red and the bill and feet black.

'Only met with in Patani, where it was not uncommon during May and June, generally frequenting the Cashew trees in search of cockchafers and big green Rutelid beetles (*Anomala viridis*). The species has not been previously recorded from the Malay Peninsula, and is apparently unknown on the west coast or further south than Patani.'

EULABETIDAE**5. *Eulabes javanensis*, (Osbeck)**

Mainatus javanensis, Bonhote, p. 66.

Gracula javanus (Cuv.), Hartert, p. 579.

♀ ad. Ban Sai Kau, Nawngchik. 22nd May. (No. 123)

♂, ♀ ad. Biserat, Jalor. June, July. (Nos. 209, 210, 271)

♂ ad. Mabek, Jalor. 27th July. (No. 325)

In the Malay Grackle the iris is brown, the wattles orange, paler at the base, the bill orange-lemon, yellow at tip, and the feet bright yellow.

'The *Tiong gajah* or *Tiong mas*, as the Malays call this species, is very common in the Patani States, frequenting open forest and orchard-land, but it is not found in the coast-districts, and is much rarer on the western side of the Peninsula. It is a favourite cage-bird among the natives, and large sums are paid for clever talkers.'

6. *Calornis chalybeus*, (Horsf.)

Calornis chalybea, *Bonhote*, p. 66.

♂ ad.	Patani.	30th May.	(No. 144)
♂, ♀ ad. et ♀ imm.	Ban Sai Kau, Nawngchik.	April, May.	(Nos. 16, 107, 114)
♂, ♀ ad.	Biserat, Jalor.	5th and 16th July.	(Nos. 242, 283)
♂ imm.	Bidor, South Perak.	2nd and 3rd Feb.	(Nos. 607, 610, 612)

The Glossy Calornis has the iris carmine and the bill and feet black.

'Common everywhere in open country, nesting in the Pinang palms, or occasionally at the top of dead trees. Malay name, *Perling*.'

7. *Aethiopsar fuscus*, (Wagl.)

Acridotheres fuscus, *Bonhote*, p. 66.

♂ ad.	Ban Sai Kau.	21st May.	(No. 121)
♀ juv.	Biserat, Jalor.	7th and 13th July.	(Nos. 253, 275)

The Jungle-Myna has the iris deep yellow (white, tinged with yellow in the young), the bill orange with the basal portion of the lower mandible black feet yellow, claws paler.

'Very common in the rice-fields; nearly always in close attendance on the buffaloes and oxen, so much so that it is often difficult to shoot specimens. Malay name, *Burong gembala kerbau* (Buffalo-herd).'

DICRURIDAE

8. *Chaptia aenea*, (Vieill.)

Chaptia aenea, *Sharpe*, *Cat. B. Brit. Mus.* iii, p. 243 (1877).

♂, ♀ ad.	Telôm, Perak-Pahang border.	24th January.	(Nos. 581, 582)
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The Bronzed Drongo has the iris red and the bill and feet black.

'Very common on the edge of high bamboo jungles in the hill country, perching on the extreme tips of the higher shoots. The species is probably semi-crepuscular in its habits, as it rarely appeared before 5 p.m., when it was

to be seen hawking insects (chiefly winged termites) and performing wonderful aerial summersaults. The note is a clear melodious whistle, twice repeated with a brief interval between. In Patani species of *Dicruridae* are known as *Anak damak* or *Hamba kēra* (Monkey's slave), while in South Perak and Selangor *Chawi-chawi* is the commoner name.'

9. *Bhringa remifer*, (Temm.)

Bhringa remifer, Sharpe, *P.Z.S.*, 1887, p. 434; *Bonhote*, p. 59; *Hartert*, p. 580.

♂, ♀ ad. Telôm, Perak-Pahang border. 3,500-4,000 feet. 19th and 20th January.

(Nos. 551, 556, 559)

Five examples from Perak differ constantly from the large series of *Bhringa* from North India, etc., in having the web on the terminal part of the lengthened outer tail-feathers much narrower, 0.5 inch or less in width. The racket-shaped end is greatly lengthened, and extends much further down the shaft, tapering off gradually towards the base, instead of terminating abruptly. Birds from Sumatra and Java appear to share this peculiarity, but the Museum series is very deficient in examples with complete tails. The name *Edolius remifer* was given by TEMMINCK to birds from Java and Sumatra, and should no doubt include the birds from Perak; the northern examples standing as *B. tectirostris*, HODGS.

'In habits similar to the preceding.'

10. *Dissemurus paradiseus* (Linn.)

Dissemurus paradiseus, *Bonhote*, p. 59.

Dissemurus paradiseus paradiseus, *Hartert*, pp. 579 and 580.

♂ ad.	Nawngchick.	28th November.	(No. 484)
♂, ♀ ad.	Biserat, Jalor.	14th July.	(Nos. 277, 286)
♀ ad. et imm.	Mabek, Jalor.	22nd and 23rd July.	(Nos. 302, 307, 308)
♀ imm.	K. Datoh, Tanjong Patani.	3rd October.	(No. 408)
♂, ♀ ad.	Sungkei, South Perak.	8th and 10th February.	(Nos. 620, 622, 645)
♂ ad.	Batang Padang, South Perak.	29th January.	(No. 604)

The Larger Racket-tailed Drongo has the iris chestnut or red and the bill and feet black.

'Widely distributed from the sea-coast to the thick central jungles, but not ascending the hills to any considerable elevation.'

ORIOLIDAE

11. *Oriolus consanguineus*, Wardlaw-Ramsay.

Oriolus consanguineus, Sharpe, *P.Z.S.*, 1887, p. 434; *Bonhote*, p. 59.

♂ ad. Telôm, Perak-Pahang border. 19th January (No. 548)

The Crimson-breasted Oriole has the iris chestnut and the bill and feet pale bluish-horn. Specimens from the Malay Peninsula appear to be somewhat larger than those from Sumatra, males from the former locality having the wing 5.4 inches, while those from the latter measure 5.1-5.2 inches. We may here remark that *O. vulneratus*, SHARPE, from Borneo, appears to be indistinguishable from the present species, the supposed differences found in the gloss of the upper parts and the amount of red on the primary-coverts being apparently of no importance (cf. *Ibis*, 1887, p. 438).

'This bird frequents dark and narrow gullies overgrown with the thickest vegetation, and is shy and retiring in its habits. Its lower limit is about three thousand feet, and it is by no means a rare bird to those acquainted with its habits.'

PLOCEIDAE

12. *Munia maja*, (Linn.)

Munia maja, *Bonhote*, p. 67.

♀ imm.	Patani.	30th May.	(No. 143)
♀ ad.	Ban Sai Kau.	20th December.	
♂ ad.	Biserat.	18th July.	(No. 288)

This White-headed Munia has the iris brown, the bill lead-blue, and the feet greyish-black.

'Common on the rice-fields and on waste ground ; a favourite cage bird with Malays. Malay name, *Burong pipit* ; *Burong laki padi* (husband of the rice).'

13. *Munia acuticauda*, Hodgs.

Munia acuticauda, *Hartert*, p. 579.

♂ ad.	Ban Sai Kau, Nawngchik.	26th April.	(No. 10)
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HODGSON'S Munia has the iris rich sienna-brown, the bill bluish lead-colour, black along the culmen, and the feet greyish-black.

'Not so common as the preceding species and found as a rule in low brush-wood overgrown with lalang grass.'

14. *Ploceus atrigula*, Hodgs.

Ploceus atrigula, *Bonhote*, p. 67.

Ploceus passerinus infortunatus, *Hartert*, p. 577.

♀ ad.	Ban Sai Kau.	24th May.	(No. 131)
♂ ad.	Biserat, Jalor.	1st July.	(No. 223)

These birds, with the wing 2·75 inch, belong to the slightly smaller race which has been named *P. passerinus infortunatus*, HARTERT.

In the birds from India the wing measures 2·9-3·0 inches. ♂ iris brown, bill black, a yellow bar across the base of the lower mandible, feet flesh colour. ♀ iris brown, bill yellowish-horn, feet pinkish.

‘Common in the environs of almost every village. The peculiar “abortive nests” or swings made by the male, and weighted with lumps of mud, are well known, and a source of wonder to the Malays, who are extraordinarily observant in matters zoological.’

15. *Chlorura*, sp.

♀. Telôm, Perak-Pahang border. 22nd January. (No. 570)

The adult female *Chlorura*, collected by Mr. ROBINSON at Telôm, is very closely allied to *C. intermedia*, HARTERT, from Lombok and Flores, having the same dark tawny rufous lores, but the chest and breast are somewhat paler, and in this respect the Malay bird closely resembles *C. borneensis*.

The iris is brown, the bill black, and the feet yellowish-brown.

‘Only one specimen of this bird was seen, creeping about among low bamboos, very much after the manner of a Titmouse.’

FRINGILLIDAE

16. *Emberiza aureola*, Pall.

Emberiza aureola, Sharpe, *Cat. B. Brit. Mus.* xii, p. 509 (1888).

ad. et imm. Nawngchik. November.

‘The Yellow-breasted Bunting was evidently on migration, at the commencement of the heavy rains.’

17. *Passer montanus*, Linn.

Passer montanus, Sharpe, *Cat. B. Brit. Mus.* xii, p. 301 (1888).

♀ ad. Ban Sai Kau. 14th September. (No. 386)

♀ ad. Anak Bukit. 25th April. (No. 9)

The Tree-Sparrow has the iris brown, the bill black, and the feet flesh-colour.

‘In towns and near the coast as common as the English sparrow at home, but rarely seen in up-country villages.’

MOTACILLIDAE

18. *Anthus rufulus*, Vieill.

Anthus rufulus, *Bonhote*, p. 66.

Anthus rufulus malayensis, *Eyton*, *Hartert*, p. 575.

♂, ♀ ad.	Kampong Jalor.	29th October, 5th November.	(Nos. 457, 469)
♀ ad.	Bayu, Jalor.	9th July.	(No. 261)
♀ ad.	Biserat, Jalor.	18th July.	(No. 287)

The specimens before us belong to the form of the Indian Pipit known as *A. malayensis*, *Eyton*, having the outer web of the penultimate tail-feathers black almost to the tip, edged externally with white.

‘Almost the most characteristic bird of open country and dry rice-fields. No. 287 was snared on its nest which was situated among long grass at the edge of a rice-field, and consisted of a flat circular pad some five inches in diameter, composed of dead grass and loose maize leaves, lined with a few horse-hairs, which must have been hard to come by as there were only three ponies in the country. The eggs were four in number, rather pointed, the ground colour dirty white, thickly covered with very fine dark sienna-brown mottlings, evenly distributed, and also with large purplish-black blotches more thickly congregated at the larger end. Malay name, *Apit-apit*.’

19. *Motacilla borealis*, (Sund.)

Motacilla borealis, *Sharpe*, *Cat. B. Brit. Mus.* x, p. 552 (1885).

♀ ad.	Patani Town.	20th April.	(No. 1)
♀ imm.	Nawngchik.	27th November.	(No. 481)
♂, ♀ ad.	Ban Sai Kau.	16th September.	(Nos. 389, 390)

The Grey-headed Wagtail has the iris black, the bill black, paler at the base, and the feet black, with the soles yellowish.

‘Common in open country from September to April.’

20. *Motacilla melanope*, Pall.

Motacilla melanope, *Sharpe*, *P.Z.S.*, 1887, p. 441.

Motacilla boarula melanope, *Hartert*, p. 575.

♀ ad.	Jeram Kawan, South Perak.	16th February.	(No. 677)
♂ ad. et imm.	Sungkei, South Perak.	7th February.	(Nos. 617, 652)

The Grey Wagtail has the iris dark brown, bill black, feet brownish-flesh.

NECTARINIIDAE

21. *Arachnothera modesta*, (Eyton.)

Arachnothera affinis modesta, *Hartert*, p. 574.

♀ ad. et imm. Bukit Besar, Nawngchik. 2,500 feet. May. (Nos. 30, 54, 364)
 ♂ ad. Jeram Kawan, South Perak. 15th February. (No. 669)

The Grey-breasted Spider-hunter has the iris hazel, the bill blackish, yellowish horn-colour below, and the feet flesh.

'The habits of all the species of Spider-hunters are very similar. On Bukit Besar, where they are very abundant, they chiefly frequented the wild banana and tall zingiberaceous plants that covered the clearing in which we were encamped. They run along the underside of these broad leaves with great rapidity, displaying a singular fearlessness. Their food in part at least consists of vegetable matter, and they are particularly fond of the purple seeds of a shrubby plant probably belonging to the *Sterculiaceae*.'

22. *Arachnothera robusta*, (Mull. and Schl.)

Arachnothera robusta, *Hartert*, p. 574.

♀ (♂) ad. Kulu Bidor, South Perak. 21st February. (No. 679)

The example of the Stout-billed Spider-hunter is certainly a female, and lacks the ornamental chest-plumes characteristic of the male.

Iris dark brown, bill and feet black.

23. *Arachnothera longirostris*, (Lath.)

Arachnothera longirostris, *Sharpe*, *P.Z.S.*, 1887, p. 441.

Arachnothera longirostra, *Hartert*, p. 574.

♀ ad. Ban Sai Kau. 3,000 feet. 23rd May.

In the Little Spider-hunter the iris is light brown, the bill black, greyish at the base of the lower mandible, and the feet black.

24. *Arachnothera chrysogenys*, (Temm.)

Arachnothera chrysogenys, *Gadow*, *Cat. B. Brit. Mus.* ix, p. 108 (1884).

♂, ♀ ad. Bukit Besar, Nawngchik. 2,500 feet. 3rd and 4th May. (Nos. 45, 52, 57)

The Yellow-eared Spider-hunter has the iris brown, the bill black, the gape and tomia yellow, and the feet yellowish-grey.

25. *Arachnothera magna*, Hodgs.

Arachnothera magna, *Sharpe*, *P.Z.S.*, 1887, p. 441.

♀ ad. Semangko Pass, Selangor-Pahang border. 2,700 feet. 16th May and November.

The Large Spider-hunter has the iris dark brown, the bill black, the tomtia dull yellow, and the feet bright gamboge.

'Very abundant on a flowering bamboo in company with *Aethopyga wrayi*.'

26. *Arachnothera crassirostris*, (Reichenb.)

Arachnothera crassirostris, *Bonhote*, p. 64.

♂ ad. Gedong, South Perak. 7th January. (No. 499)

The Thick-billed Spider-hunter has the iris hazel, the bill black, horn-coloured at base, and the feet flesh-coloured with the soles orange.

27. *Anthothreptes hypogrammica*, (S. Müll.)

Anthreptes hypogrammica, *Hartert*, p. 574.

♂ ad. Bukit Besar, Nawngchik. 2nd May. (No. 24)

The Blue-naped Sun-bird has the iris brown, the bill black, and the feet olive-brown, yellow on the soles.

'It was met with on a flowering tree in the early morning.

'Apparently a strictly jungle species and evidently rare, as only a single specimen was collected or even seen.'

28. *Anthothreptes malaccensis*, (Scop.

Anthothreptes malaccensis, *Bonhote*, p. 65.

Anthreptes malaccensis, *Hartert*, p. 573.

♂ imm.	Patani.	19th June.	
♂, ♀ ad.	Ban Sai Kau.	25th May.	
♂ imm.	Jambu, Jhering.	5th and 6th June.	(Nos. 150, 158)
♂, ♀ ad.	Sungkei, South Perak.	7th and 9th February.	(Nos. 625, 634)

The Brown-throated Sun-bird was feeding on the inflorescence of the cocoa-nut palms.

The iris is chestnut or brown, the bill black in the male, with the tip and base of the lower mandible bluish in the female, the legs greenish, and the soles orange.

'The commonest of the Sun-birds throughout the Peninsula, and found in every garden and native village, but not in jungle. In these localities it feeds, as noted above, on the cocoa-nut palms and on the flowers of Hibiscus, but among the Casuarinas on the sea coast it is often found in great numbers, and in this case is probably attracted by small insects found on the cones and in the crevices of the bark. Malay name, *Burong blacham*.'

29. *Aethopyga wrayi*, Sharpe

Aethopyga wrayi, Sharpe, *P.Z.S.*, 1887, p. 440, pl. xxxviii, fig. 2, 1888, p. 277; *Hartert*, p. 573.

♂ ad. Gunong Berumban, Perak. 5,000 feet. 28th January. (No. 602)

A male of WRAY'S Sun-bird.

'Very common at times among low shrubs and bamboos at high elevations, but very difficult to secure uninjured, chiefly owing to its extraordinary tameness and curiosity.'

DICAEIDAE

30. *Prionochilus ignicapillus*, Eyton.

Prionochilus ignicapillus, Sharpe, *P.Z.S.*, 1888, p. 277.

♂ vix ad. Bukit Besar, Nawngchik. 2,500 feet. 10th May. (No. 87)

The Crimson-breasted Flower-pecker has the iris reddish-brown, the bill black, and the feet lead-colour. In the present instance the green-edged primaries characteristic of immaturity are still retained.

'It frequents the tops of the high trees in flocks of five or six individuals.'

31. *Dicaeum cruentatum*, (Linn.)

Dicaeum cruentatum, *Bonhote*, p. 65.

♂ ad.	Patani.	14th June and 10th October.	(Nos. 187, 443)
♂ ad.	Nawngchik.	27th November.	(No. 480)
♂ ad.	Gedong, South Perak.	8th January.	(No. 505)

The Scarlet-backed Flower-pecker has the iris brown and the bill and feet black.

'An open-country and coastal form; very abundant at Patani among the Cashews. Known to the Malays in old-folk tales; it is an important figure as the *Burong supa Patri* (Princess-bird).'

32. *Dicaeum trigonostigma*, (Scop.)

Dicaeum trigonostigma, *Bonhote*, p. 65 ; *Hartert*, p. 575.

♂ ad. Biserat, Jalor. 12th June. (No. 269)
 ♂, ♀ ad. Jeram Kawan, South Perak. 13th February. (Nos. 656, 660, 661)

The Orange-bellied Flower-pecker has the iris black, the bill black, and the feet lead-colour.

33. *Dicaeum ignipectus*, (Hodgs.)

Dicaeum ignipectus, *Sharpe*, *P.Z.S.*, 1887, p. 441 ; *Bonhote*, p. 65 ; *Hartert*, p. 575.

♂ (♀) ad. Telôm, Perak-Pahang border. 4,000 feet. 21st January. (No. 561)

The example of the Fire-breasted Flower-pecker, undoubtedly a male, resembles typical *D. ignipectus* in plumage, and has the flanks of quite the same colour, but the bill is strikingly longer and stronger.

The iris is dark brown, and the bill and feet lead-colour.

