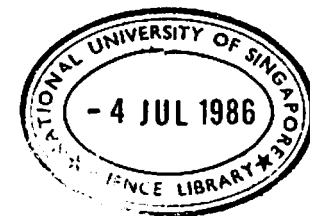


NATURE CONSERVATION
IN
WESTERN MALAYSIA, 1961

An issue to mark the occasion of the
TWENTY-FIRST ANNIVERSARY
of the founding of the
MALAYAN NATURE SOCIETY
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Edited by
J. Wyatt-Smith and P.R. Wycherley



matter how many there are it is fairly certain that they are confined to the upper reaches of the streams as this is the remotest part of the Reserve. The western part has been visited by political insurgents and the eastern section is over-run by villagers during June and July when they collect certain jungle fruits.

Food to which the rhino is particularly partial, *Toddalia aculeata* and *Calamus* sp., grows abundantly at the sources of the four main streams and so it is here, in an area of about twenty-five square miles, that one will probably find the rhino population.

By questioning local villagers I learnt that seventeen rhino had been killed since about 1940, one man accounting for ten of them!! There seems to have been little hunting since 1956 owing to insurgents and recently the Government withdrew all privately owned arms and ammunition.

The values attached to various parts of the rhino are as follows:--

Dried blood	...	US\$2 per oz.
Fresh blood	...	US\$30 per lb.
Bone	...	US\$3 per lb.
Skin	...	US\$6 per lb.

and the horn varies from US\$105 to 210 PER INCH!!

It is doubtful whether the population can ever be determined precisely but it seems reasonable to believe that there might be between twenty and thirty *Didermoceros sumatrensis* and one or two *Rhinoceros sondaicus* still left in Burma.

Reference

TALBOT, L. M., (1960). A look at threatened species. *Oryx*, 5, 169-186.

UDJUNG-KULON NATURE PARK, JAVA*

By

R. KOESNADI P. SATMOKO†

General Description

Udjung-Kulon is a peninsula at the most south-western part of Java, and with the small nearby islands covers an area of 41,120 hectares. It has long been famous for its wild life, and is the last remaining stronghold of the Javan or One-horned Rhinoceros (*Rhinoceros sondaicus*), one of the rarest mammals in the world today. It consists mainly of an obtuse conical mountain called Gunung Pajung, which means 'umbrella mountain', a name probably given to it because of the radiating ridges which resemble the frame of an umbrella.

The land is of mixed volcanic and sedimentary origin. The soil composition varies from the coral sands and limestones of the coast to tuff, tufa, marl sandstones, breccias, conglomerates and layered rock-formations on the higher areas, the ridges and mountain.

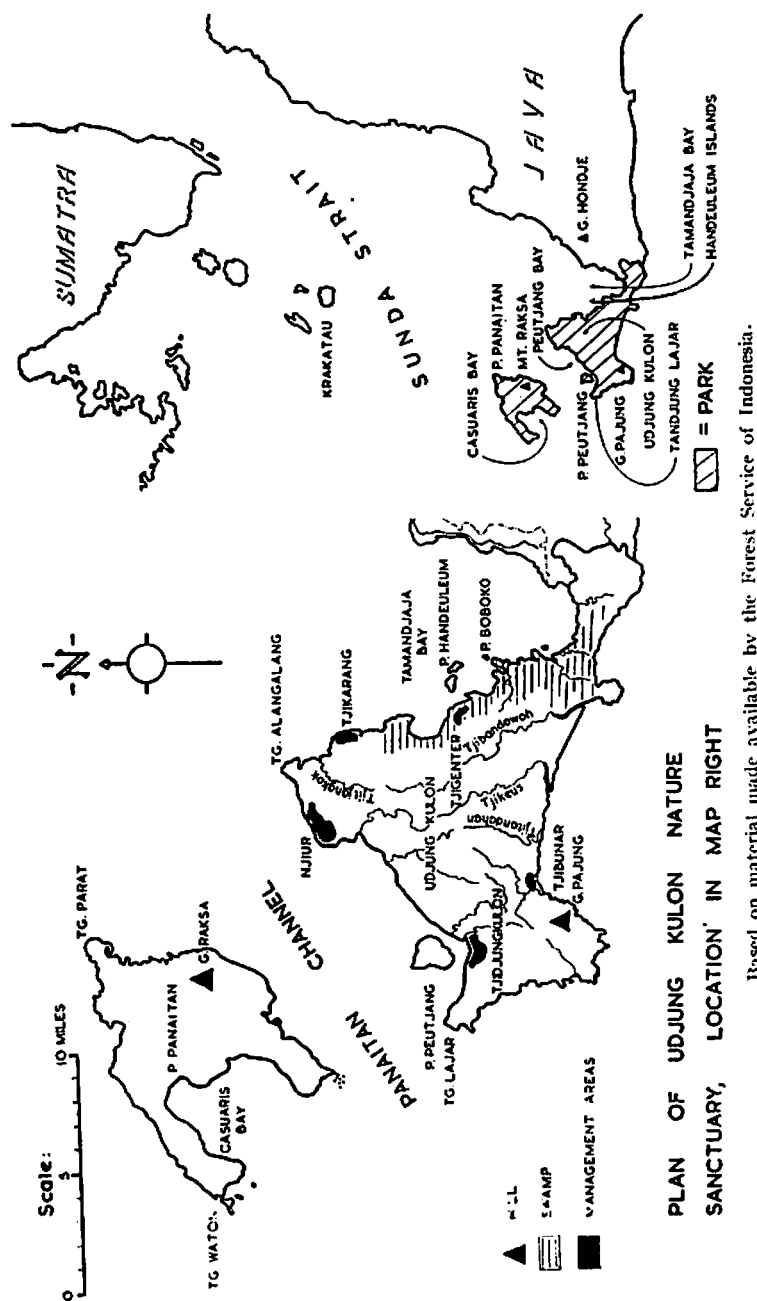
The southern and western sides of the mountain are walled by precipitous volcanic cliffs, from fifty to seventy metres high, which rise sharply from the sea. In several places the Grey-rumped Swiftlets (*Collocalia francica*) build their edible nests in the clefts and caves.