'A high mountain form on the Malay Peninsula. I am inclined to think that there has been some mistake in the locality of the specimens recorded by Mr. BONHOTE (*loc. cit.*)'

ZOSTEROPIDAE**34. *Zosterops aureiventer*, Hume.**

Zosterops aureiventer, *Sharpe*, *P.Z.S.*, p. 441 ; *Hartert*, p. 575.

♀ ad. Bukit Besar, Nawngchik. 2nd September. (No. 373).

Hume's White-eye has the iris brown, the bill lead-blue, black along the culmen and at the tip, and the feet lead-blue.

'Only seen on one day, when it suddenly appeared in considerable numbers after a very stormy night.'

35. *Zosterops palpebrosa*, (Temm.)

Zosterops palpebrosa, *Sharpe*, *Cat. B. Brit. Mus.* ix, p. 165 (1884).

♂, ♀ ad. Tanjong Patani. 28th and 30th September. (Nos. 410, 411, 412)

The birds collected at Patani appear to be typical examples of the Indian White-eye (*Z. palpebrosa*), and are easily distinguished from the Chinese *Z. simplex*, SWINH.

The iris is greyish-hazel, the bill black, lead-coloured at the base, and the feet lead-coloured.

'Found only among the Casuarinas on Cape Patani, where they were very abundant, though none were present during May and June; equally common in similar situations in Selangor, nesting among the mangroves only a few inches above high-tide level.'

SITTIDAE

36. *Dendrophila azurea*, (Less.)

Sitta Azurea, Sharpe, *P.Z.S.*, 1887, p. 441; *Hartert*, p. 573.

Ad. Semangko Pass, Selangor-Pahang border. 4,000 feet. 9th May. (No. 1)

The Azure Nuthatch has the iris white, the orbital skin livid bluish-white, and the bill and feet livid bluish-horn.

'A mountain form: abundant in the above locality.'

37. *Dendrophila saturation*, Hartert

Sitta frontalis saturation, *Hartert*, p. 573.

♀ ad. et imm. Bukit Besar, Nawngchik. May and August. (Nos. 93, 94, 366)

I have provisionally employed Mr. HARTERT's name for the violet-breasted form of the blue Nuthatch found in the Malay Peninsula, though I am by no means satisfied that it is really distinct from *D. oenochlamys* (*lilacea*) from the Philippines.

Mr. H. C. ROBINSON collected two adult females with the breast washed with violet, and a younger specimen in which these parts are greyish-rufous and entirely devoid of violet.

Iris brown or lemon-yellow, bill coral-red, feet brownish-black.

'Usually a jungle-species; one specimen, however, was shot in an orchard at Biserat, but was too much damaged to preserve.'

PARIDAE

38. *Melanochlora sultanea*, (Hodgs.)

Melanochlora sultanea, Sharpe, *P.Z.S.*, 1888, p. 277.

♂, ♀ ad. Bukit Besar, Nawngchik. 2,500 feet. February, May, and August.
(Nos. 25, 28, 65, 66, 68, 360)

A male of the Sultan-bird has the iris dark brown, the bill black, and the feet greenish-grey.

'This bird was often noted in flocks of seven or eight individuals feeding along the edge of our clearing in Bukit Besar. In flight and actions it does not in the least resemble a Titmouse, but reminds one more of the Bulbuls.'

39. Parus atriceps, Horsf.

Parus atriceps, Oates, *Faun. Brit. Ind., Birds* i, p. 46 (1889).

Parus cinereus, Vieill., *Gadow., B. Brit. Mus.* viii, p. 16, (1883).

♂ ad. Patani. June, September. (Nos. 420, 422)

♂, ♀ ad. Jambu, Jhering. June. (Nos. 149, 160, 161)

The Indian Grey Titmouse has the iris brown or hazel, the bill black, and the feet greenish-grey or greenish-blue.

'Another of the species which, in the Malay Peninsula, appears to be strictly confined to the belt of Casuarinas skirting the coast in certain districts.'

PRIONOPIDAE**40. Platylophus ardesiacus, (Cab.)**

Platylophus ardesiacus, Sharpe, *Cat. B. Brit. Mus.* iii, p. 317 (1877)

♂ ad. Sungkèi, South Perak. 7th February. (No. 614)

The Jay-Shrike has the iris Indian red, and the bill and feet black.

The specimen is in freshly moulted plumage and has the upper parts very dark and the under parts washed with grey.

LANIIDAE**41. Lanius tigrinus, Drap.**

Lanius tigrinus, Grant, *Nov. Zool.* ix, p. 480 (1902); *Hartert*, p. 576.

♀ imm. Jeram Kawan, South Perak. 13th February. (No. 659)

The young of the Thick-billed Shrike has the iris hazel, the bill black, pinkish at the base, and the feet bluish-grey.

42. Lanius cristatus, Linn.

Lanius cristatus, Gadow., *Cat. B. Brit. Mus.* viii, p. 271 (1883); Grant, *Nov. Zool.* ix, p. 481 (1902)

♀ ad. et imm. Anak Bukit, Nawngchik. 24th April. (No. 7)

A female of the Brown Shrike has the iris black, the bill lead-colour, paler at the base and black at the tip, and the feet black.

SYLVIIDAE**43. Orthotomus atrigularis, Temm.**

Orthotomus atrigularis, Sharpe, *Cat. B. Brit. Mus.* vii, p. 220 (1883).

♀ ad. Cape Patani. 10th June. (No. 169)

♀ imm. Bukit Besar, Nawngchik. 10th May. (No. 83)

♀ ad. Gedong, South Perak. 8th January. (No. 504)

Two adult females of the Black-necked Tailor-bird have the iris brown or pale yellow, the upper mandible black, the lower yellowish-horn, and the feet yellowish-flesh.

'A coastal and scrub-country form ; never apparently found in old jungle.'

44. *Phylloscopus borealis*, (Blas.)

Phylloscopus borealis, *Seebohm, Cat. B. Brit. Mus.* v, p. 40 (1881).

♂ imm. Patani. 2nd October. (No. 433)

The Arctic Willow-warbler has the iris hazel, the bill black above, yellowish beneath, and the feet yellowish-brown.

'Evidently on migration, large flocks appearing' on the breaking of the monsoon.'

TURDIDAE

45. *Turdus obscurus*, Gmel.

Merula obscurus, *Seebohm, Cat. B. Brit. Mus.* v. p. 273 (1881).

♂ ad. Telöm, Perak-Pahang border. 4,000 feet. 24th January. (No. 583)

The Dark Ouzel has the iris pale hazel, the bill black above, yellow below, and the feet pale yellow.

'Only this individual was seen ; it was so busily engaged in wrestling with a large and hairy caterpillar that I had time to send for a twelve-bore gun, the only one available, extract most of the shot from the cartridge, and shoot the bird within a distance of about ten yards from the ladder of our hut on which I was sitting.'

46. *Geocichla davisoni*, Hume.

Geocichla davisoni, *Sharpe, in Seebohm's Monogr. Turdidae*, i, p. 101, pl. xxi, (1898).

♂ ad. Telöm, Perak-Pahang border. 4,000 feet. 22nd January. (No. 659)

In DAVISON'S Ground-Thrush the iris is dark brown, the bill black, and the feet dull yellow.

'Another specimen was secured by Mr. L. WRAY in the Larut Hills, also in the winter months.'

47. *Cittocincla tricolor*, (Vieill.)

Kittacincla macrurus tricolor, *Hartert*, p. 572.

♂ ad.	Bukit Besar, Nawngchik.	2,500 feet.	9th May.	(No. 74)
♀ (♂) ad.	Biserat, Jalor.		15th July.	(No. 285)
♀ (♂) ad.	Gedong, South Perak.		9th January.	(No. 510)

The three specimens of the Shama are all in fully adult male plumage; of these two are no doubt incorrectly marked as female. The birds obtained at the two first named localities in Patani have long tails measuring respectively 7.0 and 7.3 inches, and the breast and underparts lighter chestnut. The third specimen from Perak has a shorter tail, measuring 6 inches, and the breast and underparts deeper chestnut. All intermediate stages are represented in the British Museum collection.

'The Shama is found distributed throughout the Peninsula, but does not appear to ascend the hills much above three thousand feet, or to occur among the mangroves of the tidal estuaries. It mainly affects secondary jungle, but is often found in the middle of comparatively large towns. Malay name, *Murai rimba*, or *Murai batu*.'

48. *Copsychus musicus*, (Raffl.)

Copsychus musicus, *Sharpe*, *P.Z.S.*, 1888, p. 436.

Copsychus saularis musicus, *Hartert*, p. 571.

Copsychus saularis (Linn.), *Bonhote*, p. 63.

♂, ♀ ad.	Ban Sai Kau, Nawngchik.	May.	(Nos. 125, 126)
♀ ad.	Biserat, Jalor.	July.	(No. 265)
♂ ad.	Patani.	May, June.	(Nos. 142, 165)
♂ ad.	Sungei, South Perak.	2nd February.	(No. 616)

The Magpie-Robin has the iris hazel or brown, and the bill and feet black.

'Quite the commonest bird in the Peninsula in towns and villages, extending along the roads to an altitude of about three thousand feet, but never found in jungle.'

49. *Henicurus schistaceus*, Hodgs.

Enicurus schistaceus, *Hartert*, p. 570.

♂ ad.	Sempan, Selangor-Pahang border.	4,200 feet.	10th May.
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A male of the Slaty-backed Forktail in very worn plumage, has the iris black, bill black, and the feet yellowish flesh-colour.

'Several pairs of this species were seen in the bed of a rocky stream. Their habits are very similar to those of the Wagtails; and the note, which is constantly uttered, is a very high-pitched whistle, almost a scream.'

TIMELIIDAE

50. *Mesia argenteauris*, Hodgs.

Mesia argenteauris, *Sharpe*, *P.Z.S.*, 1886, p. 352; 1888, p. 276; *Hartert*, p. 568.

♂, ♀ ad. Telôm, Perak-Pahang border. 4,000 feet. 26th, 27th January. (Nos. 500, 505, 563, 596)

The Silver-eared *Mesia* has the iris dark brown, the bill pale orange, and the feet wax-yellow.

'Common above three thousand feet; usually found in pairs hunting for food among the dead branches of fallen trees.'

51. *Cutia cervinocrissa*, Sharpe.

Cutia cervinocrissa, *Sharpe*, *P.Z.S.*, 1888, p. 276.

♀ ad. Semangko Pass, Selangor-Pahang border. 4,000 feet.

A female of the Malayan *Cutia* agrees well with typical examples collected by Mr. L. Wray, and has the iris brown, the bill slate, and the feet chrome.

'Common in the above locality in small flocks of five or six individuals, climbing among the branches of low trees and searching for insects very much in the manner of a Titmouse.'

52. *Herpornis xantholeuca*, Hodgs.

Herpornis xantholeuca, *Sharpe*, *P.Z.S.*, 1888, p. 275.

Erpornis xantholeuca, *Hartert*, p. 568.

♀ ad. Bukit Besar, Nawngchik. 24th August. (No. 342)

The White-bellied *Herpornis* has the iris brown, the bill fleshy-horn, and the feet pinkish-flesh.

53. *Siva sordidior*, Sharpe.

Siva sordida, *Sharpe* (*nec Hume*), *P.Z.S.*, 1887, p. 438.

Siva sordidior, *Sharpe*, *P.Z.S.*, 1888, p. 276.

♂, ♀ ad. Telôm, Perak-Pahang border. 4,000 feet. January. (Nos. 571, 589, 598)

The Perak *Siva* has the iris hazel, the bill pinkish-horn, and the feet brownish.

'Found in pairs, associating with *Alcippe peracensis*.'

54. *Sibia simillima*, Salvad.

Sibia simillima, Sharpe, *P.Z.S.*, 1886, p. 352; 1888, p. 274; *Bonhote*, p. 63.
Sibia picaoides simillima, *Hartert*, p. 567.

♂, ♀ ad. Telôm, Perak-Pahang border. 18th to 27th January.
 (Nos. 546, 549, 550, 591, 594)

The Long-tailed *Sibia* has the iris reddish- or hazel-brown, and the bill and feet black.

‘Very common at Telôm in flocks of four or five; contrary to the habits of most of the hill birds, it usually keeps fairly high up in the trees, and is one of the most conspicuous and easily obtained species.’

55. *Mixornis gularis*, (Raffl.)

Mixornis gularis, Sharpe, *P.Z.S.*, 1888, p. 275; *Bonhote*, p. 64; *Hartert*, p. 567.

♂ ad.	Bukit Besar, Nawngchik.	2,500 feet.	2nd September.	(No. 375)
♂ ad.	Ban Sai Kau.		22nd May.	
♂ ad.	Gedong, South Perak.		8th January.	(No. 503)
♂ ad.	Jeram Kawan, South Perak.		14th February.	(No. 666)

The Sumatran Yellow-breasted Babbler has the iris brown, the loreal-space lead-blue, the bill bluish lead-colour, the feet greenish-brown, and the toes yellow. The black shaft streaks on the feathers of the throat seem to be widest in examples from the southern parts of its range, being most strongly marked in birds from the southern part of the Malay Peninsula and Sumatra.

56. *Stachyridopsis chrysaëa*, (Hodgs.)

Cyanoderma chrysaëa, Sharpe, *P.Z.S.*, 1887, p. 440.
Stachyridopsis chrysaëa assimilis, *Hartert*, p. 566.

♂, ♀ ad. Telôm, Perak-Pahang border. 3,500 feet. January. (Nos. 538, 552, 580)

The Golden-headed Babbler has the iris dark sienna, the bill dark lead-colour, paler on tomia and pinkish at the base of the lower mandible, and the feet flesh-colour, inclining to yellowish behind.

In spite of Mr. HARTERT's statement to the contrary (cf. *Nov. Zool.* ix, p. 566 (1902)), I think Dr. SHARPE was perfectly justified in referring the Perak bird, collected by Mr. L. WRAY, to this form rather than to *S. assimilis*. The three specimens now before us agree perfectly with other birds from Perak, and are in my opinion inseparable from typical *S. chrysaëa*, differing from *S. assimilis* in the colour of the back and underparts which are much brighter yellow. The range of *S. assimilis* appears to be limited to northern

Tenasserim and Karenee. Should the Malaccan bird be regarded as distinct from *S. chrysaea*, it must bear the name of *S. bocagei*, SALVAD., founded on examples from Sumatra (cf. *Ann. Mus. Civ. Gen.* (1) xiv, p. 223 (1879)).

‘Very abundant among the undergrowth, and so extraordinarily tame and inquisitive that it was difficult to get far enough away to shoot specimens without blowing them to pieces.’

57. *Stachyrhis maculata*, (Temm.)

Stachyrhis maculata, *Hartert*, p. 566.

♀ ad. Gedong, South Perak. 12th January. (No. 534)

58. *Stachyrhis davisoni*, Sharpe.

Stachyrhis nigriceps, *Sharpe* (*nec* *Hodgs.*), *P.Z.S.*, 1887, p. 440, 1888, p. 275.

Stachyrhis davisoni, *Sharpe*, *Bull. B.O.C.* i, p. 7 (1892); *Hartert*, p. 566.

♂ ad. Semangko Pass, Selangor-Pahang border. November. (Butler Coll.)

A specimen of DAVISON's Babbler agrees with others from the Malay Peninsula in having the breast paler in colour than in birds from Sumatra (*S. larvata*) and Borneo (*S. borneensis*). Whether these latter are really distinct from one another seems doubtful.

59. *Alcippe peracensis*, Sharpe.

Alcippe peracensis, *Sharpe*, *P.Z.S.*, 1887, p. 439; *Hartert*, p. 566.

♂, ♀ ad. Telôm, Perak-Pahang border. 3,500-4,000 feet. January.
(Nos. 547, 554, 560, 564, 568, 593, 600)

In the Perak Babbler the iris is reddish-brown, the bill horn-colour, yellow on the tomia, and the feet yellowish-flesh.

‘Very common on most of the hills of the main range from three thousand feet upwards.’

60. *Alcippe cinerea*, Blyth.

Alcippe cinerea, *Hartert*, p. 566.

♂, ♀ ad. Bukit Besar, Nawngchik. May. (Nos. 50, 81)

Mr. ROBINSON describes the soft parts of the Grey Babbler as follows:—

♂ Iris brown, bill lead-coloured, feet plumbeous, pinkish at the upper portion of the tarsus.

♀ Iris brown, bill blackish-brown, feet lead-green.

61. *Malacopteron magnirostre*, (Moore).

Malacopteron magnirostris, *Hartert*, p. 563.

♂ ad. Bukit Besar, Nawngchik. May and August. (Nos. 21, 350, 362)

The Brown-headed Tree-Babbler has the iris red, chestnut, or dark brown, and the bill and feet lead-colour.

62. *Malacopteron cinereum*, Eyton

Malacopteron cinereus, *Hartert*, p. 564.

♂ ad. Sungkei, South Perak. 11th February. (No. 654)

In this Tree-Babbler the iris is dark, the bill black, flesh-coloured at the base of the lower mandible, and the feet flesh-coloured.

63. *Pellorneum subochraceum*, Swinh.

Pellorneum subochraceum, *Hartert*, p. 562.

♀ ad. Biserat, Jalor. 3rd July. (No. 246)

♀ ad. Mabek, Jalor. 26th July. (No. 321)

The Burmese Spotted Babbler has the iris hazel, the upper mandible black, the lower yellowish, and the feet flesh.

'Frequenting low bushes in dense secondary jungle, and very shy and hard to flush. The bird bears a curiously close, but of course purely superficial resemblance to *Anthus rufulus*, which it would be hard to explain in any theory of mimicry.'

64. *Gampsorhynchus saturator*, Sharpe

Gampsorhynchus saturator, *Sharpe*, *P.Z.S.*, 1888, p. 273.

Vix. ad. Semangko Pass, Selangor-Pahang border. November. (Butler Coll.)

Three nearly adult female examples of this Shrike-Babbler with the hinder part of the crown still mixed with brown feathers and with lateral traces of the band across the chest, characteristic of youth, shew signs of acquiring white shoulders, one or two white feathers being mixed among the brown plumage. It seems to us very doubtful if Dr. SHARPE's *G. saturator* can be maintained as a distinct form, for, though the type—a freshly-moulted bird in perfect plumage—is darker than specimens of *G. torquatus* in the British Museum collection, the birds before us do not appear separable.

'I have recently obtained numerous specimens of this species in the locality indicated above. They frequented the sides of a steep gully clothed with dense bamboo, and appeared, morning and evening, in flocks of nine or

ten. The flight is hurried and never long sustained, and the note a rattling cry somewhat resembling that of the Kera monkey (*Macacus fascicularis*).