The eastern part of the peninsula is a low, gently rolling plateau some fifty metres high, whereas the western side is bordered by a row of hills which rise to about one hundred and forty metres.

The whole peninsula is covered with luxuriant forest and is uninhabited. Formerly there was a village called Djung-Kulon on the mainland opposite Peutjang Island, but in 1883 it was flooded by the tidal wave formed as a result of the eruption of Krakatau in the Sunda Strait. This wave swept away the entire village, together with the vast island-forest and morass-forest at the neck of Udjung-Kulon. All the present forests on the flat shore and on the islands have developed since that time.

* This is a comprehensive account of probably the longest established, the most studied and best developed Nature Park in the region. It is also one of the most interesting, being the last stronghold of the Javan or One-horned Rhinoceros, one of the last areas in Java with original lowland forest and yet at the same time containing around the coast and on the islands juvenile forest which has evolved since the destruction caused by the eruption of Krakatau in 1883. Ed.

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Udjung-Kulon includes woodand, grassland, rocks, islands, dunes, rivers, lakelets and marshes, all mixed together and overlapping in an ever-changing pattern.

The forest begins close to the rocky coast in the mountainous southwest and is characterised by the presence of a large number of palms in the understorey (see Table 1, a). Further inland in the mountain and foothill areas the trees are taller, especially those of *Planchonia valida* which rise far above the surrounding vegetation, and a feature is the tangled mass of rattans, e.g. *Plectocomia elongata* (bubuway), and lianes (see Table 1, b and c). To the east again are thousands of hectares of lowland forest in which are found not only most of the species usually found in the west Javan jungle of the same elevation (see Table 1, d) but also species, such as members of the important south-east Asian family of trees, the Dipterocarpaceae, which are almost extinct elsewhere in Java. In this forest are dense clumps of the half-herbaceous marantaceous plant *Donax arundastrum*, the bamboo *Schizostachyum zollingeri* and gingers.

The southern coast is sandy for the greater part with extensive flat sandstone rocks at intervals. Strong winds blow almost continuously on this coast, night and day, giving rise to dunes and lagoons. The vegetation is grassland with bush-like screw-pines (*Pandanus* spp.) and the occasional giant *Pandanus bidur* some eight to twenty metres high, whereas the dunes are covered by the typical and usual association of *Ipomoea pes-caprae*, *Spinifex littoreus*, and *Vigna marina* (see Table 1, e).

In contrast to the wild southern coast the sea along the shore of the Peutjang Bay on the west coast is calm. Small rocks protrude from the water-surface at intervals and these are occasionally used by terns as breeding places. The shore vegetation is typical, the most common species being *Barringtonia speciosa*, *Calophyllum inophyllum*, *Cordia subcordata*, *Crinum asiaticum*, *Desmodium umbellatum*, *Hibiscus tiliaceus*, *Terminalia catappa* and *Vitex negundo* (see Table 1, f).

In the neck of the peninsula the low slopes, stretching eastwards, are varied by partially swampy valleys and small streams. The vegetation is generally no more than ten to twenty metres in height and consists of well spaced trees amongst a dense shrubbery of woody plants, bamboos, palms and rattans. Mangrove forest occurs along this coast.

Striking features are the abundant trees of *Buchanania arborescens* on the young coral islands of Handeuleum, the thick clusters of *Casuarina equisetifolia* at Djamang, the dominating palm *Corypha*

gebanga on the grassy terrain of Tjekarang, the clumps of *Guettarda speciosa* along the banks at Tjitelang, the densely-crowned trees of *Ardisia humilis* in the Tembing game-pasture area and the prevalence of *Lagerstroemia speciosa* on the parklike grassland of Tjigenter.

As much as 3,500 millimetres of rain falls on the average each year. The streams flow rapidly and where their outlet to the sea is barred by a broad impervious coral wall, small brackish lakes are formed around which zones of *Ardisia humilis* and rushes and sedges occur. Examples of these are found in the vicinity of the Njiur and Tjekarang game feeding-grounds. Some of the water-courses rise and flow through tufaceous soil and limestone resulting in precipitated terraces of travertine such as can be seen along the upper reaches of the Tjigenter river. Along these upper courses are found many beautiful butterflies, dragonflies and midges. The lower reaches teem with a variety of fish (see Table 2, a and b). Nipah-palms (*Nipa fruticans*) fringe the broad, brackish water streams of the estuary.

The principal islands off the coast of the peninsula are Panaitan Island (or Prince Island), Peutjang Island (or Seagull Island) and the Handeuleum group of islands and islets.

Panaitan Island is in the Sunda Strait about ten kilometres north-west of Tandjung Lajar, and is the farthest west of any of the islands. It is about 12,000 hectares in area. The U-shaped extended arms of the deeply-indented Casuaris Bay, which faces south-westwards, were at one time the walls of a crater-cone, the bay itself being the cavity of the volcano. In the north the predominating vegetation is mangrove and the *Barringtonia* shore formation (see Table 2, f). There is also in the drier areas a lightly wooded parkland or savannah of *Ardisia* trees and the grasses *Imperata cylindrica* and *Saccharum spontaneum* with scattered large trees of *Sarcocephalus* sp. In the wetter parts Cyperaceae dominate. Elsewhere the island is under high forest with patches of deciduous trees such as *Pongamia pinnata*, *Guettarda speciosa*, *Spondias pinnata* and *Sterculia urceolata*. The latter grow to very large trees and their exceptionally high buttresses are particularly striking. The highest point is Mount Raksa, 319 metres. There are two Hindu statues on its summit representing Siva and Ganesha. Off the east coast of the island are rows of beautiful marine gardens which are clearly visible through the blue water. Some of the principal fauna are listed in Table 2, c. The sheltered waters of Lentah, Semadang and Peutjang Bays in the Panaitan Channel are also extremely rich in marine life (see Table 2, d).

Panaitan Channel, the ocean south of Ujung-Kulon and Panaitan Island offer good opportunities for deep-sea gamefishing. By means of trolling Spotted Spanish Mackerel (*Indocybium guttatum*), Trevally (*Gnathodon speciosus*), Dart (*Trachinotus bailloni*), Barred Spanish Mackerel (*Cybius commersoni*), Tuna (*Kishinoella tonggol*), Mackerel Tuna (*Euthynnus affinis*) and Barracudas (*Sphyraena* spp.) may be taken on line and hook using artificial bait. The best fishing season appears to be from July to October during the dry monsoon. Other fish found in these waters are included in Table 2, e.

Peutjang Island is about 450 hectares in area, almost flat and only some 500 metres from the mainland. It is covered with a very open type of forest rich in *Intsia bijuga*. The Javan Deer is found on the island and this population is said to be a distinct sub-species.

The Handeuleum group of coral islands is situated in the Bay of Tamandjaja in the east. The group comprises two main islands, Handeuleum I and II of a total area of 70 hectares, five outliers and a number of rocky islets. The two main islands are covered with a juvenile forest in which some of the most common species are *Buchanania arborescens*, *Neonauclea calycina*, *Pemphis acidula*, *Pongamia pinnata*, *Rademachara gigantea*, *Hibiscus tiliaceus*, *Ardisia humilis*, *Piper aduncum* and *Lantana camara*. The sea around these islands is muddy and the waters are not as rich in fishes as those around Peutjang Island.

History of the Park

In 1921 the peninsula of Ujung-Kulon was declared a Nature Monument ("Strict Nature Reserve") and administered by the Department of Internal Affairs. The aim was to protect the flora and fauna, and to retain them in their natural condition, fundamentally for scientific purposes. The genesis of this protection movement was idealistic in the highest sense. An exceptional streak of this idealism amid an age of ruthless raiding led the first group of scientists, aesthetes and conservationists viewing Ujung-Kulon, to decide that the best use of this area would be non-productive in the strictly practical sense.

In accordance with the clause on Nature Monuments and Game Reserves Ordinance of 1932, Ujung-Kulon Nature Reserve was to be kept untouched in all its natural setting. As a result, all the existing grasslands were gradually overgrown with secondary forest. The response of wild life to the rapidly changing ecological conditions was unfortunately not gratifying. Herbivores — in particular the plain dwelling and grass-eating species — did not fare well. The balance of nature had in some way become abnormal for the large numbers of wild animals living there. The stock of game began to dwindle alarmingly.

The fault lay in the original principle, but it was not until sixteen years later that Ujung-Kulon became a Game Reserve or Nature Park instead of the old, restricted, closed type of reserve.

By Government decree on June 24, 1937, No. 17 (Govt. Gazette No. 420) the islands of Panaitan, Peutjang and the Handeuleum group were included in this newly constituted Ujung-Kulon Nature Park, which was further enlarged by the addition of a vast portion of the adjacent Hondje-mountain Forest Reserve. Simultaneously this Park was proclaimed a forest sanctuary and a prohibited area. This measure was a vast improvement on the former status. From thenceforth the administrative control of this area was taken over by the Forest Service. Since then, the necessary management for improving the habitat for wild life, and the maintenance and development of this Park as a game refuge was put into effect.

However, very little was done towards the maintenance of this Park during the Japanese occupation and on the outbreak of the war of independence in Indonesia (1945-1950) Ujung-Kulon was abandoned. What was not already destroyed was left to the mercies of the jungle which rapidly obliterated all the work of previous years. Even the grasslands gradually disappeared under secondary growth. During this period a certain amount of poaching took place in the Park. Some thirteen rhinoceros were killed and many wild-oxen, deer and other animals were ruthlessly slaughtered.

In 1950, shortly after the transfer of sovereignty to the Government of the Republic of Indonesia, the newly established "Wildlife Management and Nature Protection Bureau" of the Forest Service took over the affairs of the Park. Most of the former staff were summoned for duty to reorganize this reserve. Labourers were recruited from the neighbouring villages of Tjipining, Tamandajaja, Tjikawung and Tjegog. Recruitment has always been from these villages, as these descendants of generations of jungle-dwellers and seamen are in their natural element in these remote, rough regions. Funds were made available and in September, 1951, a start was made on the erection of buildings and patrol bivouacs of local pattern, the clearing of secondary growth to maintain game-pasture, the reopening of the patrol paths, and the policing and managing of the Park.

Meanwhile, proceedings were taken against poachers. The wrongdoers were charged with the shooting of the strictly protected rhinoceros and of being in a prohibited area, and were fined Rp. 150. This punishment was farcically low, since these poachers had sold the horns of illegally killed rhinos for Rp. 8,000 each, and dried skin for Rp. 180

or more per kilogram. Previously those who were charged with such an offence had to pay a severe penalty; in one case an offender was given two years' imprisonment.

In order to deal with poaching, a bounty and monetary system has now been instituted. In addition to the scheduled guard-duties in the Park, directions have also been issued to armed game- and forest-rangers policing the adjacent forest area (i.e. the Hondje-mountain forest sanctuary which is declared an intermediate zone of Ujung-Kulon) to prevent hunting and other irregularities that may occur. It is hoped that these extra protective measures will act as a salutary example and that the widespread abuses of the past will abate. Up to the time of writing, the result of this extra severe control has been most encouraging. Poaching has not occurred since and there are now far more rhinoceros than formerly.

Further improvements are being made as money and labour become available. All the original temporary structures have been replaced gradually. There is now better accommodation, viz. permanent buildings, camouflaged observation-towers or look-out cabins, staff quarters, and a fleet consisting of Diesel-engined launches, a 4-ton bark, catamarans (twin-hulled sailing boats), flat-bottomed utility skiffs, canoes, and many other small local boats.

The equipment is better than before the war and progress is being made steadily. According to the present need, this Park has a permanent staff of 41 employees — including a captain or game-warden, 2 assistants, 5 rangers, park keepers, guards and crew of the vessels — and some 100 seasonal labourers.