65. *Rhinocichla mitrata* (S. Müll.)

Rhinocichla mitrata, Sharpe, *P.Z.S.*, 1886, p. 352; 1888, p. 274; *Hartert*, p. 562.

♂ ad. Telôm, Perak-Pahang border. 3,500-4,000 feet. January. (Nos. 537, 579, 587)

Two adult males of the Chestnut-capped Babbling Thrush have the iris chestnut, the naked skin round eye white, the bill orange, and the feet chrome-yellow.

‘Almost the most abundant species of bird in the jungles of the main range above three thousand five hundred feet. Generally found in parties of two or three.’

66. *Melanocichla lugubris* (S. Müll.)

Melanocichla lugubris, Sharpe, *Cat. B. Brit. Mus.* vii, p. 451 (1883).

Melanocichla peninsularis, Sharpe, *P.Z.S.*, 1888, p. 274.

♂ ad. Semangko Pass, Selangor-Pahang border. May. 2,700 feet.

Bill rich orange, iris chestnut, bare skin on each side of the throat livid blue. *M. peninsularis* was founded by Dr. SHARPE on a somewhat worn specimen procured by Mr. L. WRAY on Gunong Batu Patch, in Perak, at an elevation of three thousand four hundred feet. A female bird in the TWEEDDALE collection got by CARL BOCK on Mount Sago, Sumatra, 3rd September, 1878, is indistinguishable from the type of *M. peninsularis*, and I am therefore of opinion that only one species, *M. lugubris*, really exists.

‘In habits somewhat similar to *Rhinocichla mitrata*, but more terrestrial. On the three occasions on which I have met with it, it has always been on the ground in flocks of from three to seven individuals.’

PYCNONOTIDAE

67. *Otocompsa emeria* (Linn.)

Otocompsa emeria, *Hartert*, p. 561.

♂ ad.	Patani.	May and June.	(Nos. 145, 190, 196)
♀ ad.	Ban Sai Kau, Nawngchik.	22nd May.	(No. 127)
♀ ad.	Biserat, Jalor.	5th July.	(No. 245)

This Red-whiskered Bulbul has the iris brownish-chestnut or dark hazel, bill and feet black.

‘Extremely common in open country on the east coast littoral, decidedly rare on the western side of the Peninsula.’

68. *Pycnonotus finlaysoni*, Strickl.

Pycnonotus findlaysoni (*sic*) *Bonhote*, p. 62.

Pycnonotus finlaysoni, *Hartert*, p. 560.

♀ ad. Mabek, Jalor. 23rd July. (Nos. 309, 310)

FINLAYSON'S Bulbul has the iris dark brown, the bill dark horn, and the feet plumbeous.

69. *Pycnonotus salvadorii*, Sharpe.

Pycnonotus salvadorii, *Hartert*, p. 561.

♀ ad. Gedong, South Perak. 12th January. (No. 532)

IN SALVADORI'S Bulbul the iris is chestnut, the bill horn colour, whitish at the base, and the feet brownish-horn.

'Shot in dense bamboo-jungle.'

70. *Pycnonotus analis*, (Horsf.)

Pycnonotus goiavier analis, *Bonhote*, p. 62 ; *Hartert*, p. 560.

♂ ad. et ♀ imm.	Patani.	June, September, and October.	(Nos. 194, 414, 436)
♀ ad.	Biserat, Jalor.	15th July.	(No. 279)
♀ ad.	Gedong, South Perak.	9th January.	(No. 511)
♀ ad.	Sungkei, South Perak.	8th February.	(No. 630)

In the Yellow-vented Bulbul the iris is hazel, and the bill and feet black.

'This species and the Magpie-Robin (*Copsychus musicus*) are, perhaps, the commonest and most characteristic birds of the towns and villages throughout the Malay Peninsula. It is quarrelsome and pugnacious in its habits, and is almost invariably found in pairs. The note is a very unmusical crescendo chuckle terminating abruptly. Malay name, *Mērēbah*.'

71. *Pycnonotus robinsoni*, sp. nov.

This species is most nearly allied to *P. cinereifrons*, from Palawan, but differs in lacking the grey markings on the forehead, which is uniform olive-brown, much like the rest of the crown. From *P. plumosus* it is distinguished by having more distinct white shaft-streaks to the feathers of the cheeks and ear-coverts, the outer edges to the quills dull greenish, not olive-green, and the middle of the breast and belly pale yellowish-white. In possessing the two last characters the present species resembles *P. cinereifrons*.

♂ Total length, 7.0 inches ; wing, 3.35 ; tail, 3.4 ; tarsus, 0.85.

♀ " " 7.0 " " 3.2 " 3.3 " 0.85.

♂, ♀ ad. Tanjong, Patani. 30th September and 1st October. (Nos. 413, 424)

ROBINSON's Bulbul has the iris brown, the bill brownish-horn, and the feet blackish-lead.

'As previously noted, the littoral belt of Casuarinas, occurring in certain parts of the Malay Peninsula, seems to support an avifauna not met with elsewhere. The present species flies in flocks of four or five, never stopping long in one tree.'

72. *Pycnonotus simplex*, Less.

Pycnonotus simplex, *Bonhote*, p. 62; *Hartert*, p. 560.

♂, ♀ ad.	Bukit Besar, Nawngchik.	2,500 feet.	3rd May and 30th August.	(Nos. 46 & 370)
♂ ad.	Jeram Kawan, South Perak.		14th February.	(No. 665)
♂ ad.	Gedong, South Perak.		9th January.	(No. 517)
♂ ad.	Sungkei, South Perak.		9th February.	(No. 633)

MOORE's Olive Bulbul has the iris red, orange, white, or brown, the bill black, the base of the lower mandible slate-colour, and the feet reddish-brown.

73. *Trachycomus ochrocephalus*, (Gmel.)

Trachycomus ochrocephalus, *Sharpe*, *P.Z.S.*, 1888, p. 272; *Bonhote*, p. 62.

Ad.	Mabek, Jalor.	28th July.	(No. 326)
♂ ad.	Sungkei, South Perak.	7th February.	(No. 613)

The Yellow-crowned Bulbul has the iris yellow or hazel, and the bill and feet black.

The '*Burong-baran-baran*' of the Malays is one of the most beautiful songsters of the Peninsula and very local in its habitat, but common wherever it is found, frequenting thick brushwood by the edge of rivers above tidal limits.

74. *Tricholestes criniger*, (Blyth).

Tricholestes criniger, *Hartert*, p. 560.

♀ ad.	Gedong, South Perak.	9th January.	(No. 516)
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The Bristle-backed Bulbul has the iris hazel, the bill bluish-horn, and the feet yellowish-brown.

75. *Criniger tephrogenys*, (Jard. and Selb.)

Criniger tephrogenys, *Hartert*, p. 558.

♂, ♀ ad.	Bukit Besar, Nawngchik.	March, May, August.	(Nos. 24, 42, 55, 352)
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The Malayan White-throated Bulbul has the iris orange, hazel, or rich brown, the bill bluish lead-colour or black, whitish at base of the lower mandible, and the feet pink or pale yellow.

No examples were obtained of *C. ochraceus*, MOORE, a species which had till recently been overlooked and united with the above under the name *C. gutturalis*, till Dr. HARTERT pointed out the error.

‘Very common at certain places and seasons. In the Semangko Pass in May, 1902, it suddenly appeared in enormous numbers, being doubtless attracted by the swarming of a species of termite which was then taking place.’

76. *Micropus melanocephalus*, Gmel.

Micropus melanocephalus, Sharpe, *Cat. B. Brit. Mus.* vi, p. 65 (1881).

♂ ad. Sungkei, South Perak. 11th February. (No. 651)

A male of the Black-headed Bulbul, has the iris blue, and the bill and feet black.

77. *Pinarocichla euptilosa*, (J. and S.)

Pinarocichla euptilosa, Sharpe, *Cat. B. Brit. Mus.* vi, p. 62 (1881).

♂ ad. Gedong, South Perak. 9th January. (No. 508)

In the Crested Brown Bulbul the iris is red, and the bill and feet black.

‘Met with among low undergrowth in dense jungle, climbing about with restless and jerky movements, alternately raising and depressing its crest.’

78. *Iole olivacea*, Blyth.

Iole olivacea, Hartert, p. 558.

♂ ad. Gedong, South Perak. 11th January. (No. 526)

The Olive Bulbul has the iris chestnut, the bill brown, whitish at the base, and the feet brownish-horn.

79. *Iole peracensis*, Hartert and Butl.

Iole tickelli (Blyth), Sharpe, *P.Z.S.*, 1887, p. 436; *Bonhote*, p. 61.

Iole tickelli peracensis, Hartert and Butl., *Nov. Zool.* v, p. 506 (1898); Hartert, p. 558.

♂ ad. Telôm, Perak-Pahang border. 4,000 feet. 21st to 28th January. (Nos. 565, 599)

This subspecies of *I. tickelli*, which we may call the Perak Bulbul, appears to be well characterized. Three specimens in the national collection, as well as those mentioned above, have the crown darker and the ear-coverts brownish, and in these respects differ constantly from typical *I. tickelli*.

80. Hemixus cinereus, (Blyth.)

Hemixus cinerea, *Bonhote*, p. 61 ; *Hartert*, p. 557.

♂, ♀ ad. Bukit Besar, Nawngchik. 2,500 feet. April and August.
(Nos. 18, 344, 363, 368, 369)

In the Grey Bulbul the iris is chestnut and the bill and feet black.

‘Fairly common in the above locality, and also at Telôm.

‘In life the loose moustachial feathers are continually depressed and extended exactly as in the case of certain Australian Fly-catchers of the genus *Arses*.’

81. Hemixus malaccensis, Blyth.

Hemixus malaccensis, *Hartert*, p. 558.

♂, ♀ ad. Jeram Kawan, South Perak. 15th February. (Nos. 670, 671)

The Malayan Bulbul has the iris chestnut, the bill black, reddish at the base ; and the feet brownish.

82. Irena cyanea, Bebbie.

Irena cyanea, *Hartert*, p. 557.

Irena puella, *Bonhote* (*nec. Lath.*), p. 62.

♂, ♀ ad. et. imm. Bukit Besar, Nawngchik. 2,500 feet. April, May, August, and September.
(Nos. 19, 23, 39, 44, 47, 62, 73, 101, 348, 355, 359, 376, 377, 378, 379)

A fine series of the Malayan Fairy Blue-bird was collected. It is represented in all stages of plumage, from the young in female dress to the fully adult.

‘Only met with in this one locality, where it was very abundant in parties of five or six, which, as a rule, included only one fully plumaged male, feeding on the fruit of a species of *Ficus*. The skin of this bird is extraordinarily tender, and it is almost as difficult to skin as the Trogons.’

83. Chloropsis cyanopogon, (Temm.)

Chloropsis cyanopogon, *Hartert*, p. 557.

♀ vix ad. Mabek, Jalor. 23rd July. (No. 322)

The Blue-whiskered *Chloropsis* is represented by a nearly adult female, with the blue streak partially developed on one side only.

‘Not uncommon, but difficult to see or shoot on account of the close assimilation between the colour of its plumage and the thick foliage which it seldom leaves. With other species of a general green colour it shares the Malay name of *Burong daun* (Leaf-bird).’

84. *Chloropsis hardwickii*, J. and S.

Chloropsis hardwickii, Sharpe, *Cat. Birds, Brit. Mus.* vi, p. 18 (1881).

♂ ad. Telôm, Perak-Pahang border. 4,000 feet. 21st January. (No. 562)

An adult male of the Orange-bellied Chloropsis, has the iris dark, bill black, and feet French-grey.

85. *Chloropsis zosterops*, Vig.

Chloropsis zosterops, Sharpe, *Cat. B. Brit. Mus.* vi, p. 24 (1881).

♂, ♀ ad. Bukit Besar, Nawngchik. 2,500 feet. May and August.

(Nos. 33, 51, 99, 356, 357, 371)

The Malachite-shouldered Chloropsis has the iris dark brown, the bill black, and the feet lead-grey.

'We found this species, together with *Irena cyanea*, extraordinarily local in habit, occurring only in a small patch of jungle, on Bukit Besar, where a species of *Ficus* was fruiting in great abundance.'

86. *Chloropsis icterocephala* (Less.)

Chloropsis icterocephalus, Hartert, p. 557.

The Malayan Chloropsis is represented by several pairs. The iris is dark brown, the bill black, and the feet plumbeous-green.

87. *Aethorhynchus lafresnayi*, (Hartl.)

Aethorhynchus lafresnayi, Sharpe, *Cat. B. Brit. Mus.* vi, p. 14 (1881).

♂, ♀ ad. Bukit Besar, Nawngchik. 2,500 feet. May and September. (Nos. 90 and 381)

The Great Iora is a rare species in collections, and the specimens collected by Messrs. ANNANDALE and ROBINSON are a valuable addition to the National Collection. Iris brown, bill bluish-lead colour, feet yellowish.

'Though local, this bird is not really uncommon in deep jungle on hills of moderate elevation throughout the Peninsula. It is, however, difficult to procure, as it keeps to the tops of the highest trees.'

88. *Aegithina viridissima*, (Bonap.)

Aegithina viridissima, Sharpe, *Cat. B. Brit. Mus.* vi, p. 6 (1881).

♀ (♂? Native Coll.) Gedong, South Perak. 8th January. (No. 506)

The example of the Green Iora is no doubt an adult female. The iris is white, the bill and feet pale lead-blue.

'Shot in thick bamboo jungle.'

89. Aegithina tiphia (Linn.)

Aegithina tiphia, *Bonhote*, p. 61; *Hartert*, p. 557.

♀ ad. et ♂ imm.	Biserat, Jalor.	July and October.	(No. 450)
♀ ad. et ♂ imm.	Patani.	April and June.	(Nos. 177, 188)
♂ ad.	Sungkei, South Perak.	7th February.	(No. 623)

Two males of the Common Iora from Patani and Biserat, are rather dull-coloured birds, and doubtless immature. They show no traces of black on the crown. In a fully adult male procured at Sungkei in February the feathers of the top of the head and nape are very slightly edged with black, and the chest is deep, brilliant yellow.

‘Common in the neighbourhood of villages throughout the Peninsula.’

CAMPOPHAGIDAE**90. Graucalus sumatrensis**, (S. Müll.)

Graucalus sumatrensis, *Hartert*, p. 554.

♂ ad. Sungkei, South Perak. 8th February. (No. 628)

The Sumatran Cuckoo-Shrike has the iris whitish and the bill and feet black.

‘Apparently confined to the lowlands, where it seems to be rare. In the mountains its place is taken by *G. larutensis*, SHARPE, of which I have recently collected several specimens, and which seems to be a far more locally abundant species.’

91. Pericrocotus cinereus, Lafr.

Pericrocotus cinereus, *Sharpe*, *Cat. B. Brit. Mus.* iv, p. 83 (1879).

♂ imm. Sungkei, South Perak. 13th February. (No. 637)

The Ashy Minivet is represented by one immature male, with the iris hazel, and the bill and feet black.

92. Pericrocotus flammifer, Hume.

Pericrocotus flammifer, *Sharpe*, *Cat. B. Brit. Mus.* iv, p. 74 (1879).

♂ ad. Semangko Pass, East Selangor. November. (Butler Coll.)

MR. OATES' key to the species of *Pericrocotus* (cf. *Faun. Brit. Ind.* i, p. 478 (1889)) is somewhat misleading, for when he speaks of the first two or more primary quills being entirely black, he evidently refers to the *outer webs* only. Thus the present species, DAVISON's Scarlet Minivet, comes under the heading:—‘b' First three primaries entirely black,’ but, as a matter of fact, the third quill has a well-marked red patch on the margin of the inner web.

93. *Pericrocotus montanus*, Salvad.

Pericrocotus montanus, *Hartert*, p. 554.

Pericrocotus wrayi, *Sharpe*, *P.Z.S.*, 1888, p. 269, pl. xv.

♂, ♀ ad. Telôm, Perak-Pahang border. 3,500-4,000 feet. (Nos. 539, 575, 596)

WRAY'S Scarlet Minivet has the iris brown and the bill and feet black.

94. *Pericrocotus croceus*, Sharpe.

Pericrocotus croceus, *Sharpe*, *P.Z.S.*, 1888, p. 269 ; *Bonhote*, p. 60 ; *Hartert*, p. 555.

♀ ad. Telôm, Perak-Pahang border. 3,500-4,000 feet. January. (Nos. 540, 576)

This species was described by Dr. SHARPE from a single male example procured by Mr. L. WRAY on Gunong Batu Puteh. It appears to be a well-defined form, and not a mere colour-variety of *P. montanus* as Dr. SHARPE was inclined to believe. In March, 1898, Mr. A. L. BUTLER procured a female of this species on Gunong Ijas, (4,000 feet); it was at first identified by Dr. HARTERT as a female of *P. montanus*, but subsequently correctly determined as *P. croceus* and the distinctive differences were indicated. In 1899, the 'Skeat' Expedition procured an adult male at Gunong Inas, Perak, (4,000 feet). Two adult females in the present collection resemble the female of *P. montanus* in the coloration of the underparts, but the top of the head and back are dull glossy black, instead of dark grey, and the lower back and rump are clear orange-yellow, instead of dusky-yellow. They resemble the male type of *P. croceus* in all respects, but the chin is white and the throat yellow as in the female of *P. montanus*.

'The habits of the all species of Minivets in the Peninsula are very similar. Only *P. flammifer* is at all common below three thousand feet, the others being usually found in parties of three or four flying about the branches of lofty trees, but never staying long in one place. As a rule, the sexes seem to keep together, and males are very much commoner than females.'

MUSCICAPIDAE**95. *Culicicapa ceylonensis*, (Swains.)**

Culicicapa ceylonensis, *Sharpe*, *P.Z.S.*, 1888, p. 271 ; *Hartert*, p. 553.

♂ ad. Bukit Besar, Nawngchik. 2,500 feet. May, August, and September.
(Nos. 40, 351, 374)

The Grey-headed Fly-catcher has the iris hazel, bill black above, pinkish beneath, feet brown or pale gamboge, soles orange.

96. *Stoparola thalassinoides*, (Cab.)

Stoparola thalassinoides, *Sharpe*, *P.Z.S.*, 1888, p. 271.

Stoparola thalassoides (sic), *Hartert*, p. 553.

♂, ♀ ad. Semangko Pass, Selangor-Pahang border. November. (Butler Coll.)

The above male of the Sea-blue Fly-catcher and other specimens in the national collection are much less brilliant than one collected by Mr. L. WRAY at Larut, Perak. The latter skin is not dated, but appears to be freshly moulted, which no doubt accounts for its much brighter plumage.