The broad plan is to develop this Nature Park for visitors whose interest lies in studying natural history or observing and photographing wild life in attractive surroundings. Accommodation is being arranged, and the facilities provided are aimed at reasonable comfort without losing sight of the object of the Park. They infringe upon the demesne of the spirit of the jungle as little as is humanly possible. In any case, all things must be kept simple and the first objective is to provide a natural environment. In the first case, nature conservation will be the paramount aim. The aggregate area required to meet the recreational and tourist needs will not cover more than approximately three per cent. of the total area. It should not conflict, therefore, with essential requirements for the survival and multiplication of wild life.

Although plans are still incomplete it is possible to handle small parties of visitors — the best months are from August to October — and the work of development is making steady progress. Erection of two-

storied rest houses on the Peutjang and Handeuleum islands will be finished this year, as will the building of observation cabins at the game-pastures of Tjidjungkulon and Tjibunar which will give overnight accommodation for visitors.

The annual recurrent expenditure for the development and maintenance of feeding-grounds throughout the Park is about Rp. 100,000. Before the war liver fluke disease had for long been endemic in the stagnant wet pastures of Udjung-Kulon, never a year passing without this disease appearing, although it was not usually fatal. By manipulating the habitat to give better nourishment to the ungulates, and by draining stagnant wet feeding-grounds to eliminate the existence of the snail (*Limnacus minutus*) the intermediate host of fluke, and by applying copper sulphate to pools and water sources to combat cercaria, cysts and sporocysts of the fluke (*Distomum hepaticum*), etc., it is hoped that these diseases will soon be well under control.

Animals in Udjung-Kulon suffered rather heavily during the time of the Japanese occupation and the Revolution. During the first reconnaissance expedition by Mr. A. Hoogerwerf (Head of the Nature Preservation Division, Botanical Garden) and the author shortly after the assignation of sovereignty, there was very little evidence of the once-abundant wild life. Besides the heavy poaching, the feeding-grounds were overgrown with heavy cover of bush and thicket.

Game has, however, responded fairly well to the protection measures applied. Apparently through management the habitat has become more favourable for wild life and this has led to a considerable increase in the ungulates and other wild animals. In restoring game feeding-grounds special ecological studies are being carried out throughout the park and its intermediate zone. An experiment in creating cover and interspersing (i.e. intermingling of two necessary habitat factors food and cover) is in progress. The policy of maintaining a sane relationship between number of game and their food supply should produce the desired effect. In this respect Nature must be aided by man.

The amount of game seen now and its tameness is quite remarkable. Game in this Park, including the rhinoceros, are increasing.

Javan Rhinoceros (*Rhinoceros sondaicus*). There are now about fifty Javan Rhinoceros in Udjung-Kulon, the last individuals in Java. Last year some five calves were observed. In the adjacent intermediate zone there are another three individuals which usually restrict their range to the vicinity of Aer-Mokla forest. This huge, ungainly creature with its armoured hide, massive legs, odd-looking head, and horned nose is fairly safe from extinction in this last refuge. Every



Botanical Garden, Bogor, R.I.
Male Javan Rhinoceros wallowing in the Udjung-Kulon Nature Park.



Wildlife Management and Nature Protection Division,
Forest Service, Indonesia.
Banteng in the parklike grassland at Tjigenter.



Botanical Garden, Bogor, R.I.
Banteng at the Djamang water hole, Ujung-Kulon.

possible measure is being taken to safeguard it, because this animal is threatened with extinction due to the widespread, mistaken belief throughout the East in the medicinal and aphrodisiac properties of its horn and hide. There is reason to believe that there are still a regrettably large number of persons whose one idea of earning big money is to kill rhinoceros. Therefore, all-the-year-round guardians are considered doubly important and are maintained both inside and outside the Park.

Banteng (*Bibos sondaicus*, syn. *Bibos banting*). The Banteng were originally found over a considerable part of the grassy north- and south-coast of the peninsula, but owing to the disappearance as described earlier of most of these feeding-grounds in the past, over half of the original number have wandered outside the Park into the Hondje-mountain intermediate zone. Last year's census reported more than three hundred individuals in the Park, and approximately three hundred and fifty in the forest sanctuary outside. This wild ox appears to become more numerous every year, and it is now found in bands of thirty to fifty head or even more, on the reopened pastures.

Deer. In Ujung-Kulon deer are represented by the Barking Deer (*Muntiacus muntjac*), the Mouse Deer or Kanchil (*Tragulus javanicus*), the Javan Deer (*Cervus hippelaphus*) and the doubtful new sub-species of Peutjang Island, *C. h. laronesiotes*.

Any reference to this sub-species must necessarily be preceded by a brief historical sequence of some remarkable changes in the conditions on the island. It is thought that this species, of which there is an apparently stationary herd of some fifty to sixty animals, arose from *Cervus hippelaphus*, the common Javan plain-dwelling deer, which had for some reason swum across the channel from the mainland to Peutjang Island. After the eruption of Krakatau, the primary vegetative covering was presumably grass, thus forming plentiful food resources for these migrated animals. In all probability the number of deer were too small to influence the vegetation and all these feeding-grounds were gradually overgrown by dense bushes and trees, so that the grass-eating deer had ultimately to rely entirely upon leaves of the understorey-vegetation for food. This gradual change of food, generation after generation, and the lack of beasts of prey caused a change in their physical constitution and resulted in a variation in their heritable character.

It was earlier believed that the Peutjang deer was merely the same race as Javan deer, as considerable variation in the pattern is apparent. But the mainland species is exclusively a grass-eating and plains-

dwelling animal which cannot live in forest conditions, whereas the species of Peutjang Island is a real forest deer. The latter is much smaller, long haired, lighter in colour and apparently cannot swim.

It is still an open question if the deer found on Panaitan Island until World War II was also a separate biotype. Apart from the loss of this species, the subsequent response of deer to the protection measures has been most gratifying. More deer in herds of from twenty to sixty individuals were seen during 1960 than was anticipated, a number larger than before the war; and in general their physical condition was good. However, the deer of Tjigenter parkland appear to be slightly infected with the nasal bot fluke, the normal scourge of deer. It would appear that the vegetation and ecological conditions of this relatively restricted and enclosed parkland, which is covered with a short mat of *Andropogon aciculatus* and is heavily overgrazed by the existing couple of dozen deer and three dozen Banteng, are not exactly favourable for producing the quantities of herbivorous insects necessary to attract birds such as the Javan Jungle Myna (*Aethiopsar grandis*) and the Slender-billed Crow (*Corvus enca*). These are very important in eliminating bot-fly (*Oestrus* spp.) infection.