97. *Philentoma velatum*, (Temm.)

Philentoma velatum, *Sharpe*, *P.Z.S.*, 1888, p. 271; *Hartert*, 553.

♀. Bukit Besar, Nawngchik. 2,500 feet. 5th May. (No. 64)

A female of the Maroon-breasted Fly-catcher has the iris reddish-brown and the bill and feet black.

98. *Philentoma pyrrhopterum*, (Temm.)

Philentoma pyrrhoptera (sic), *Hartert*, p. 553.

Philentoma pyrrhopterum, *Sharpe*, *P.Z.S.*, 1888, p. 271.

♂ ad. Bukit Besar, Nawngchik. 9th May. (No. 77)

An adult male of the Chestnut-winged Fly-catcher has the iris red, the bill pale lead-colour, and the feet black.

99. *Rhipidura javanica*, Sparrm.

Rhipidura javanica, *Bonhote*, p. 60.

♂, ♀ ad. et imm. Patani. June, September, and October. (Nos. 189, 419, and 432)

The Javan Fantail Fly-catcher has the iris pale hazel and the bill and feet black.

'Very abundant on the east coast of the Peninsula, but not extending far inland; rarer but more generally distributed in Perak and Selangor, and found at greater distances from the coast. Known to the Malays as the *Murai gila*, or mad thrush, on account of its curious dancing movements.'

100. *Rhipidura albicollis* (Vieill.)

Rhipidura albicollis atrata, *Salvad.*, *Sharpe*, *P.Z.S.*, 1887, p. 435; *Hartert*, p. 552.

♀ ad. Telôm, Perak-Pahang border. 22nd January. (No. 573)

The large series of skins in the British Museum, ranging from India to the Malay Peninsula, clearly shews that the width of the white tips to the tail-feathers is an unimportant character, and that *R. atrata*, of SALVADORI, has no claim to specific rank. The iris is brown, the bill black, and the feet brownish-grey.

'Not rare at Telôm, and in habits precisely resembling the foregoing species.'

101. *Terpsiphone incii*, Gould.

Terpsiphone incii, Sharpe, *Cat. B. Brit. Mus.* iv, p. 350 (1879).

♂ imm.	Ban Sai Kau, Nawngchik.	17th September.	(No. 395)
♂ juv.	Bukit Besar.	2,500 feet. 30th April.	(No. 17)

An immature male of INCE's Paradise Fly-catcher has the iris brown, the bill cobalt-blue, and the feet lead-colour; a still younger male in first plumage is similar, but the bill is lead-colour, tinged with pink.

102. *Terpsiphone affinis*, (Blyth.)

Terpsiphone affinis, Sharpe, *P.Z.S.*, 1888, p. 270; *Bonhot*, p. 60; *Hartert*, p. 553.

♂, ♀ ad. et imm.	Bukit Besar, Nawngchik.	2,500 feet.	May.
	(Nos. 58, 63, 64, 71, 86, 92, 95)		
♂ ad.	Gedong, South Perak.		12th January.
	(No. 533)		

Adult males of the Burmese Paradise Fly-catcher have the iris chestnut-brown, the bill cobalt-blue, the inside of the mouth emerald-green, the wattle round the eye cobalt-blue, and the feet blue-grey.

The female has the bill dark horn, paler at the base.

'This wonderful Fly-catcher, perhaps the most beautiful of all birds, was very abundant on Bukit Besar, though full-plumaged males in good condition were somewhat hard to procure, as they were very shy and restless. They are very proud of their plumage, and display it by perching across a bough, depressing and half-spreading the wings and raising and expanding the tail, a habit which is shared by the Shama and the Magpie-Robin.

'A nest was found on Bukit Besar on the 7th May. It was built in the fork of a small sapling about eight feet from the ground, and externally has a deep crucible-shaped cup covered with moss, and internally a shallow oval cup lined with the fine black tendrils of a creeper.

'Malay name, *Mirbau ekor gading* (Ivory-tailed Thrush).

'The food consists largely of evil-smelling Bugs, such as *Acanthocoris scallier*.' N.A.

103. *Hypothymis azurea*, (Bodd.)

Hypothymis azurea, *Hartert*, p. 552.

♂, ♀ ad. Bukit Besar, Nawngchik. May and August. (Nos. 82, 361)
 ♂ ad. Mabek, Jalor. July.

The Azure Fly-catcher has the iris red, the bill bright cobalt-blue, and the feet bluish-lead colour.

'A very uncommon bird in the East Coast States. The specimens obtained were all shot in high trees growing over streams.'

104. *Poliomyias luteola* (Pall.)

Poliomyias luteola, *Sharpe*, *Cat. B. Brit. Mus.* iv, p. 201 (1879).

♂ imm. Telôm, Perak-Pahang border. 22nd January. (No. 572)

The Rufous-breasted Fly-catcher appears to be a winter visitor to the Malay Peninsula. The iris is black, the bill horn-coloured, the gape yellow, and the feet black.

105. *Niltava decipiens*, Salvad.

Niltava grandis, *Sharpe*, *P.Z.S.*, 1886, p. 351; 1887, p. 436; 1888, p. 272.

Niltava grandis decipiens, *Hartert*, p. 551.

♀*. Telôm, Perak-Pahang border. 20th and 26th January. (Nos. 557, 592)
 ♂ juv. Gunong Berumban. 28th January. (No. 601)

The females of this form, as Mr. HARTERT has already remarked, are easily distinguished from the females of *N. grandis* by having the top of the head and nape strongly washed with purplish-blue, and by their smaller size, the wing measuring 3·7 inch in length in the present species, and 4·2 inch in *N. grandis*. The national collection contains a specimen of the adult male from Lolo, Sumatra (*Carl Bock*), TWEEDDALE collection, and a female obtained by Mr. L. WRAY at Batang-Padang, Perak. The latter is remarkable in having two of the outer tail-feathers on the right side blue.

106. *Alseonax latirostris*, (Raffl.)

Alseonax latirostris, *Sharpe*, *Cat. B. Brit. Mus.* iv, p. 127 (1879).

♀ ad. Telôm, Perak-Pahang border. 4,000 feet. 22nd January. (No. 567)
 ♀ ad. Gedong, South Perak. 12th January. (No. 530)

Two females of the Brown Fly-catcher have the iris hazel, the bill black, yellow at the base of lower mandible, and the feet brownish.

* One of the two birds collected at Telôm is marked as a male—no doubt a mistake has been made.

107. Hemichelidon ferruginea, Hodgs.

Hemichelidon ferruginea, *Hartert*, p. 549.

♂ ad. Telöm, Perak-Pahang border. 3,500 feet. 17th January. (No. 536)

A male of the Ferruginous Fly-catcher has the iris brown, the bill black, and the feet flesh-colour.

HIRUNDINIDAE**108. Hirundo badia, (Cass.)**

Hirundo badia, *Bonhote*, p. 66.

♀ ad. et. imm. Biserat, Jalor. 28th June and 13th July. (Nos. 213, 233, 274)

Two adult females with the tails deeply forked and measuring, respectively, 3.7 and 3.8 inches, have distinct black shafts to all the chestnut feathers of the underparts. In an immature female with the tail less deeply forked, measuring only 3.0 inches in length, and with the secondaries and greater wing-coverts narrowly margined at the tips with rufous, the black shaft streaks on the feathers of the underparts are *only indicated on some of the feathers of the chest*. This difference is important and does not appear to have been properly recorded.

The Malayan Chestnut Swallow has the iris hazel, the bill black, yellow at the gape, and the feet fleshy-brown.

'This species seems only to be found in the precipitous limestone hills, honeycombed with caves, which are so characteristic a feature of certain parts of the Malay Peninsula. Round these hills it is very abundant, nesting in the entrances of the caves and beneath overhanging ledges of the cliffs.'

109. Hirundo gutturalis, (Scop.)

Hirundo gutturalis, *Sharpe*, *P.Z.S.*, 1887, p. 442.

♀ imm.	Patani Town.	30th September.	(No. 415)
♂ imm.	Nawangchik.	28th November.	(Nos. 485, 486)
♀ imm.	Anak Bukit.	24th April.	(No. 8)
♂, ♀ ad.	Kampong, Jalor.	4th November.	

The six specimens of the Eastern Chimney-Swallow are most immature. Adults have the iris dark brown, and the bill and feet black.

PITTIDAE**110. Pitta cyanoptera, Temm.**

Pitta cyanoptera, *Bonhote*, p. 67.

♂ ad.	Bukit Jalor.	28th October.	(No. 456)
♀ ad.	Kampong, Jalor.	3rd November.	(No. 465)

The Lesser Blue-winged Pitta has the iris dark hazel, the bill black, and the feet flesh-colour.

'Pittas are very local birds in the Malay Peninsula, and only this species was met with by us. It is, undoubtedly, a migrating bird in the Patani States, arriving at the commencement of the wet season. At Tanjong Patani, large numbers are annually caught in the ground-nets after landing in an exhausted condition. The specimens mentioned above were snared by little Malay boys in a swampy patch of jungle at the foot of a precipitous limestone hill.'

Malay name, *Burong lah*, or *Burong pachat*, (Leech-bird).

EURLAEMIDAE

111. *Calyptomena viridis*, Raffl.

Calyptomena viridis, Sharpe, *P.Z.S.*, 1887, p. 432; *Bonhote*, p. 67; *Hartert*, p. 548.

♂, ♀ ad. Bukit Besar, Nawngchik. 9th May. (Nos. 69, 75)

The Green Broadbill has the iris black, the bill dull-green, yellow on the tomia and at the tip of the culmen, and the feet greenish.

'Local; usually in heavy jungle, but occasionally in secondary growths on the outskirts of villages.'

112. *Eurylaemus ochromelas*, Raffl.

Eurylaemus ochromelas, Sharpe, *P.Z.S.*, 1887, p. 432; *Bonhote*, p. 68.

♀ ad. Sungkei, South Perak. 10th February. (No. 641)

The Black and Yellow Broadbill has the iris whitish, the feet yellowish-flesh, and the bill pale blue, with the tomia black.

'Shot on a banyan tree, in company with many other species of frugivorous birds.'

113. *Cymborhynchus macrorhynchus*, (Gmel.)

Cymborhynchus macrorhynchus, *Bonhote*, p. 68.

Cymborhynchus macrorhynchus lemniscatus (Raffl.), *Hartert*, p. 548.

♀ ad.	Biserat, Jalor.	5th July.	(No. 241)
♂ ad., imm. et juv.	Mabek, Jalor.	22nd to 25th July.	(Nos. 303, 304, 317, 318, 319)
♀, ♂ ad.	Sungkei, South Perak.	7th and 8th February.	(Nos. 615, 627)
♀ ad.	Gedong, South Perak.	9th and 10th January.	(Nos. 512, 515, 519)

The Black and Red Broadbill has the iris dark emerald-green, the bill blue, the base of the lower mandible chrome-yellow, and the feet bluish lead-colour.

A nest of this species known as the *Burong hujan-hujan* was found at Mabek, on July 22nd, in secondary jungle, suspended from the projecting limb of a small tree, about eight feet from the ground, and looking like a mass of debris left there by a flood. The nesting-chamber was formed in the upper portion of an elongate oval, about 270 mm. long, and 360 mm. in its greatest diameter, and was entered by a circular hole furnished with an eave. The materials were palm fibres, twigs, creepers and aerial roots with a few leaves, the inside was neatly lined with grass, and the eggs, which were three in number, were deposited on a bed of fresh, green leaves. In shape the eggs were slightly elongate ovals, the shell being rather dull, and of a pinky-white colour, thickly covered with dark terra-cotta-brown blotches fairly evenly distributed, though they form a rather thick zone towards the larger end of one egg. Dimensions: A, 26.5×19 ; B, 27×19.75 ; C, 27.5×19 mm.

114. *Corydon sumatranus*, Raffles.

Corydon sumatranus, Sharpe, *P.Z.S.*, 1888, p. 278; *Hartert*, p. 548.

♂ ad. Gedong, South Perak. 12th January. (No. 528)

The Dusky Broadbill has the iris brown, the orbital skin pink, the bill pink, lavender on the tomia and tip of the culmen, and the feet brownish.

A nest of this species was found at Sungkei Tali, Ulu Bentong, Pahang, on the 16th December, 1904. It is a very large pendant pyriform structure made of dead creepers, etc., somewhat loosely interwoven, the entrance low down on one side, and the lining and foundation formed of flat strips of palm-leaf. It was suspended from the end of a ratan thirty feet from the ground, and contained three highly incubated eggs. These are rather wide, blunt ovals. In all three the ground colour is pinkish-white, but the markings vary, one having the small yellowish-brown surface spots and pale lavender shell-marks evenly distributed all over the shell; in a second, the spots, though equally fine, are mostly concentrated towards the larger end of the shell, the smaller end being almost devoid of markings; while in the third the spots are larger, the majority being clustered round the larger end, and the remainder sparingly scattered over the rest of the shell. The measurements in all three are $1.2 \times .95$ inch.

PICIDAE

115. *Sasia abnormis*, (Temm.)

Sasia abnormis, Sharpe, *P.Z.S.*, 1888, p. 279.

Sasia abnormis everetti, Hargitt, *Hartert*, p. 547.

♂ ad. Bukit Besar. 2,500 feet. 5th and 11th May. (No. 59)

The Malayan Piculet has the iris carmine, the skin round the eye pinkish-red, the upper mandible black, and the lower pale horn-colour or lemon-yellow, and the feet gamboge-yellow.

'The habits of this Piculet, as has also been noted by BUTLER in the case of *S. innominata*, differ considerably from those of the true Wood-peckers. Both my specimens were shot among the terminal twigs of small trees, and nearly invariably perched across the boughs, and not longitudinally.'

116. *Yungipicus canicapillus*, Blyth.

Yungipicus canicapillus, *Hartert*, p. 547.

♂, ♀ ad.	Patani.	1st June and 6th October.	(No. 146)
♂ ad.	Biserat, Jalor.	13th July.	(No. 275)
♂, ♀ ad.	Jambu, Jhering.	5th and 7th June.	(Nos. 147, 148, 163, 164)

The Burmese Pigmy-Woodpecker has the iris brown or hazel, the bill bluish horn-colour, the base of the lower mandible whitish, and the feet olive-green.

117. *Miglyptes tukki*, (Less.)

Miglyptes tukki, *Sharpe*, *P.Z.S.*, 1888, p. 279; *Bonhote*, p. 71.

Miglyptes tukki, *Hartert*, p. 547.

♂, ♀ ad.	Ban Sai Kau.	24th May.	(Nos. 129, 130)
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The Buff-necked Barred Woodpecker has the iris hazel, the upper mandible black, the lower bluish-horn, and the feet brownish-grey.

118. *Miglyptes grammithorax*, (Malh.)

Miglyptes grammithorax, *Sharpe*, *P.Z.S.*, 1887, p. 443; *Bonhote*, p. 71.

Miglyptes grammithorax, *Hartert*, p. 547.

♂ ad.	Kampong Mabek, Jalor.	22nd July.	(No. 298)
♀ ad.	Bukit Besar.	28th August.	(No. 358)

The Fulvous-rumped Barred Woodpecker has the iris hazel, the bill bluish-horn, and the feet greenish.

119. *Hemicercus sordidus*, Eyton.

Hemicercus concretus sordidus, *Hartert*, p. 547.

(♂) ♀ ad.	Gedong, South Perak.	10th January.	(No. 521)
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In the Grey and Buff Woodpecker the iris is brown, the bill bluish-horn, and the feet greenish lead-colour.

120. Chrysocolaptes validus, (Temm.)

Chrysocolaptes validus, *Bonhote*, p. 72.

♀ ad. Gedong, South Perak. 10th January. (No. 522)

The Orange-backed Woodpecker has the iris chocolate-brown, the bill yellowish-horn, and the feet greenish lead-colour.

121. Chrysocolaptes guttacristatus, (Tick.)

Chrysocolaptes guttacristatus, *Hargitt, Cat. B. Brit. Mus.* xviii, p. 448 (1890).

♀ ad. Biserat, Jalor. 29th June. (No. 211)

TICKELL's Golden-backed Woodpecker has the iris chestnut, the bill bluish-horn, and the feet greenish lead-colour.

122. Tiga javanensis, (Ljung.)

Tiga javanensis, *Bonhote*, p. 72 ; *Hartert*, p. 547.

♂ ad.	Patani.	10th and 15th June.	(No. 195)
♂, ♀ ad.	Ban Sai Kau, Nawngchik.	24th May and 9th September.	(Nos. 132, 133, 384)
♂, ♀ ad.	Biserat, Jalor.	15th and 18th July.	(Nos. 278, 292)
♂ ad.	Jambu, Jhering.	5th June.	(No. 150)

The Golden-backed Three-toed Woodpecker has the iris chestnut, the bill bluish-horn, and the feet greenish-slate.

This species is eminently a denizen of cultivated lands, and I have hardly ever seen it outside the groves of cocoanut and Penang palms which surround every Malay village. It feeds mainly on ants, principally the tailor-ant (*Oecophylla smaragdina*), but I have observed it attack and swallow a small flying lizard (*Draco volans*).

123. Micropternus brachyurus, (Vieill.)

Micropternus brachyurus, *Sharpe, P.Z.S.*, 1888, p. 279 ; *Bonhote*, p. 72 ; *Hartert*, p. 547.

♀ ad.	Gedong, South Perak.	9th January.	(Nos. 509, 520)
♂ ad.	Biserat Jalor.	30th June.	(No. 220)
♂, ♀ ad.	Sungkei, South Perak.	7th February.	(Nos. 618, 626)

The Malay Rufous Woodpecker has the iris brown, the bill dull black, and the feet greenish-grey.

124. Micropternus phaeocephs, Blyth.

Micropternus phaeocephs, *Hargitt, Cat. B. Brit. Mus.* xviii, p. 393 (1890).

♀ ad. Biserat, Jalor. 30th June. (No. 219)

A female of the Northern Rufous Woodpecker has the iris dark hazel, the bill bluish-horn, and the feet greenish-grey.

This is probably the most southern limit of the species.

125. *Gauropicoides rafflesi*, (Vig.)

Gauropicoides rafflesi, *Hargitt, Cat. B. Brit. Mus.* xviii, p. 132 (1890).

♀ ad. Telôm, Perak-Pahang border. 18th January. (No. 544)

RAFFLES' Three-toed Woodpecker has the iris sienna, the bill bluish-horn colour, and the feet plumbeous-green.

'By no means common; the present specimen and one from Northern Pahang, now in the Selangor Museum, are the only specimens I have seen from any Peninsular locality north of the territory of Malacca.'

126. *Chrysophlegma wrayi*, Sharpe.

Chrysophlegma wrayi, *Sharpe, P.Z.S.*, 1888, p. 279; *Bonhote*, p. 71.

♀ ad. Telôm, Perak-Pahang border. 4,000 feet. 24th January. (No. 578)

WRAY'S Woodpecker has the iris bright chestnut-red, the bill bluish-lead colour, greener on the lower mandible, and the feet greenish-lead colour.

'Though rare in collections, this Woodpecker is very common throughout the mountain jungles of the main range of the Peninsula above about three thousand feet, generally flying in pairs, and when disturbed uttering a cry very similar to that of the English Green Woodpecker.'

127. *Chrysophlegma malaccense*, (Lath.)

Chrysophlegma malaccense, *Sharpe, P.Z.S.*, 1887, p. 442; *Bonhote*, p. 71.

Chrysophlegma miniatus malaccensis, *Hartert*, p. 546.

♂ ad. Patani. 19th June. (No. 200)

The Banded Red Woodpecker has the iris reddish-brown, the bill bluish-horn, paler at tip, and the feet greenish.

128. *Chrysophlegma humei*, Hargitt.

Chrysophlegma humei, *Hartert*, p. 546.

♀ ad. Bukit Besar, Nawngchik. 2,500 feet. August and September. (Nos. 345, 380)

The Checkered-throated Woodpecker has the iris chocolate, the upper mandible black, the lower bluish-horn, and the feet greenish-lead colour.

'Not common in any part of the Peninsula, keeping to the upper branches of tall forest trees, and hence rather difficult to obtain.'

129. *Gecinus puniceus*, (Horsf.)

Gecinus puniceus, *Sharpe, P.Z.S.*, 1888, p. 279.

Gecinus puniceus observandus, *Hartert, Nov. Zool.* iii, p. 542 (1896), and ix, p. 547 (1902).

♂ ad. Kampong, Jalor. 18th November. (No. 474)

The Crimson-winged Green Woodpecker has the iris red, the bill dull olive, pale yellow beneath, and the feet greenish-lead colour.

130. *Gecinus viridanus*, (Blyth)

Gecinus viridanus, *Hargitt, Cat. B. Brit. Mus.* xviii, p. 47 (1890).

♂ ad. Patani. 10th June. (No. 174)

♀ ad. Biserat, Jalor. 5th July. (No. 248)

The Burmese Scaly-bellied Green Woodpecker has the iris chestnut, the upper mandible black, greenish towards the base, and the lower mandible greenish-yellow with black tip.

'Common among the Casuarinas on the coast, but rare elsewhere; south of the latitude of Penang it appears to be replaced in similar situations by the allied *G. vittatus*.'

CAPITONIDAE**131. *Psilopogon pyrolophus*, S. Mull.**

Psilopogon pyrolophus, *Sharpe, P.Z.S.*, 1886, p. 352; 1887, p. 442; *Shelley, Cat. B. Brit. Mus.* xix, p. 98 (1891).

♂ ad. Telöm, Perak-Pahang border. 4,000 feet. 23rd and 25th January. (Nos. 574, 585)

In the Fire-tufted Barbet the iris is reddish-brown with an outer ring of whitish, the bill apple-green with a dark vertical band, and the feet greenish-lead colour.

132. *Xantholaema haematocephala*, Marshall.

Xantholaema haematocephala, *Bonhote*, p. 73.

♂ ad. Ban Sai Kau. 19th May. (No. 104)

♂ ad. et. ♀ imm. Biserat, Jalor. 30th June, 14th July. (Nos. 222, 276)

The Crimson-gorgeted Barbet or Coppersmith has the iris dark hazel, the orbital region crimson-lake, the bill black, and the feet bright coral-pink.

'Fairly abundant in Patani and the neighbouring States, but decidedly scarcer on the west coast. The note from which it derives its name is frequently heard at noon, when nearly all other birds are silent. Curiously enough its Malay appellation is *Tukang besi* (Blacksmith).'

133. Mesobucco duvauceli (Less.)

Mesobucco duvauceli, *Bonhote*, p. 73.

♀ imm. Bukit Besar, Nawngchik. 16th May. (No. 96)

♂ ad. Sungkei, South Perak. 11th February. (No. 650)

The Black-eared Barbet has the iris dark brown, the bill black, and the feet plumbeous.

134. Thereiceryx hodgsoni, (Bonap.)

Cyanops lineata (Vieill.); *Bonhote*, p. 73.

Thereiceryx lineatus hodgsoni, *Hartert*, p. 546.

♂ ad. Patani. 10th June. (No. 176)

HODGSON'S Barbet has the iris hazel, the bare orbital skin orange-yellow, the bill orange-brown, and the feet pale gamboge-yellow.

135. Cyanops mystacophanes, (Temm.)

Cyanops mystacophanes, *Bonhote*, p. 73.

♂, ♀ ad. et. imm. Bukit Besar, Nawngchik. 2,500 feet. March, May, August, and September.
(Nos. 38, 41, 43, 53, 72, 84, 98, 349, 363, 372)

♂ ad. et. imm. Biserat, Jalor. 9th and 18th July.
(Nos. 259, 270, 290)

The Gaudy Barbet has the iris brown, the bill black, and the feet greenish-yellow.

136. Cyanops henricii, (Temm.)

Cyanops henricii, *Bonhote*, p. 72.

♂ ad. Jeram Kawan, South Perak. 15th February. (No. 668)

In HENRICI'S Blue-throated Barbet the iris is brown, the bill black, and the feet plumbeous-green.

'The habits of all the Barbets are very similar, and what is said of one will equally apply to most of the others. With the exception of *Xantholaema haematocephala* and *Mesobucco duvauceli* which are frequently found in orchards, and *Thereiceryx hodgsoni* which inhabits the coastal belt, they are usually inhabitants of old jungle, though, when certain trees, more especially figs, are in fruit, they may be found in the environs of villages. The peculiar clanking calls which are so characteristic a sound in Malay forests, are probably referable to Barbets, but it is difficult to say with certainty, as the birds invariably become silent when the tree in which they are feeding is approached. They are shy and retiring and exceedingly difficult to localize among the branches, notwithstanding their gaudy colours.'

137. Chotorhea chrysopogon, (Temm.)

Chotorhea chrysopogon, *Bonhote*, p. 72.

♂ imm.	Bukit Besar, Nawngchik.	2,500 feet.	28th August.	(No. 354)
♀ ad.	Sungkei, South Perak.		10th February.	(No. 647)

The Golden-bearded Barbet has the iris brown, the bill black, and the feet plumbeous-green.

138. Chotorhea versicolor, (Raffl.)

Megalaema versicolor, *Sharpe*, *P.Z.S.*, 1888, p. 280.

♂ ad.	Gedong, South Perak.	12th January.	(No. 529)
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The Beautiful Barbet has the iris black, the bill black, and the feet greenish.

CUCULIDAE**139. Rhopodytes tristis, (Less.)**

Rhopodytes tristis, *Bonhote*, p. 75 ; *Hartert*, p. 545.

♀ ad.	Ban Sai Kau.	20th May.	(No. 106)
♂ ad.	Biserat.	28th June and 17th October.	(Nos. 214, 449)
♂, ♀ ad.	Jambu.	6th and 12th June.	(Nos. 156, 182)

The Large Green-billed Malkoha has the iris hazel, the orbital skin lake-red, the bill pale sea-green, and the feet greenish-grey.

‘Very common among bamboos around villages, but rarely found in old jungle. Very weak in flight, and loth to use its wings unless hard pressed. In Perak and Selangor this species is only found in the hills, and the Patani river seems to be about its southern limit for low country. I have never seen it on the ground as mentioned by *DAVISON*. In Patani most Cuckoos of the group *Phoenicophainae* are called *Burong kêra*, probably from the chuckling note which somewhat resembles the sound made by the Kêra Monkey.’

140. Rhopodytes diardi, (Less.)

Rhopodytes diardi, *Bonhote*, p. 75 ; *Hartert*, p. 545.

♀ ad.	Biserat, Jalor.	7th July.	(No. 262)
♂ ad.	Mabek.	23rd and 28th July.	(Nos. 313, 329, 331)
♀ ad.	Sungkei, South Perak.	7th February.	(No. 624)
♀ ad.	Gedong, South Perak.	11th and 12th January.	(Nos. 525, 531)

DIARD's Green-billed Malkoha has the iris white, the orbital skin red, the bill sea-green, and the feet lead-colour.

141. *Urococcyx erythrogna*thus, (Hartl.)*Urococcyx erythrogna*thus, *Bonhote*, p. 76.

♀ ad.	Bukit Besar, Nawngchik.	25th August.	(No. 347)
♂ ad.	Ban Sai Kau.	16th September.	(No. 591)
♂ ad.	Kampong Bayu, Biserat.	8th July.	(No. 255)
♀ ad.	Kampong Mabek.	23rd July.	(No. 311)
♂, ♀ ad.	Gedong Batang, Perak.	9th January.	(Nos. 514, 523, 524)

The Greater Red-billed Malkoha has the iris orange or yellow, ocular space crimson, bill pale sea-green, basal half of the lower mandible crimson, and the feet lead-colour.

142. *Rhinortha chlorophaea*, (Raffl.)*Rhinortha chlorophaea*, *Bonhote*, p. 75 ; *Hartert*, p. 545.

♂, ♀* ad.	Biserat, Jalor.	June and July.	(Nos. 218, 268)
♀ ad.	Mabek, Jalor.	23rd July.	(No. 306)
♀ ad.	Sungkei, South Perak.	10th February.	(No. 638)

In RAFFLE'S Green-billed Malkoha the iris is dark hazel or yellowish, the orbital skin pale blue, the bill pale sea-green, and the feet bluish-horn.

'Similar in habits to the preceding, but frequenting jungle also, where it climbs about the parasitic creepers depending from the trees, looking more like a squirrel than a bird.'

143. *Zanclostomus javanicus*, (Horsf.)*Zanclostomus javanicus*, *Bonhote*, p. 75 ; *Hartert*, p. 545.

♀ ad.	Bukit Besar, Nawngchik.	9th May.	(No. 80)
♂ ad.	Biserat, Jalor.	9th July.	(No. 262)

In the Lesser Red-billed Malkoha the iris is dark hazel, the orbital skin-blue, the bill coral-red, and the feet plumbeous.

'Usually in the hill-jungle.'

144. *Centropus javanicus*, (Dumont.)*Centropus javanicus*, *Bonhote*, p. 75.

♂ imm.	Gedong, South Perak.	7th January.	(No. 498)
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The immature of the Lesser Coucal has the iris brown, the bill black, horn-coloured at the base, and the feet lead-colour.

* All the examples of this species are marked '♂' but the sex of three has undoubtedly been wrongly determined.

145. *Centropus sinensis*, (Steph.)

Centropus sinensis, *Bonhote*, p. 74.

♀ ad.	Patani.	22nd June.	(No. 205)
♂ ad. et imm.	Ban Sai Kau.	20th May and 9th September.	(Nos. 115, 385)
♂ imm.	Biserat, Jalor.	10th July.	(No. 266)
♂ ad.	Sungkei, South Perak.	8th and 16th February.	(Nos. 631, 678)

The common Coucal or Crow-Pheasant has the iris red and the bill and feet black.

‘Both species of Crow-Pheasant inhabit the brushwood near villages, secondary jungle, and stretches of lalang grass. When disturbed they generally make use of their running powers, but if forced to take to flight resort to the nearest tree, which they ascend by a series of awkward hops from branch to branch.’

146. *Eudynamis horonata*, (Linn.)

Eudynamis horonata, *Bonhote*, p. 74.

♂, ♀ ad.	Nawngchik.	27th and 30th November.	(Nos. 487, 488)
♂ ad.	Ban Sai Kau.	22nd May.	(No. 124)
♂ ad. et juv.	Biserat, Jalor.	30th June and 9th August.	(No. 334)

The Indian Koel has the iris red, the bill greenish-horn, and the feet bluish or greenish-lead colour.

147. *Chalcococcyx xanthorynchus*, (Horsf.)

Chalcococcyx xanthorynchus, *Shelley*, *Cat. B. Brit. Mus.* xix, p. 289 (1891).

♀ imm.	Bukit Besar, Nawngchik.	11th May.	(No. 89)
♂ ad. et juv.	Biserat, Jalor.	18th July.	(Nos. 289, 291)

The Violet Cuckoo has the iris brown, the eyelid vermilion, the bill yellow, vermilion at base, and the feet black.

148. *Chalcococcyx malayanus*, (Raffl.)

Chalcococcyx malayanus, *Hartert*, p. 545.

♂ ad.	Patani.	13th June.	(No. 186)
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The Malayan Bronze Cuckoo has the iris reddish with a whitish line outside the pupil, the eye wattle vermilion, the bill black, and the feet greenish.

149. *Cacomantis merulinus*, (Scop.)

Cacomantis merulinus, *Bonhote*, p. 74; *Hartert*, p. 545.

♀ ad. et imm.	Bukit Besar, Nawngchik.	6th May and 28th November.	(Nos. 67, 483)
♀ juv.	Biserat, Jalor.	3rd July.	

The Rufous-billed Cuckoo has the iris red, the bill horn-colour, the gape yellowish, and the feet yellow.

150. *Surniculus lugubris*, (Horsf.)

Surniculus lugubris, *Hartert*, p. 544.

♂, ♀ ad.	Bukit Besar, Nawngchik.	12th May.	(Nos. 63, 91)
♀ ad.	Mabek, Jalor.	23rd July.	(No. 312)
♂ ad.	Sungkei, South Perak.	10th February.	(Nos. 643, 644)

The Drongo-Cuckoo has the iris dark brown, the bill black, and the feet dull lead-colour.

TROGONIDAE

151. *Pyrotrogon erythrocephalus*, (Gould.)

Harpactes erythrocephalus, *Sharpe*, *P.Z.S.*, 1888, p. 280.

♂ ad.	Telôm, Perak-Pahang border.	4,000 feet.	24th January.	(No. 577)
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In the Red-headed Trogon the iris is chestnut-red, the bill and the orbital skin purplish-cobalt, and the feet pinkish.

'Trogons of at least two species are very common at Telôm, but were very difficult to see, and still more difficult to convert into specimens, for, as has been remarked elsewhere, their skin is of the consistency of wet tissue paper. Malay name is *Burong kasumba* (Pink bird).'

152. *Pyrotrogon oreskios*, (Temm.)

Harpactes oreskios, *Sharpe*, *P.Z.S.*, 1888, p. 280.

Pyrotrogon oreskios, *Hartert*, p. 544.

♀ ad.	Bukit Besar, Nawngchik.	9th May and 27th August.	(Nos. 76 and 353)
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The Yellow-breasted Trogon has the iris brown, the bill blue, and the feet lead-colour.

153. *Pyrotrogon duvauceli*, (Temm.)

Harpactes duvauceli, *Sharpe*, *P.Z.S.*, 1886, p. 353; *Bonhote*, p. 70.

♂ imm. et. ♀ ad.	Bukit Besar, Nawngchik.	8th May and 24th August.	(Nos. 68, 341)
♂ ad.	Gedong, South Perak.	11th January.	(No. 527)

The Red-rumped Trogon has the iris dark brown, the orbital skin silvery-cobalt, the bill purplish-cobalt, black on the culmen, and the feet nearly black.

CYPSELIDAE

154. *Tachornis infumata*, (Sch.)

Tachornis infumata, *Hartert, Cat. B. Brit. Mus.* xvi, p. 467 (1892).

♀ ad. Ban Sai Kau. 20th May. (No. 113)

The Little Palm Swift has the iris reddish-brown, the bill black, with the lower mandible red, and the feet greenish.

'It suddenly appeared in large flocks among the cocoa-nut palms at about six p.m. one evening, but was never met with again.'

CAPRIMULGIDAE

155. *Caprimulgus macrurus*, Horsf.

Caprimulgus macrurus, *Bonhote*, p. 68.

Caprimulgus macrourus, *Hartert*, p. 544.

♀ ad. Ban Sai Kau. 21st May. (No. 119)

♂ ad. Biserat, Jalor. 20th Oct. (No. 451)

HORSFIELD'S Night-jar has the iris hazel, the bill horn, and the feet pinkish flesh-colour.

'Very common in open country throughout the Peninsula during every month of the year.'

156. *Caprimulgus jotaka*, Temm. and Schl.

Caprimulgus jotaka, *Hartert, Cat. B. Brit. Mus.* xvi, p. 552 (1892).

♀ ad. Telôm, Perak-Pahang border. 16th January. (No. 535)

The Jungle Night-jar is a winter visitor to the Malay Peninsula; it has the iris brown, the bill horn, and the feet pinkish-brown.

'I am inclined to think that this species is resident in the higher mountain-jungles of the Peninsula and not merely a migrant as is generally supposed. I have met with it in March, May, and September, but have never seen it otherwise than in deep jungle.'

BUGEROTIDAE

157. *Anthracoceros malabaricus*, (Gmel.)

Anthracoceros malabaricus, *Bonhote*, p. 70.

♂, ♀ ad. Mabek, Jalor. 22nd and 25th July. (Nos. 301-320)

♀ ad. Sungkei, South Perak. 10th February. (No. 636)

The male of the Malayan Pied-Hornbill has the iris chestnut, the orbital skin purplish-blue, and the bill ivory-white, with a nearly black patch on the casque. In the female the iris is chestnut-brown, the bare skin of the throat and

face silvery-white, livid blue round the eye, the bill pale ivory-yellow with a black and brown patch at the base of the lower mandible, and the feet black.

'It frequents more open country than the Jungle-Hornbills, usually along the river-banks and is much less noisy. It is usually met with in parties of five or six, and the flight, though less laboured, is rarely sustained for as long as that of the larger species.'

158. *Dichoceros bicornis*, (Linn.)

Dichoceros bicornis, *Bonhote*, p. 70.

♂ (head only). Biserat, Jalor. July.

The Homrai Hornbill.

'Three species of large Hornbills were not uncommon in the jungles round Bukit Besar, but I did not consider it worth while spending much time in hunting them.'

The species seen included *Rhinoplax vigil*, the Helmet Hornbill, and *Buceros rhinoceros*, the Rhinoceros Hornbill. The habits of all are very similar. They fly in flocks varying from six to as many as fifteen individuals, using their wings with slow measured strokes, the rush of air through the primaries making a noise which may perhaps be compared to the distant sound of a traction engine toiling up a hill. As soon as they alight on a tree, they give vent to a series of harsh discordant screams, but *Rhinoplax vigil* has, in addition, a sharp staccato note which has given rise to the Malay legend that the bird was once a man, who, becoming enraged with his mother-in-law started to chop through the posts supporting her house, and was thereupon turned into the bird, whose notes represent the blows of the axe.