Barking Deer or Muntjac are found at all elevations, but they are seldom seen owing to their skulking habits and love of thick undergrowth.

The Kanchil or Chevrotain is almost completely nocturnal. They are more numerous than is generally considered and are found over most of the peninsula and islands.

Water Buffalo (*Bubalus bubalis*). These animals are confined mainly to the south-east of the peninsula. They are, in reality, feral domesticated animals. It is thought that these animals may be a nuisance to the endemic animals by harbouring and transmitting cattle-disease. Special attention is, therefore, being paid to control these animals.

Wild pigs are abundant. The common species is *Sus vittatus*.

Tiger (*Panthera tigris*) and Panther (*Panthera pardus*). These animals are mostly restricted to the palm and *Pandanus* wilderness of the southern regions, and are seldom seen during the day. The tiger, the most feared of all our fauna, has disappeared almost completely from the forests of Java, and is safe from extinction only in the game reserves. The estimated number of tiger and panther in Ujung-Kulon is only fifteen; they do not occur on the islands. One of the chief aims of

conservation is to retain these splendid beasts of prey unimpaired in Ujung-Kulon where they do not harm but actually assist in the balance of nature.

Another member of the cat family found in this Park is the Leopard Cat (*Felis bengalensis*).

Wild Dog (*Cuon javanicus*). These animals are more in evidence recently. The question now arises of maintaining a satisfactory balance between these wild dogs and the ungulates on which they prey. This is all the more important if, as may be the case, the sanctuary conditions in the Park in fact reflect a change in the normal balance.

Other animals present are the Javan Mongoose (*Herpestes javanicus*), the Palm Civet (*Paradoxurus hermaphroditus*), the Little Civet (*Viverricula malaccensis rasse*), the Smooth Otter (*Lutra perspicillata*), the common Hairy-nosed Otter (*Lutra sumatrana*), and the Small-clawed Otter (*Amblyonyx cinerea*).

Of the primates the Grey Gibbon (*Hylobates moloch*, syn. *H. leuciscus*) occurs mostly in the mountainous regions. Also present and more numerous are the Long-tailed Macaque (*Macaca irus*) and the Silvered Leaf Monkey (*Trachypithecus pyrrhus*).

Gnawing mammals include the Pallid Giant Squirrel (*Ratufa bicolor*), the Plantain Squirrel (*Callosciurus notatus*), the Flying Squirrel (*Pteromys nitidus*), meadow mice and rats. Also present are the Flying Lemur (*Cynocephalus variegatus*) and Tree-Shrews (*Tupaia* spp.).

Bats. Flying Foxes (*Pteropus vampyrus*) can be seen at twilight and also many kinds of bats; Short-nosed Fruit Bats (*Cynopterus* spp.), Flat-headed or Club-footed Bats (*Tylonycteris* spp.), and False Vampires (*Megaderma* spp.).

Reptiles. The common reptiles include the Estuarine Crocodile (*Crocodylus porosus*), Common Water Monitor (*Varanus salvator*), Reticulated Python (*Python reticulatus*), vipers, adders and lizards.

Birds. Bird life is very well represented as can be seen from Table 3. The Green Peafowl is not uncommon along the north coast, particularly in the Tjidjungkulon-Tjidaun, Tjikarang and Tjigenter game pastures, but they are rarer further south. Bee-eaters are numerous everywhere and many species of songbirds are both heard and seen on the islands and in the vicinity of the game feeding-grounds. Hornbills with their noisy wing-beats are often spotted in flight or their sonorous vocal cry heard across the country-side. The cliffs along the south-west and west coast, which are almost bare of vegetation, are

packed with terns during the nesting season. The Long-tailed Nightjar inhabits the dune areas of the south coast. Herons, storks, the Indian Darter and Little Cormorant breed at Njiur and Tjitjangkok.

Places of Interest

There are numerous recreational activities in which the visitor may participate; observing wild life, sight-seeing, boating, fishing and so on. Vessels and paths afford many vantage points from which one may enjoy the magnificence of the enormous cliffs and reefs of Tandjung Lajar, the First Point of Java. Other paths lead to important points of interest, such as the Tjigenter, Tjikarang, Tjitjangkok, Djamang, Njiur, Njawan, and Tjidjungkulon-Tjidaun game concentration areas, all of which are located near the shore.

Njiur and Tjitjangkok are centres for breeding herons and storks. The game feeding-grounds of the former are vast plains of grassland with flood-plain and saline lake-shore species of plants represented. The dry places are overgrown with *Imperata cylindrica* grass and tussocks of *Panicum repens* and *Andropogon* sp. The wet plains are profusely covered with *Polygonum longisetum*, *Cyperus* spp. and *Fimbristylis annua*. This grassland is fringed with *Ardisia*, *Neonauclea*, *Hibiscus*, *Glochidion*, *Terminalia* and other trees. These feeding-grounds are occupied by a fairly large stock of deer and about two dozen Bantengs besides many lesser mammals. In about the middle of the trough the drainage culminates in shallow lakelets, moulding a life zone for such birds as the Lesser Adjutant Stork, Milky Stork, White-necked Stork, Grey Heron, Grey Teal, Indian Whistling Duck and Lesser Whistling Duck. It is possible to see the scene at the tops of the trees where the adult Large and Little Egrets, Javanese Pond Herons, Rufous Night Herons, Indian Darters and Little Cormorants are nesting and feeding their chicks.

The feeding-ground of Tjikarang grassland is subject to flooding. In general it may be classed as meagre and infected. However, the scenery itself is very attractive with the occurrence of large clumps of *Corypha* palms. In an afternoon visit in the dry season one is sure to see a variety of game, Bantengs, deer, junglefowl and, most interesting of all, dozens of peafowl lingering about the open palm. Even tiger can be observed at times.

Tjigenter is one of the most attractive game concentration points and the most parklike grassland found in Ujung-Kulon. It is not far away from the camping site of Handeuleum Island. A fair-sized look-out cabin has been completed near Tjigenter-river to enable the

spectators to observe wild life at their convenience. If visitors decide to go up the river by canoe at evening they might meet an odd rhinoceros on the way.

From a faunal point of view, the feeding-grounds of Tjidjungkulon-Tjidaun are the best in the Park. These pastures — situated just opposite Peutjang Island — are particularly favourable to a large game population due to the palms and grassland with interspersed thickets and grassy glades, and the fresh water river the Tjidaun. The grasslands are covered with good species of grass such as *Andropogon aciculatus*, *Ischaemum muticum*, *Isachne miliacea* and *Panicum colonum*. Small tussocks of *Cyperus* spp. and *Fimbristylis* spp. occur on the wet places. Cover vegetation of *Melastoma malabathricum* fringes the edges of these pastures. Foot-marks of rhinoceros can regularly be seen deeply printed in the sand of the broad beach of Tjidjungkulon.

The game-pastures lie on the northern side of the mainland and the prevailing wind is south-easterly during the dry season, so that there is no danger of spectators being given away by scent. Banteng and deer may come down to feed at any time during the day, but the best is generally from about four o'clock in the afternoon.

When considering wild life in Indonesia the heavily wooded character of the country must be borne in mind. Other than some game reserves in east Java, it is only in Ujung-Kulon that the association of the fauna with the artificially made habitats is so far advanced that it is possible to see wild life in such concentrations. The true woodland fauna, however, has always been dispersed and less easily seen.

Table 1. A list of some of the commoner plants growing in the Park.

Locality	Vernacular Name	Scientific Name
(a) Palms in understorey of jungle close to rocky coast in mountainous south-west	Langkap Suwangkung Nibung Wergu Salak	<i>Arenga obtusifolia</i> <i>Caryota furfuracea</i> <i>Oncosperma filamentosa</i> <i>Rhapis flabelliformis</i> <i>Zalacca edulis</i>
(b) Trees of mountain and foothill areas of the west	Dangdeur leuweung Peundeuj Putat Tjerlang Kadungdung leuweung	<i>Gossampinus vuletonii</i> <i>Parkia biglobosa</i> <i>Planchonia validu</i> <i>Pterospermum diversifolium</i> <i>Spondias pinnata</i>
(c) Common epiphytes on trees of mountains and foothills	Paku pandan Anggrek bawang Anggrek bulan	<i>Asplenium nidus</i> <i>Dendrobium crumenatum</i> <i>Phalaenopsis amabilis</i>
(d) Trees of lowland forest in the interior	Djengdjen Lame Handjah Teureup	<i>Albizia lebbeckioides</i> <i>Alstonia scholaris</i> <i>Anthocephalus cadamba</i> <i>Artocarpus elasticus</i>

Tjalingtjing	<i>Averrhoa bilimbi</i>
Gadok	<i>Bischofia javanica</i>
Purut	<i>Calophyllum javanicum</i>
Kananga	<i>Cananga odorata</i>
Kadungdung	<i>Canarium decumanum</i>
Kanari babi	<i>Canarium indicum</i>
Haringin	<i>Cassia timoriensis</i>
Haremeng	<i>Cratoxylon racemosum</i>
Kikandih	<i>Crypteronia paniculata</i>
Segel	<i>Dillenia excelsa</i>
Kitjadung	<i>Diospyros macrophylla</i>
Dadap belendung	<i>Erythrina variegata</i>
Salam	<i>Eugenia polyantha</i>
Kiara	<i>Ficus retusa</i>
Leles	<i>Ficus variegata</i>
Manggu leuweung	<i>Garcinia celebica</i>
Tjeuri	<i>Garcinia dioica</i>
Tangkil	<i>Gnetum gnemon</i>
	<i>G. latifolium</i>
Merbau	<i>Intsia bijuga</i>
Bungur	<i>Lagerstroemia speciosa</i>
Gempol	<i>Nauclera orientalis</i>
Taritih	<i>Parinari corymbosa</i>
Soge	<i>Peltophorum pterocarpus</i>
Sigeung	<i>Pentace polyantha</i>
Kibima	<i>Podocarpus blumei</i>
Leungsir	<i>Pometia pinnata</i>
	<i>Pouteria obovata</i>
Kisereh	<i>Sapium virgatum</i>
Burahol	<i>Stelechocarpus burahol</i>
Kikatjang	<i>Strombosia javanica</i>
Bantjet	<i>Turpinia pomifera</i>
Laban	<i>Vitex pubescens</i>
(c) Vegetation of dunes	<i>Calotropis gigantea</i>
Widuri	<i>Ipomoea pes-caprae</i>
Daun katang	<i>Laportea</i> sp.
Pulus	<i>Pouteria obovata</i>
	<i>Scaevola frutescens</i>
Kaju gabus	<i>Sesuvium portulacastrum</i>
Gelang pasir	<i>Spinifex littoreus</i>
Djukut tiara	<i>Tournefortia argentea</i>
Babakoan	<i>Vigna marina</i>
Tjang laut	
(f) Shore vegetation of Peutjang Bay and sheltered west coast (Barringtonia formation)	<i>Albizia procera</i>
Kihiang	<i>Albizia retusa</i>
Kiambon	<i>Barringtonia speciosa</i>
Butun	<i>Cerbera manghas</i>
Bintaro	<i>Cycas rumphii</i>
Paku hadji	<i>Dillenia aurea</i>
Sempur	<i>Erythrina variegata</i>
Dadap belendung	<i>Eugenia subglauca</i>
Kopo	<i>Gmelina asiatica</i>
Wareng	<i>Hernandia sonora</i>
Bengkak	<i>Intsia bijuga</i>
Merbau	<i>Neonauclea calycina</i>
Tjangjaratan	<i>Microcos tomentosa</i>
Deruwak	<i>Pandanus tectarius</i>
Pandan	<i>Pemphis acidula</i>
Tjentigi	<i>Pongamia pinnata</i>
Kipahang	<i>Radermachera gigantea</i>
Pedali	<i>Sonneratia caseolaris</i>
Pidada	<i>Sophora tomentosa</i>
Kiali	<i>Tournefortia argentea</i>
Babakoan	<i>Wedelia biflora</i>
Kibahu	