'Skulls of *Rhinoplax vigil* command a high price in the Peninsula, as much as five or ten dollars being asked and obtained for them. Rings made out of the dense frontal portion of the casque are reputed to act as talismans, turning green when dipped into a poisoned liquid.'

UPUPIDAE

159. *Upupa indica*, Reichenb.

Upupa indica, *Bonhote*, p. 68.

♀ ad.	Patani.	10th June.	(No. 173)
♂, ♀ ad.	Nawngchik.	27th and 29th November.	(Nos. 479, 491)

The Indian Hoopoe has the iris hazel or chestnut, the bill black, horn-coloured at the base, and feet brownish-black.

'Exceedingly local in the Patani States, and always met with in open sandy country near the coast.'

MEROPIDAE

160. *Merops sumatranus*, Raffl.

Merops sumatrensis (*sic*), *Bonhote*, p. 69.

♂ ad.	Patani.	13th and 15th June.	(Nos. 183, 184)
♂ ad.	Biserat, Jalor.	2nd and 3rd July.	(Nos. 229, 230, 231, 343, 444)
♂, ♀ ad.	Sungkei, South Perak.	7th and 11th February.	

In the Sumatran Bee-eater the iris is red and the bill and feet black.

161. *Merops philippinus*, Linn.

Merops philippinus, *Sharpe*, *Cat. B. Brit. Mus.* xvii, p. 71 (1892).

♂, ♀ ad.	Patani.	13th and 15th June.	(Nos. 185, 192)
♀ ad.	Nawngchik.	29th and 30th November.	(Nos. 492, 495)

The Blue-tailed Bee-eater has the iris red and the bill and feet black.

‘This bird was breeding in great numbers in the banks of the Perak River, near the Siamese border, in the month of April.’ N.A.

162. *Melittophagus swinhoi*, (Hume)

Merops leschenaulti swinhoi, *Hartert*, p. 544.

♂ ad.	Patani.	15th June.	(No. 191)
♂ ad.	Nawngchik.	28th November.	(No. 481)

The Chestnut-headed Bee-eater has the iris red and the bill and feet black.

‘These three species of Bee-eaters, which are collectively known as *Berek-berek*, are common throughout the Peninsula in open country and round rice-fields. *Nyctiornis amicta*, on the other hand, the only other species of Malayan Bee-eater, is exclusively a high-forest bird, which on the east coast of the Peninsula does not seem to range as far north as Patani, though common in Selangor and Perak.’

CORACIIDAE

163. *Coracias affinis*, McClell.

Coracias affinis, *Sharpe*, *Cat. B. Brit. Mus.* xvii, p. 13 (1892).

♀ ad.	Nawngchik.	27th November.	(Nos. 477 and 478)
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The Burmese Roller has the iris dark hazel, the bill black, and the feet yellowish-green.

‘The birds were probably on migration, as this Roller was abundant in the Patani district in November and December, but not seen at any other time of the year.’ N.A.

184. Eurystomus orientalis, (Linn.)

Eurystomus orientalis, *Bonhote*, p. 68.

♂, ♀ ad.	Patani.	30th May.	(Nos. 138 and 139)
♂, ♀ ad.	Biserat, Jalor.	5th July and 16th October.	(Nos. 247, 447)
♂ ad.	Jambu, Jhering.	10th and 12th June.	(Nos. 166, 180, and 181)

The Non-migratory Broad-billed Roller has the iris brown, the bill vermillion, black at the tip, and the feet coral-red.

185. Eurystomus calonyx, Hodgs.

Eurystomus calonyx, *Sharpe, Cat. B. Brit. Mus.* xvii, p. 38 (1892).

♀ ad.	Patani.	2nd October.	(No. 430)
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The Migratory Broad-billed Roller has the iris hazel, the bill dark red, blackish at the tip, and the feet coral-red.

ALCEDINIDAE**186. Halcyon smyrnensis, (Linn.)**

Halcyon smyrnensis fusca (Bodd.), *Bonhote*, p. 69; *Hartert*, p. 543.

♂, ♀ ad.	Ban Sai Kau.	26th April, 19th May.	(Nos. 13, 111)
♂ imm.	Rhaman, near Biserat.	19th July.	(No. 296)

The White-breasted Kingfisher has the iris brown or chestnut, the bill dark coral-red, and the feet coral-red.

187. Halcyon pileatus, (Bodd.)

Halcyon pileatus, *Sharpe, Cat. B. Brit. Mus.* xvii, p. 229 (1892).

♀ imm.	Kampong Jalor.	29th October.	
♂ ad.	Jeram Kawan, South Perak.	16th February.	(Nos. 675, 676)

In the Black-capped Kingfisher the iris is dark brown, the bill dark vermillion, and the feet coral-red.

188. Halcyon coromandus, (Lath.)

Halcyon coromandus, *Sharpe, Cat. B. Brit. Mus.* xvii, p. 217 (1892).

♀ ad.	Patani.	3rd October.	(No. 439)
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The Ruddy Kingfisher has the iris dull brown, the bill vermillion, and the feet coral.

169. Halcyon humei, Sharpe.

Halcyon humei, *Bonhote*, p. 69; *Hartert*, p. 543.

♂ ad.	Patani.	21st June.	(No. 207)
♂ ad. et. imm.	Jambu, Jhering.	5th and 7th June.	(Nos. 152, 157, 159)
♀ ad. et. ♂ imm.	Nawngchik.	29th and 30th November.	(No. 496)

HUME's Kingfisher has the iris brown, the bill black, with the basal part of the lower mandible white, and the feet brownish-black.

170. Oarcineutes pulchellus, (Horsf.)

Carcineutes pulchellus, *Sharpe*, *P.Z.S.*, 1886, p. 352.

♂ ad. Bukit Besar, Nawngchik. 2,500 feet. 11th May.

The Banded Kingfisher has the iris brown, the bill black, whitish at the tip and on the lower part of the under mandible, and the feet greenish-white.

171. Ceyx tridactyla, (Pall.)

Ceyx tridactyla, *Sharpe*, *Cat. B. Brit. Mus.* xvii, p. 174 (1892).

♀ ad. Bukit Besar, Nawngchik. 5th September. (No. 382)

The Indian Three-toed Kingfisher has the iris brown, the bill vermilion, and the feet pinkish-vermilion.

172. Alcedo meninting, Horsf.

Alcedo meninting, *Hartert*, p. 543.

♀ ad. Biserat, Jalor. 3rd August. (No. 330)

The Malayan Kingfisher has the iris dark brown, upper mandible black, the lower orange-red with a yellowish tinge towards the tip, and the feet bright coral-red.

173. Alcedo ispida, Linn.

Alcedo ispida, *Bonhote*, p. 69.

♀ ad. Jeram Kawan, South Perak. 14th February. (No. 677)

In the Common Kingfisher the iris is brown, the bill black above, coral beneath, and the feet coral.

174. Pelargopsis fraseri, Sharpe.

Pelargopsis fraseri, *Bonhote*, p. 69.

♂, ♀ ad.	Patani.	30th May and 10th October.	(Nos. 141, 444)
♂ ad.	Nawngchik.	29th November.	
♂ ad.	Ban Sai Kau.	20th May.	(No. 118)
♀ ad. et imm.	Biserat.	16th and 18th July.	(Nos. 281, 293)

The Malayan Stork-billed Kingfisher has the iris brown, the bill deep lake-red, the inside of the mouth rich orange, and the feet red.

PSITTACIDAE

175. *Loriculus galgulus*, (Linn.)

Loriculus galgulus, *Bonhote*, p. 76 ; *Hartert*, p. 542.

♂ imm. Biserat, Jalor. 12th and 16th July. (No. 272, 284)
 ♂ ad. Sungkei, South Perak. 9th February. (No. 635)

The Malayan Loriquet has the iris dark brown, the bill blackish, and the feet plumbeous-green.

176. *Psittinus malaccensis*, (Lath.)

Psittinus incertus (Shaw), *Bonhote*, p. 76.

Psittinus malaccensis, *Hartert*, p. 542.

♂, ♀ ad. Biserat, Jalor. 6th July and 15th October. (No. 252)

The Little Malayan Parrot has the iris red, the upper mandible red, the lower greenish, and the feet greenish.

BUBONIDAE

177. *Photodilus badius*, (Horsf.)

Photodilus badius, *Sharpe, Cat. B. Brit. Mus.* ii, p. 309 (1875).

♀. Jeram Kawan, South Perak. 13th February. (No. 658)

The Bay-Owl has the iris sooty-black, the bill pinkish-horn, and the feet whitish-horn.

‘Shot in deep jungle sitting on a dead branch with its body pressed close to the trunk of the tree.’

178. *Syrnium seloputo*, (Horsf.)

Syrnium sinense, *Sharpe, Cat. B. Brit. Mus.* ii, p. 261 (1875) ; *Bonhote*, p. 58.

Syrnium seloputo, *Blanford, Faun, Brit. India, Birds* iii, p. 278 (1895).

♂, ♀ ad. Ban Sai Kau. 18th September. (Nos. 397, 398)

♀ ad. Biserat, Jalor. 8th July. (No. 254)

The Malayan Wood-Owl has the iris yellow, the bill bluish-horn, paler at the base, and the feet grayish.

‘Common in orchards and gardens round the rice-fields.’

179. *Ninox scutulata*, (Raffl.)

Ninox scutulata, *Grant, Ibis*, 1896, p. 111.

♂ ad. Biserat, Jalor. 20th July. (No. 297)

The Brown Hawk-Owl has the iris chrome-yellow, the bill bluish-horn, the cere green, and the feet yellow.

180. Ketupa ketupa, (Kaup.)

Ketupa javensis (Less.), *Bonhote*, p. 58.

♀ ad. et. imm.	Ban Sai Kau.	25th May.	(Nos. 135, 136)
♀ ad.	Biserat, Jalor.	8th July.	(No. 257)
♂ imm.	Kampong, Jalor.	20th November.	(No. 475)

Adult examples of the Malayan Fish-Owl with the spotting on the upper-parts nearly obsolete have only three light buff bars on the middle tail-feathers, while in the more spotted immature birds there are five caudal bands. Iris orange, bill bluish-horn, feet dull yellow.

'Very common in similar situations to *Syrnuim seloputo*, roosting during the day in the durian and mangosteen trees. The stomach of one bird which I examined contained a large rat and several small fish and crustaceans.

'This Owl also feeds largely on the big aquatic Bug, *Amorgus indicus*.' N.A.

PANDIONIDAE**181. Polioaëtus ichthyaëtus**, (Horsf.)

Polioaëtus ichthyaëtus, *Bonhote*, p. 58.

♂ ad. et. imm.	Tanjong Patani.	27th September and 6th October.	(Nos. 400, 440)
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The Grey-headed Fishing-Eagle has the iris pale yellow, the bill and cere lead-colour, darker on the culmen, and the feet yellowish-white.

'Very abundant on the seaward face of Tanjong Patani, together with *Haliaëtus leucogaster* and *Haliastur intermedius*.'

FALCONIDAE**182. Microhierax fringillarius**, (Drap.)

Microhierax fringillarius, *Bonhote*, p. 58 ; *Hartert*, p. 541.

♂ ad.	Ban Sai Kau.	17th September.	(No. 394)
♀ imm.	Biserat, Jalor.	15th July.	(No. 280)
♂ imm.	Mabek, Jalor.	25th July.	(No. 316)
♀ ad.	Sungkei, South Perak.	8th February.	(No. 629)
♀ ad.	Gedong, South Perak.	8th January.	(No. 507)

The Black-legged Falconet has the iris yellow or dark hazel, and the bill and feet black.

'The *Lang-belalang* or Grasshopper-hawk is widely spread throughout the Peninsula in suitable localities, frequenting by preference the edges of rice-fields and recently burnt jungle.

'I have watched a pair sitting at the end of a blackened branch and darting out at the insects that flew past.' N.A.

183. *Haliastur intermedius*, Gurney.

Haliastur indus, *Bonhote* (nec Bodd.), p. 58.

♀ ad. et. ♂, ♀ imm.	Patani.	22nd June and 2nd October.	(Nos. 203, 426-428)
♀ ad.	Ban Sai Kau.	7th and 18th September.	(Nos. 383, 396)
♀ ad.	Mabek, Jalor.	26th July.	(No. 323)
♀ imm.	Jambu, Jhering.	5th June.	(No. 153)

The Malayan Brahminy Kite has the iris yellow, the bill bluish-horn, yellowish towards the cere, and the feet dull yellow.

‘Very abundant on the coast, and occurring wherever there are large stretches of rice-land, but found much more sparingly towards the interior of the Peninsula.’

184. *Spizaëtus alboniger*, (Blyth)

Spizaëtus alboniger, *Sharpe*, *Cat. B. Brit. Mus.* i, p. 271 (1874).

♂ imm. Gedong, South Perak. 7th January. (No. 500)

The immature of BLYTH’S Hawk-Eagle has the iris whitish-yellow, the bill and cere lead-blue, and the feet chrome-yellow.

185. *Spizaëtus limnaëtus*, (Rafil.)

Spizaëtus limnaëtus, *Sharpe*, *P.Z.S.*, 1887, p. 433.

♀ ad. Kampong Jalor. 17th November. (No. 473)

The Changeable Hawk-Eagle has the iris brown, the bill lead-colour, and the feet cadmium-yellow.

186. *Spilornis bacha*, (Daud.)

Spilornis bacha, *Sharpe*, *P.Z.S.*, 1887, p. 433.

Spilornis cheela, *Bonhote* (nec Lath.), p. 57.

♂ ad. Ban Sai Kau. 19th May. (No. 102)

♀ ad. Biserat, Jalor. 26th July, 21st October. (No. 452)

These specimens belong to the larger, high-ground, darker form of Crested Serpent-Eagle, of which the typical examples are from Java.

187. *Spilornis pallidus*, Walden.

Spilornis bacha, *Hartert*, p. 541.

♂ ad. Gedong, South Perak. 9th January. (No. 513)

The above adult male represents the smaller and paler low-ground form originally described from Borneo. It has the iris orange, the cere pale chrome-yellow, the bill bluish-horn, darker at the tip, and the feet dull yellow.

VULTURIDAE

188. *Pseudogyps bengalensis*, (Gmel.)

Pseudogyps bengalensis, *Sharpe, Cat. B. Brit. Mus.* i, p. 11 (1874).

♀ ad. Patani. 10th June.
Imm. Kampong Jalor. 2nd November. (No. 465)

The Indian White-backed Vulture has the iris black, the naked skin of the head yellowish-green, and the feet black.

189. *Otogyps calvus*, (Scop.)

Otogyps calvus, *Sharpe, Cat. B. Brit. Mus.* i, p. 14 (1874).

♂ ad. Biserat, Jalor. 6th August.
♂ ad. Kampong Jalor. 30th October. (No. 464)

The Black or Pondicherry Vulture has the iris creamy-yellow, the bare skin on the head and neck red mottled and dusky, the bill black, and the feet dull red.

PHALACROCORACIDAE

190. *Phalacrocorax carbo*, (Linn.)

Phalacrocorax carbo, *Hartert*, p. 540.

♂ ad. et ♀ juv. Patani. 16th August and 2nd October. (Nos. 336, 429)

In the common Cormorant the *adult male* has the iris dark emerald-green, the gular region bright chrome, the bill whitish-horn, and the feet black.

The young female has the iris greyish-green, the bill yellowish-horn, the bare skin cadmium-yellow, and the feet black.

ANATIDAE

191. *Dendrocygna javanica*, (Horsf.)

Dendrocygna javanica, *Bonhote*, p. 81.

Dendrocygna javanica, *Hartert*, p. 541.

♀ ad. Patani. 22nd June. (No. 206)

The Whistling Tree-Duck has the iris brown, the eyelids yellow, the bill dark greenish-horn, and the feet black.

CICONIIDAE

192. *Dissura episcopus*, (Bodd.)

Dissura episcopus, *Sharpe, Cat. B. Brit. Mus.* xxvi, p. 294 (1898).

♀ ad. Bayu, Jalor. 8th July. (No. 256)
♀ ad. Kampong Jalor. 30th October. (No. 461)

The White-necked Stork has the iris brown, the bill reddish, darker at the base, and the feet crimson-lake.

Dr. REICHENOW (cf. *Vögel Afr.* 1, p. 347 (1901)) has pointed out that African examples of this genus belong to a distinct species *D. microscelis* (G. R. GRAY), which had been regarded by most authors as synonymous with the present species. A third species, *D. stormi* (BLAS.), found in Borneo, has also been described as *D. murtoni*, GRANT.

ARDEIDAE

193. *Ardetta cinnamomea*, Gmel.

Ardetta cinnamomea, Sharpe, *Cat. B. Brit. Mus.* xxvi, p. 236 (1898).

♂ vix. ad. Patani River. 22nd April. (No. 6)

The Chestnut Bittern has the iris brownish-yellow, with a white ring round pupil, and the feet yellowish-green.

‘Snared by the natives among high reeds.’

194. *Bubulcus coromandus*, (Bodd.)

Bubulcus coromandus, Bonhote, p. 80.

♂, ♀ imm. Kampong, Jalor. 16th and 17th November. (Nos. 471, 472)

The Cattle-Egret has the iris yellowish-white, bill and feet chrome-yellow, and the feet black.

‘Very abundant on flooded rice-fields in the above locality, suddenly appearing with the bursting of the monsoon. Scarce and sporadic during the dry season from April to October. Malay name, *Bangau*.’

195. *Ardeola grayi*, (Sykes)

Ardeola grayi, Sharpe, *Cat. B. Brit. Mus.* xxvi, p. 207 (1898).

♀ imm. Nawngchik. 30th November.

The Pond-Heron has the iris chrome-yellow, and the feet greenish-yellow.

‘Consorting with *Bubulcus coromandus* on flooded meadows at the commencement of the wet season.’

196. *Butorides javanica*, (Horsf.)

Butorides javanica, Sharpe, *Cat. B. Brit. Mus.* xxvi, p. 177 (1898).

Imm. Patani River. 22nd April. (No. 5)

♀ imm. Jambu, Jhering. 6th June. (No. 162)

The Little Green Heron has the iris chrome-yellow, the bill black, with the lower mandible, except the tomia greenish-yellow, the loreal space chrome-yellow, the feet greenish in front, and yellowish behind.

'Not uncommon among the mangroves of the tidal creeks, where it was very difficult to discern on account of its colours harmonizing so exactly with the surroundings. In its normal attitude of rest this bird stands with its bill pointing vertically upwards, making its whole outline as linear as possible.'

197. *Demiegretta sacra*, (Gmel.)

Demiegretta sacra, Sharpe, *Cat. B. Brit. Mus.* xxvi, p. 137 (1898).

♀ ad. (white form). Kampong Datoh. 3rd October. (No. 437)

The Eastern Reef-Heron has the iris whitish, the upper mandible and tip of lower black, the remainder yellowish-green, the lores yellowish-green, and the feet sage-green.

'Procured on the mud among mangroves.'

198. *Garzetta garzetta*, (Linn.)

Garzetta garzetta, Sharpe, *Cat. B. Brit. Mus.* xxvi, p. 118 (1898).

♂, ♀ ad. Jambu, Jhering. 6th June. (Nos. 154, 155)

In the little Egret the iris is yellow, the lores greenish-yellow, the bill black, the base of the lower mandible bluish-white, the tarsi black, and the feet pale greenish-yellow.

'From a flock of nine or ten, feeding on the mud-flats of the estuary at low tide.'

CHARADRIIDAE

199. *Gallinago stenura*, (Bonap.)

Gallinago stenura, Sharpe, *Cat. B. Brit. Mus.* xxiv, p. 619 (1896).

♀ ad. Ban Sai Kau. 18th September. (No. 392)

The Pin-tailed Snipe has the iris hazel, the bill blackish-brown, yellowish at the base, and the feet greenish-yellow.

'Snipe arrived in the Patani States during the second week in September, and were extraordinarily abundant during the two succeeding months, large numbers of them being killed by flying against the recently erected telephone wires.'

200. *Tringa minuta*, (Leisl.)

Limonites minuta, Sharpe, *Cat. B. Brit. Mus.* xxiv, p. 538 (1896).

♂, ♀ ad. Tanjong Budi, Patani. September and October. (Nos. 406, 416, 435)

The Little Stint has the iris, bill, and feet blackish.

201. *Tringa platyrhyncha*, Temm.

Limicola platyrhyncha, Sharpe, *Cat. B. Brit. Mus.* xxiv, p. 612 (1896).

♀ ad. Kampong Budi. 29th September. (No. 418)

The Broad-billed Sandpiper has the iris dark brown, the bill black, yellowish at the base, and the feet greenish-brown.

202. *Tringa subarquata*, Glldenst.

Ancylochilus subarquatus, Sharpe, *Cat. B. Brit. Mus.*, xxiv, p. 586 (1896).

♀ ad. Patani River. 24th September. (No. 409)

The Curlew-Sandpiper has the iris, bill, and feet black.

203. *Terekia cinerea*, (Glldenst.)

Terekia cinerea, Sharpe, *Cat. B. Brit. Mus.* xxiv, p. 474 (1896).

♀ ad. Kampong Budi. 2nd October. (Nos. 429 ? and 434)

The Terek Sandpiper has the iris hazel, the bill black, yellow at the base, and the feet yellowish.

204. *Aegialitis dubia*, (Scop.)

Aegialitis dubia, Sharpe, *Cat. B. Brit. Mus.* xxiv, p. 263 (1896).

♀ ad. Kampong Jalor. 4th November. (No. 466)

The Little-ringed Plover has the iris dark, the bill black, yellow at the base, and the feet yellowish.

205. *Aegialitis mongolicus*, (Pall.)

Ochthodromus mongolus, Sharpe, *Cat. B. Brit. Mus.* xxiv, p. 223 (1896).

♂ imm. Patani. 2nd October. (No. 481)

♂, ♀ imm. Tanjong Budi. 22nd and 24th September. (Nos. 402, 408, 417)

Immature specimens of the Lesser Sand-Plover have the iris dark hazel and the bill and feet black.

206. *Charadrius dominicus*, Mll.

Charadrius dominicus, Bonhote, p. 79.

♀ imm. Tanjong Budi, Jhering. 23rd September. (No. 404)

♂ ad. Kampong Jalor. 5th November. (No. 470)

The Eastern Golden Plover has the iris dark hazel, the bill black, and the feet greenish-lead colour.

207. *Streptopelia interpres*, (Linn.)

Arenaria interpres, Sharpe, *Cat. B. Brit. Mus.* xxiv, p. 92 (1896).

♂, ♀ imm. Tanjong Budi, Jhering. 22nd and 23rd September. (Nos. 401, 405)

The Turnstone has the iris dark brown, the bill black, reddish-brown at the base, and the feet yellowish-orange.

'Shore-birds become abundant on the coasts of the Peninsula towards the end of August, rapidly increasing in numbers during September and October. In addition to the species enumerated above, Curlews and the Burmese Wattled Plover (*Sarcogrammus atrinuchalis*) were very abundant on Tanjong Patani during the first few days of October.'

LARIDAE

208. *Sterna sinensis*, Gmel.

Sterna sinensis, Bonhote, p. 80.

♂, ♀ ad. Tanjong Budi, Patani. 16th August. (No. 337, 338)

The White-shafted Little Tern has the iris dark brown, the bill chrome-yellow, tipped with greenish-black, and the feet chrome.

'In addition to the above species, *Sterna bergii* and a gull resembling *L. ridibundus* in winter plumage were noted off Tanjong Patani.'

HELIORNITHIDAE

209. *Heliopais personata*, (Gray)

Heliopais personata, Bonhote, p. 79.

♂ ad. Jeram Kawan, South Perak. 13th February. (No. 662)

The Masked Finfoot has the iris chrome, the bill bright yellow, and the feet pale apple-green.

'Rare as this species is in collections, it is by no means uncommon in suitable localities throughout the Peninsula. It frequents the upper reaches of rivers where the current is strong and the water is clear, and is very shy. When disturbed it only takes to flight with the greatest reluctance, and then for a very short time. Normally it escapes down stream, using its wings as paddles and with his head bent back, very much in the attitude of the Snake-bird, (*Plotus melanogaster*), which affects similar situations. If the opportunity is afforded it, it takes refuge beneath the overhanging banks.'

'The Malay name is *Itek ayer* (Water-Duck).' N.A.

RALLIDAE

210. *Gallicrex cinerea*, (Gmel.)

Gallicrex cinerea, *Bonhote*, p. 79.

A male of the Kora or Water-cock in the blackish summer-plumage bears no particulars.

'The *Ayam-ayam* or 'Hen' is very local in its distribution, but common wherever found. The present specimen was obtained near Patani.

211. *Amaurornis phoenicura*, (Forst.)

Amaurornis phoenicura, *Sharpe*, *Cat. B. Brit. Mus.* xxiii, p. 156 (1894).

♀ ad.	Patani.	22nd April.	(No. 4)
♂ imm.	Kampong Jalor.	23rd November.	(No. 476)
♂ ad.	Sungkei, South Perak.		(No. 647)

The White-breasted Water-Hen has the iris dark sienna-brown, the bill greenish-olive, the base of the upper mandible and frontal shield crimson, and the feet yellow with a gamboge tinge.

'Common along river-banks and in swamps throughout the Peninsula.'

212. *Amaurornis fuscus*, (Linn.)

Limnobaenus fuscus, *Sharpe*, *Cat. B. Brit. Mus.* xxiii, p. 146 (1894).

♂ ad.	Patani.	22nd April.	(No. 3)
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The Ruddy Crake has the iris and eyelid crimson, the bill leaden-black, inclining to greenish, the feet brick-red, brighter above the tibio-tarsal joint, the claws and hinder aspect of tarsus darker.

'Snared by Malays among the reeds at the mouth of the Patani River.'

213. *Rallina superciliaris*, (Eyton)

Rallina superciliaris, *Sharpe*, *Cat. B. Brit. Mus.* xxiii, p. 76 (1894).

♂ ad.	G. Berumban, Perak.	6,000 feet.	28th January.	(No. 603)
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'The Banded Crake was collected by Sakais.'

COLUMBIDAE

214. *Chalcophaps indica*, (Linn.)

Chalcophaps indica, *Bonhote*, p. 77 ; *Hartert*, p. 540.

♂, ♀ ad.	Biserat.	2nd July.	(Nos. 226, 227, 228)
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The Bronzed-winged Dove has the iris dark hazel, the orbital skin dark lake, the bill vermillion, orange towards the tip, darker at the base, and the legs purplish-lake.

'Met with everywhere throughout low-country jungle, and trapped by means of a pigeon call. It is extensively used as food. Malay name, *Punai tana*.'

215. *Geopelia striata*, (Linn.)

Geopelia striata, *Salvad., Cat. B. Brit. Mus.* xxi, p. 458 (1893).

♂, ♀ ad.	Patani.	20th June.	(Nos. 204, 340)
♂, ♀ ad.	Ban Sai Kau.	16th and 17th September.	(Nos. 388, 393)

The Barred Ground-Dove has the iris brown, the bill lavender, and the feet lake-red.

'Found in similar situations to the preceding, but not so common.'

216. *Turtur tigrinus*, (Temm. and Knip.)

Turtur tigrinus, *Bonhote*, p. 77.

Turtur tigrina, *Hartert*, p. 540.

♂ ad.	Patani.	10th June.	
♀ ad.	Ban Sai Kau.	16th September.	(No. 387)
♂, ♀ ad.	Biserat, Jalor.	1st and 6th July.	(Nos. 224, 250, 251)
♂ imm.	Jambu, Jhering.	9th June.	(No. 178)

The Malay Spotted-Dove has the iris brown or orange, the bill black, and the feet coral-pink.

'Commonest near the coast in open sandy localities; one of the favourite cage birds of the Malays.'

217. *Osmotreron olax*, (Temm.)

Treron olax, *Bonhote*, p. 77; *Hartert*, p. 539.

♂ ad.	Jeram Kawan, South Perak.	13th February.	(No. 655)
♂ ad.	Bidor, South Perak.	3rd February.	(No. 611)
♂ ad.	Gedong, South Perak.	7th January.	(Nos. 501, 502)

The Little Malayan Green Pigeon has the outer ring of the iris terra-cotta-red, the inner white, the bill yellowish-green, and the feet bright coral-red.

'This species and *O. vernans* are common everywhere throughout the Peninsula, though their place is largely taken by *O. fulvicollis* in the mangroves on the coast.'

218. Osmotreron vernans, (Linn.)

Osmotreron vernans, *Bonhote*, p. 76.

♂, ♀ ad. Patani. 10th June. (Nos. 170, 171)
 ♂, ♀ ad. et ♂ imm. Biserat, Jalor. June, July, and October. (Nos. 215, 216,
 217, 238, 239, 454)

In the Pink-necked Green Pigeon the iris is yellow, with an orange ring round the pupil, the bill bluish-horn, paler at the tip, and the feet deep lake-pink.

219. Treron nipalensis, (Hodgs.)

Treron nipalensis, *Salvad., Cat. B. Brit. Mus.* xxi, p. 34 (1893).

♂, ♀ ad. Sungkei, South Perak. 11th February. (Nos. 648, 649)

The Thick-billed Green Pigeon has the iris pale cream-colour, the bill pale yellow, the base of the lower mandible crimson, and the feet bright coral-red.

220. Butreron capellei, (Temm.)

Butreron capellei, *Bonhote*, p. 76 ; *Hartert*, p. 539.

♂ ad. Mabek, Jalor. 24th July. (No. 315)

The Large Thick-billed Green Pigeon has the iris yellowish-brown, the bill greenish-yellow, and the feet bright yellow.

‘Somewhat rare and shy, feeding on the tops of very high trees.’

TURNICIDAE**221. Turnix taigoor, (Sykes)**

Turnix taigoor, *Bonhote*, p. 78 ; *Hartert*, p. 539.

♀ ad. Ban Sai Kau. 26th April. (No. 13)

The Bustard-Quail has the iris red, and the bill and feet pale plumbeous.

‘Fighting quails are much kept by the Malays, more especially in the northern parts of the Peninsula. Both this and the Painted Quail (*Excalfactoria chinensis*) are common wherever there are wide stretches of *lalang* grass.’

PHASIANIDAE**222. Gallus gallus, (Linn.)**

Gallus gallus, *Bonhote*, p. 78.

♀ ad. Biserat, Jalor. 2nd July. (No. 232)
 ♂ ad. Sungkei, South Perak. 9th and 10th February. (Nos. 632, 640)

The Jungle-Fowl has the iris yellowish-brown, the wattles red, the bill pale horn colour, and the feet pale lead colour.

‘Everywhere abundant, and interbreeding with the domestic poultry.’

223. Polyplectron malaccensis, (Scop.)

Polyplectron bicalcaratum, Grant, *Cat. B. Brit. Mus.* xxii, p. 354, (1893);
Bonhote, p. 78.

Polyplectron malaccensis, *Hartert*, p. 538.

♂, ♀ ad. Lower Batang Padang, South Perak. 29th January. (Nos. 605, 608)

Dr. HARTERT is no doubt right in maintaining that *P. malaccensis* is the correct name for the Malayan Peacock-Pheasant.

‘Usually inhabiting the densest jungle, and even more shy than the Argus. Malay name, *Kuang chermin* (Mirror Argus-Pheasant), alluding to the tail spots.’

224. Pavo muticus, Linn.

Pavo muticus, *Bonhote*, p. 78; *Hartert*, p. 538.

♂ ad. et imm. Mabek, Jalor. 22nd July. (Nos. 299, 300)

The Burmese Pea-fowl has the iris dark hazel, the anterior portion of the bare face lavender-blue, the hinder portion from the gape upwards pale chrome-yellow, the bill black, horn-coloured at the tip, and the feet black.

‘Exceedingly rare on the western side of the Peninsula, but very abundant in Pahang and the more inland districts of the Patani States, and frequenting low jungle near rivers. Malay name, *Merak* (probably onomatopoeic).’

225. Argusianus argus, Linn.

Argusianus argus, *Bonhote*, p. 78; *Hartert*, p. 538.

♂ ad. Rhaman. 19th July. (No. 295)

The Argus has the iris greenish-hazel, the naked skin of the head blue, the bill whitish-horn, and the feet pale coral-pink.

‘Common throughout the Peninsula in old jungle, but apparently does not frequent the swampy tracts near the coast. It is especially fond of the ridges of the hills, where spaces cleared by the cocks as “showing-off” grounds are often to be met with. The natives told me that this peculiarity was taken advantage of by them in trapping the males, who are very particular in removing any dead leaves or twigs from their grounds. A strip of bamboo sharpened on the lower edge is firmly pegged down in the form of a hoop in the centre of the space, and the bird in its efforts to remove it places its head beneath the sharpened edge and so decapitates itself. I give the story for what it is worth. By the Sakai the Argus-Pheasant is not unfrequently tamed, and hens may often be seen among their domestic poultry. The Malay name is *Burong kuang*.’





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Bukit Tapang, from near Biserat.



View at Nawngchik town, with Bukit Besar in the distance.



JUNGLE ON BUKIT BESAR, NAWNGCHIK.



View in the Casuarina Woods on Cape Patani.

MAP OF CENTRAL SECTION OF MALAY PENINSULA

SPECIALLY PREPARED FROM LATEST SURVEYS AND FROM DATA BY N. ANNANDALE AND H. C. ROBINSON TO ILLUSTRATE "FASCICULI MALAYENSIS"



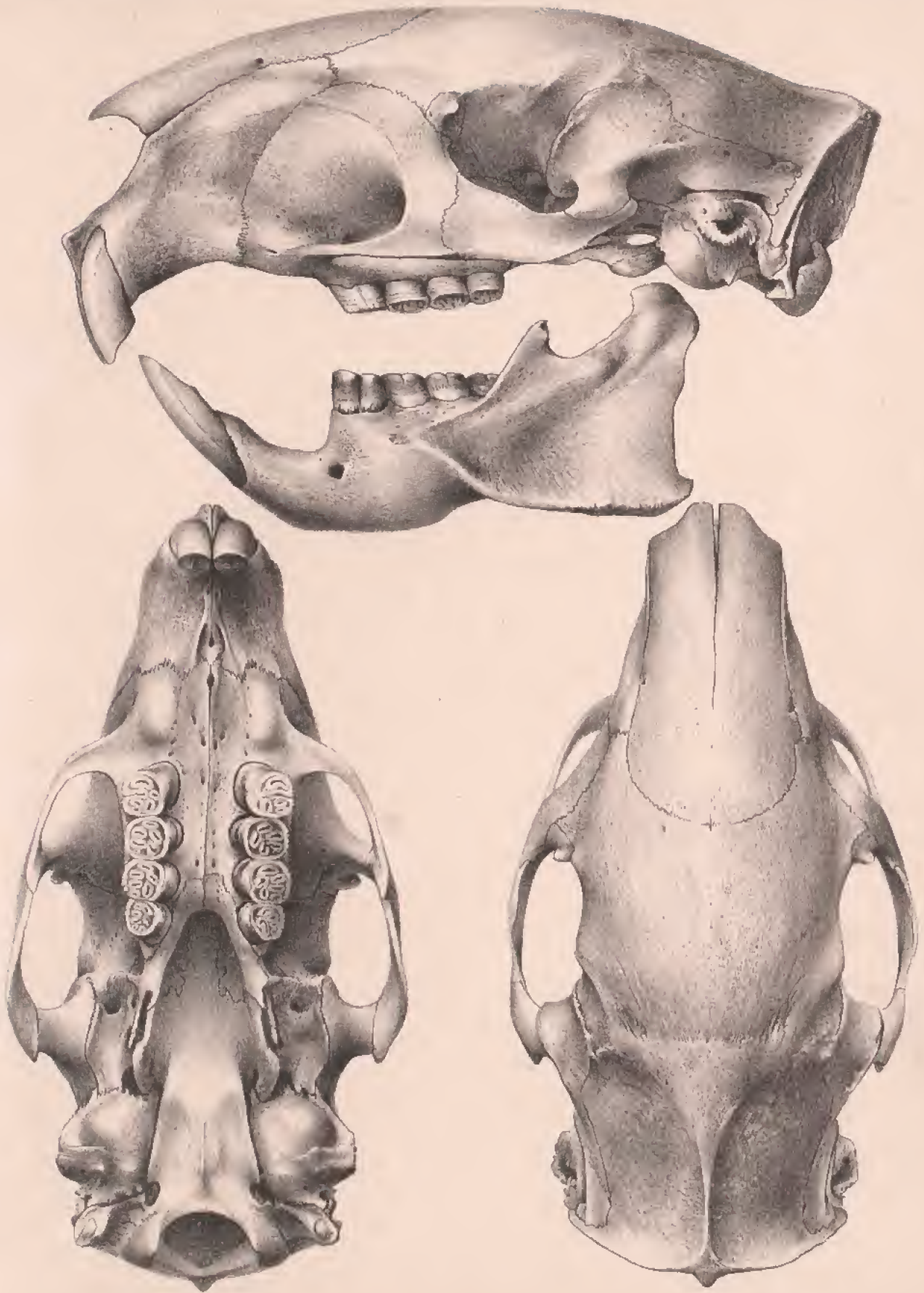




H Goodchild del et lith.