(g) Rare species, mainly trees; some are almost extinct	Kikalapa	<i>Ailanthus malabaricus</i>
	Medang	<i>Abarema montana</i>
		<i>Beilschmiedia gemniflora</i>
		<i>Beilschmiedia undulata</i>
		<i>Beilschmiedia reylanica</i>
	Dangdeur	<i>Bombax valetonii</i>
	Degel	<i>Crudia bantamensis</i>
	Palahlar	<i>Dipterocarpus trinervis</i>
	Kaju mutoh	<i>Erythroxylum cuneatum</i>
		<i>Firmiana malayana</i>
	Tjerlang laut	<i>Heritiera percoriacea</i>
		<i>Limonia dubia</i>
		<i>Neesia altissima</i>
	Bidur	<i>Pandanus bidur</i>
	Ipil	<i>Parinari sumatrana</i>
		<i>Pterygota horsfieldii</i>
	Lame	<i>Rauwolfia sumatrana</i>
	Kidamar	<i>Vatica bantamensis</i>
	Kibajawak	<i>Vavaea bantamensis</i>

Table 2. A list of some of the inhabitants of the waters about the Peninsula.

Locality	Common Name	Scientific Name
(a) Lower reaches of the Tjigenter River	Freshwater eels	<i>Anguilla</i> spp.
	Catfish	<i>Clarius batrachus</i>
	Carps	<i>Osteochilus</i> spp.
	Barbs	<i>Puntius</i> spp.
	Minnnows	<i>Rasbora</i> spp.
(b) Brackish water streams of the Tjigenter estuary	Sardine	<i>Amblygaster sirm</i>
	Milkfish	<i>Chanos chanos</i>
	Sting-rays	<i>Dasyatis</i> spp.
	Giant Perch	<i>Lates calcarifer</i>
	Mullet	<i>Liza dussumieri</i>
	Tarpon	<i>Megalops cyprinoides</i>
	Eupotamous Catfish	<i>Mystus</i> sp.
	Skate	<i>Raja</i> spp.
(c) Marine gardens off east coast of Panaitan Island	Anemone Fish	<i>Amphiprion percula</i>
	Anemone	<i>Anemone demoiselle</i>
	Parrot Fish	<i>Callyodon blochii</i>
	Multi-coloured Parrot Fish	<i>Callyodon pulchellus</i>
		<i>Chaesio caeruleus</i>
		<i>C. chrysozona</i>
		<i>C. diagramma</i>
		<i>C. erythrogaster</i>
	Butterfly fishes	<i>Chelmon rostratus</i>
		<i>Pomacanthodes annularis</i>
	Brown Triple-tail	<i>Lobotes surinamensis</i>
	Grunter	<i>Pomadourus</i> spp.
(d) Sheltered waters of Panaitan Channel	Seaweeds, especially	<i>Euchemia</i> spp.
		<i>Gelidiopsis</i> spp.
	Eagle Ray	<i>Aetobatus</i> sp.
	Green Sea Turtle	<i>Chelonia mydas</i>
	Sardines	<i>Clupea</i> spp.
	Porcupine-fish	<i>Diodon hystrix</i>
	Tassel Fish	<i>Eleutheronema tetradactylum</i>
	Reef-cod	<i>Epinephelus tauvina</i>
	Tiger Shark	<i>Galeocarda cuvieri</i>
	Halfbeaks	<i>Hemiramphus</i> spp.
	Sea-bass	<i>Lutjanus</i> spp.
	Devil Ray	<i>Manta</i> or <i>Mobula</i> sp.
	Boxfish	<i>Ostracion cornutus</i>

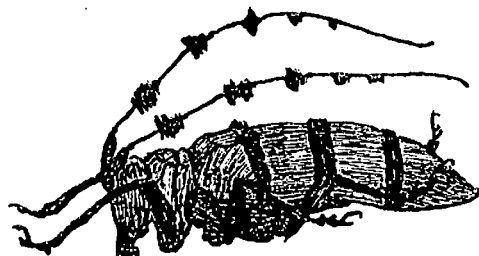
	Lobster	<i>Palaemon lar</i>
	Sawfish	<i>Pristis microdon</i>
	Guitarfish	<i>Rhynchobatus</i> sp.
	Herring	<i>Sardinella fimbriata</i>
	Hammerhead sharks	<i>Sphyrna blochii</i>
		<i>S. zygaena</i>
	Anchovies	<i>Stolephorus</i> spp.
	Scorpion-fish	<i>Synanceia horrida</i>
	Ribbon-fish	<i>Trichiurus haumela</i>
	Garfish	<i>Tylosurus melanotus</i>
(c) Open waters of Panaitan Channel	Dolphin Fish	<i>Coryphaena hippurus</i>
	Barred Spanish Mackerel	<i>Cybium commersoni</i>
	Mackerel Tuna	<i>Euthynnus affinis</i>
	Trevally	<i>Gnathodon speciosus</i>
	Sailfish	<i>Histiophorus gladius</i>
	Spotted Spanish Mackerel	<i>Indocybium guttatum</i>
	Skipjack Tuna	<i>Katsuwonus pelamis</i>
	Yellow-fin Tuna	<i>Kishinoella tonggol</i>
	Barracudas	<i>Neothunnus stosibi</i>
		<i>Sphyrna</i> spp.
	Marlin	<i>Tetrapturus brevirostris</i>
		<i>T. indicus</i>
	Dart	<i>Trachinotus bailloni</i>
	Swordfish	<i>Xiphias gladius</i>

Table 3. A list of some of the birds found in the Park.