Mintern Bros imp.

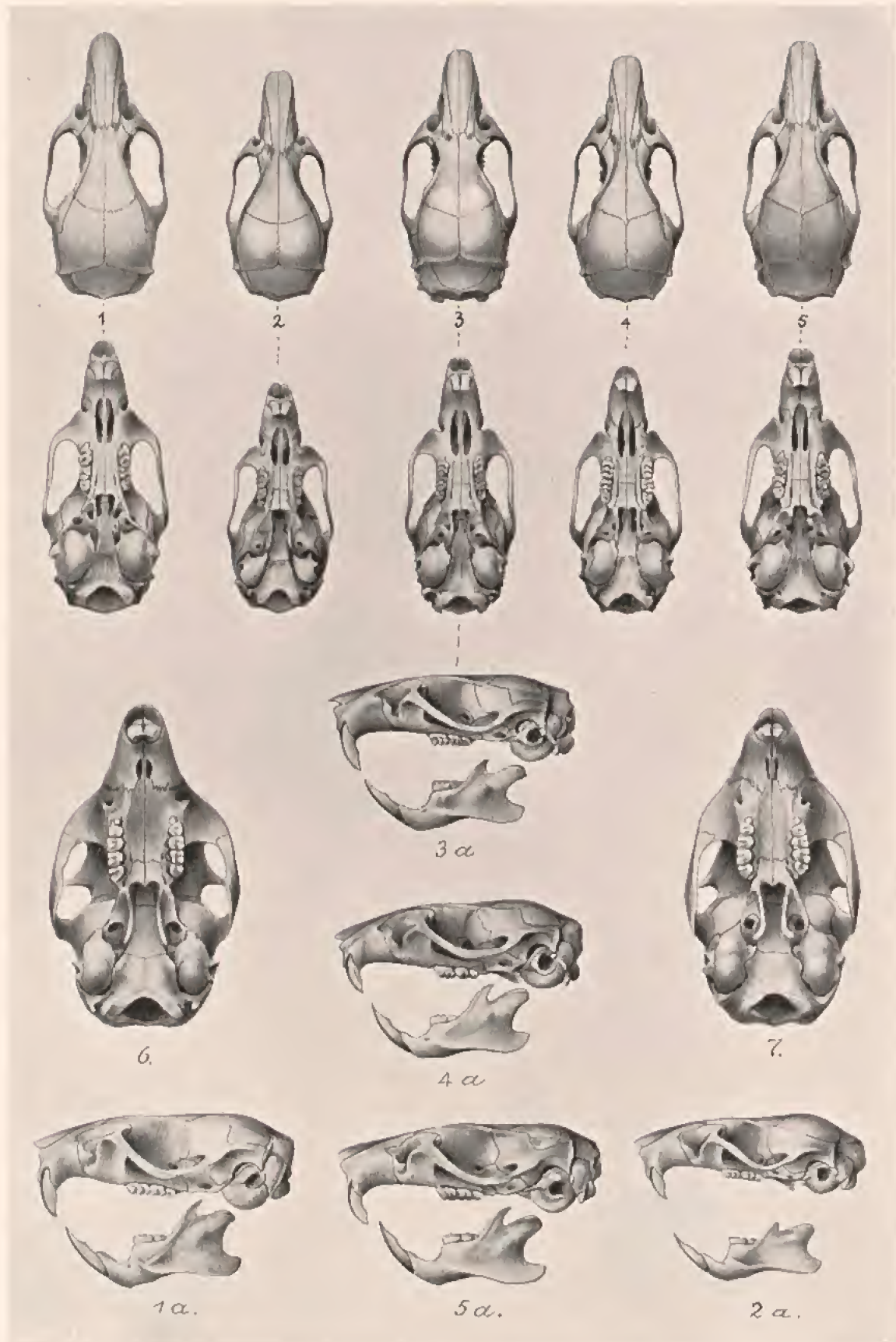
1. 2. MUS JALORENSIS.
3 MUS GRISEIVENTER.
¾ nat size.



H. Grönvold del et lith.

Mintern Bros imp.

HYSTRIX GROTEI, GRAY.
(NAT SIZE).



Skulls of *Sciurus* and *Mus* from the Malay Peninsula.



J. Green del. et lith.

Miner Bros. imp.

1. MEGALOPHRYS MONTANA, var. ACERAS. 2. RHACOPHORUS ROBINSONII.
3 4. IXALUS LARUTENSIS.



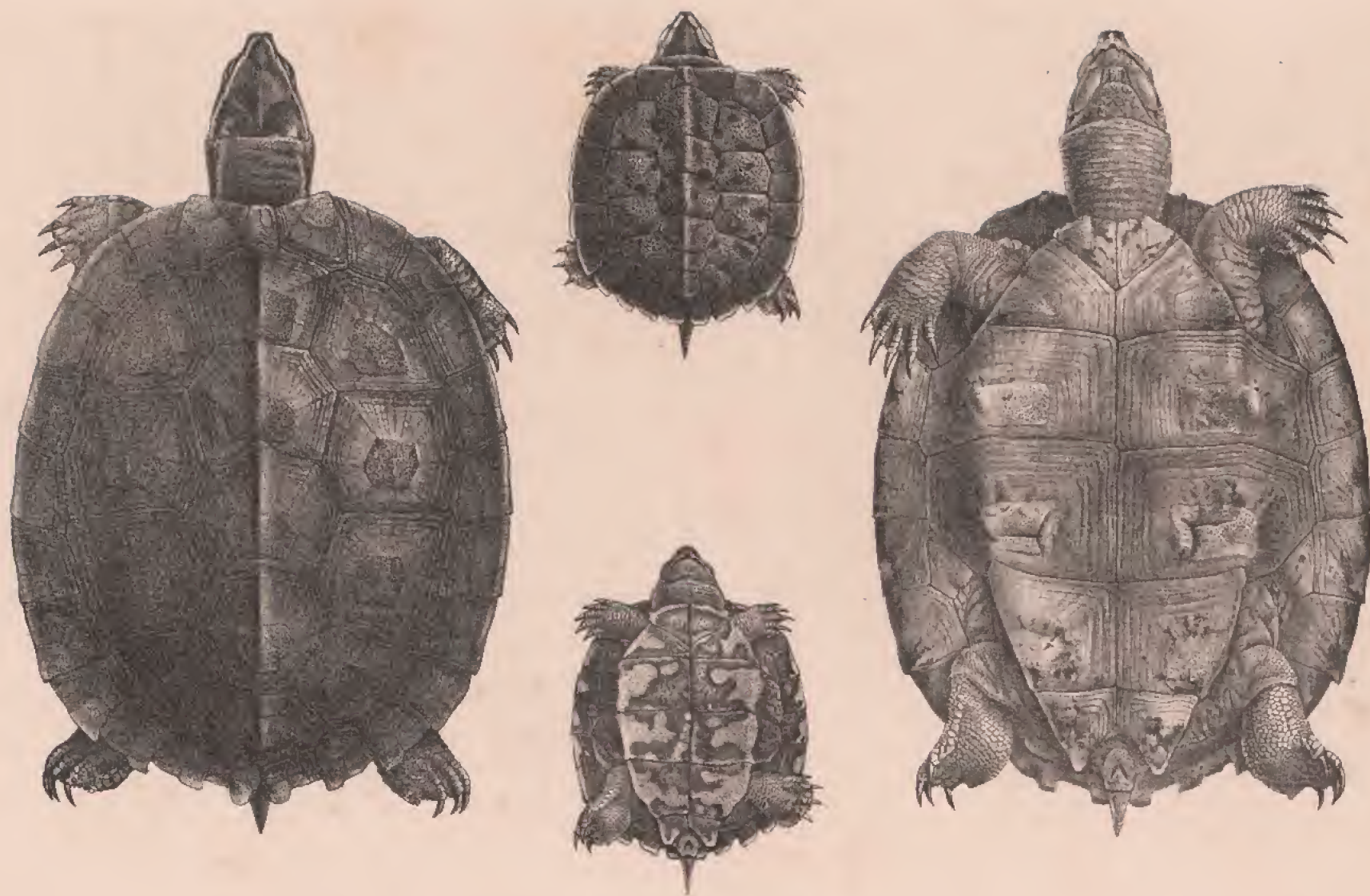
2.



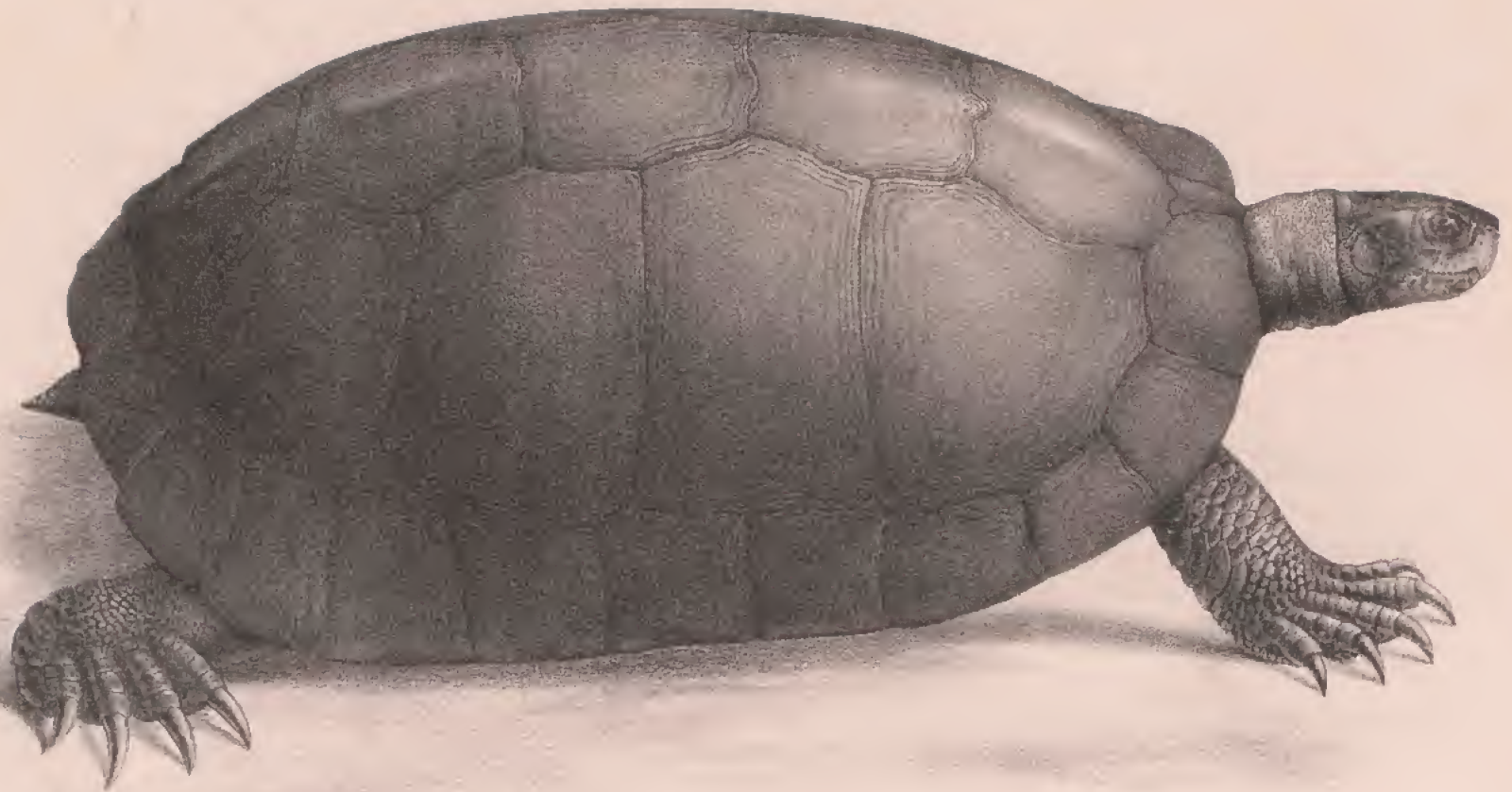
1.

2a.

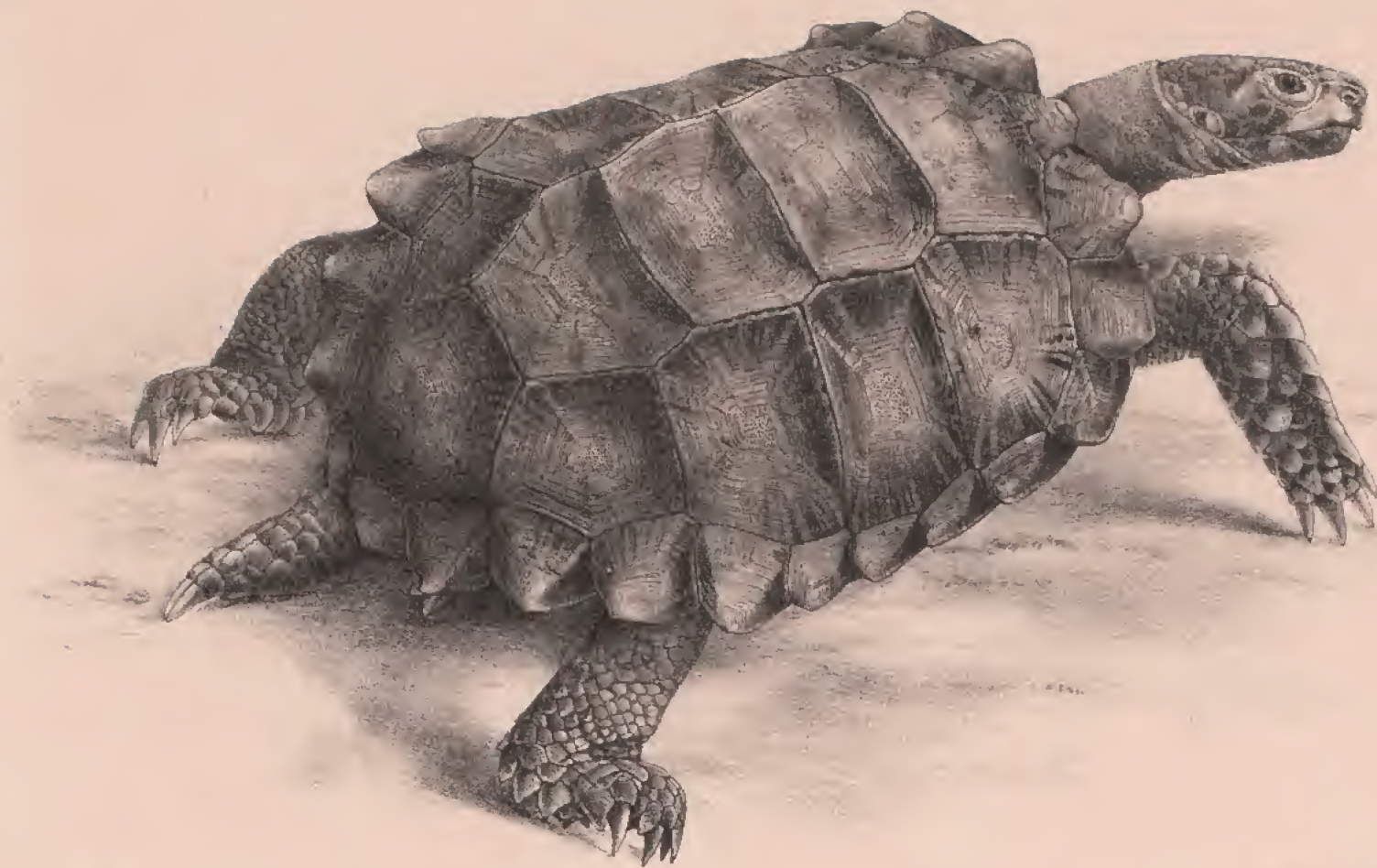
1. RHACOPHORUS NIGROPALMATUS. 2. IXALUS HORRIDUS.



CYCLEMYS ANNANDALII, YOUNG. ($\frac{2}{3}$ NAT. SIZE).



CYCLEMYS ANNANDALII ($\frac{2}{3}$ NAT. SIZE).



TESTUDO PSEUDEMYS. ($\frac{1}{2}$ NAT. SIZE).

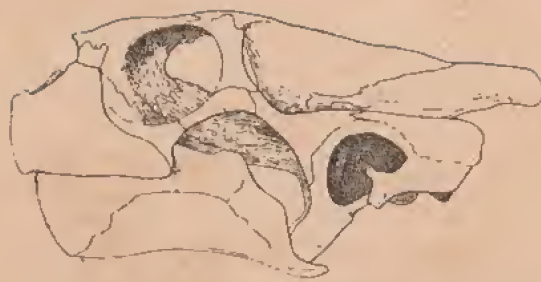


FIG. 1. Skull of *Testudo pseudemys*. Two-thirds natural size.



FIG. 2. Skull of *Testudo emys*. Two-thirds natural size.



1b.



1a.



3a.



2.



1.



3.

J. Green del et lith.

1. DRACO PUNCTATUS. 2. LIOLEPIS BELLII.
3. LYGOSOMA MIODACTYLUM.

Miner Bros. imp.

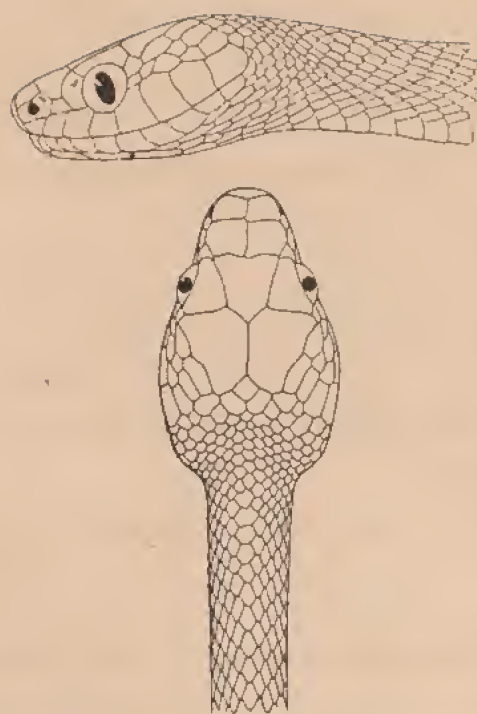


FIG. 3. Head of *Dipsadomorphus pallidus*. Two-thirds natural size.