Common Name	Scientific Name
PETRELS:	
Swinhoe's Storm Petrel	<i>Oceanodroma monorhis</i>
GANNETS AND BOOBIES:	
Brown Booby	<i>Sula leucogaster</i>
Red-footed Booby	<i>Sula sula</i>
CORMORANTS:	
Little Cormorant	<i>Phalacrocorax pygmaeus niger</i>
DARTERS:	
Indian Darter or Snake Bird	<i>Anhinga anhinga</i>
HERONS AND EGRETS:	
Grey Heron	<i>Ardea cinerea</i>
Little Green Heron	<i>Butorides striatus</i>
Large Egret	<i>Egretta alba</i>
Little Egret	<i>Egretta garzetta</i>
Reef Egret	<i>Egretta sacra</i>
Javanese Pond Heron	<i>Ardeola speciosa</i>
Rufous Night Heron	<i>Nycticorax caledonicus</i>
STORKS:	
White-necked Stork	<i>Dissoura episcopus</i>
Milky Stork	<i>Ibis cinereus</i>
Lesser Adjutant Stork	<i>Leptoptilos javanicus</i>
DUCKS:	
Grey Teal	<i>Anas gibberifrons</i>
Lesser Whistling Duck	<i>Dendrocygna arcuata</i>
Indian Whistling Duck	<i>Dendrocygna javanica</i>
HAWKS AND EAGLES:	
Black Kite	<i>Milvus migrans</i>
Brahminy Kite	<i>Haliaeetus indus intermedius</i>
White-bellied Sea Eagle	<i>Haliaeetus leucogaster</i>
Grey-headed Fishing Eagle	<i>Ichthyophaga ichthyaeetus</i>
Crested Serpent Eagle	<i>Spilornis cheela</i>
Osprey	<i>Pandion haliaeetus</i>
Peregrine Falcon	<i>Falco peregrinus</i>

GAME BIRDS:	
Bustard Quail	<i>Turnix javanica</i>
Red Jungle Fowl	<i>Gallus gallus bankica</i>
Green Peafowl	<i>Pavo muticus</i>
COOTS, RAILS AND CRAKES:	
Chinese Banded Crane	<i>Porzana paykulli</i>
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>
JACANAS:	
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>
PLOVERS:	
American Golden Plover	<i>Pluvialis dominica</i>
Grey Plover	<i>Pluvialis squatarola</i>
CURLEWS AND SANDPIPERS:	
Curlews	<i>Numenius</i> spp.
Common Sandpiper	<i>Tringa hypoleucos</i>
Redshank	<i>Tringa totanus</i>
STONE PLOVERS:	
Reef Thick-knee	<i>Esacus magnirostris</i>
TERNS AND NODDIES:	
Bridled Tern	<i>Sterna anaethetus</i>
Greater Crested Tern	<i>Sterna bergii</i>
Roseate Tern	<i>Sterna dougalli</i>
Black-naped Tern	<i>Sterna sumatrana</i>
Philippine Noddy	<i>Anous stolidus</i>
PIGEONS AND DOVES:	
Green Imperial Pigeon	<i>Ducula aenea</i>
Wedge-tailed Pigeon	<i>Sphenurus korthalsi</i>
Yellow-bellied Pintail Green Pigeon	<i>Sphenurus oxyurus</i>
Pink-necked Green Pigeon	<i>Treron vernans</i>
Bronze-winged Dove	<i>Chalcophaps indica</i>
Barred Ground Dove	<i>Geopelia striata</i>
Red Cuckoo-dove	<i>Macropygia phasianella</i>
Pink-necked Fruit Dove	<i>Ptilinopus porphyreus</i>
CUCKOOS:	
several true cuckoos	<i>Cuculus</i> spp.
Fan-tailed Cuckoo	<i>Cacomantis variolosus</i>
Koel	<i>Eudynamis scolopacea</i>
Lesser Coucal	<i>Centropus bengalensis</i>
OWLS:	
Malaysian Fish Owl	<i>Bubo ketupu</i>
Collared Scops Owl	<i>Otus bakkamoena</i>
NIGHTJARS:	
Long-tailed Nightjar	<i>Caprimulgus macrurus</i>
SWIFTS:	
House Swift	<i>Apus affinis</i>
White-rumped Spinetailed Swift	<i>Chaetura leucopygialis</i>
White-bellied Swiftlet	<i>Collocalia esculenta</i>
Grey-rumped Swiftlet	<i>Collocalia francica</i>
Thunberg's Swiftlet	<i>Collocalia fuciphaga</i>
Brown-rumped Swiftlet	<i>Collocalia vestita</i>
KINGFISHERS:	
Forest Kingfisher	<i>Ceyx erithacus</i>
White-collared Kingfisher	<i>Halcyon chloris</i>
Stork-billed Kingfisher	<i>Pelargopsis capensis</i>
BEE-EATERS:	
Blue-throated Bee-eater	<i>Merops viridis</i>
HORNHILLS:	
Wreathed Hornbill	<i>Aceros undulatus</i>
Northern Pied Hornbill	<i>Anthracoceros malabaricus</i>
Rhinoceros Hornbill	<i>Buceros rhinoceros</i>

BARBETS:	
Little Barbet	<i>Megalaima australis</i>
Coppersmith Barbet	<i>Megalaima haemacephala</i>
Black-banded Barbet	<i>Megalaima javensis</i>
Dull Barbet	<i>Megalaima zeylanica lineata</i>
PITTA:	
Banded Pitta	<i>Pitta guajana</i>
BULBULS:	
Black-headed Bulbul	<i>Pycnonotus atriceps</i>
Golden-vented Bulbul	<i>Pycnonotus cafer aurigaster</i>
Yellow-vented Bulbul	<i>Pycnonotus goiavier analis</i>
Yellow-crowned Bulbul	<i>Pycnonotus zeylanicus</i>
LORAS AND LEAFBIRDS:	
Common Iora	<i>Aegithina tiphia scapularis</i>
Green Leafbirds	<i>Chloropsis</i> spp.
ROBINS:	
Shortwings	<i>Brachypteryx</i> spp.
White-rumped Sharma	<i>Copsychus malabaricus</i>
BABLERS:	
Lesser Red-headed Babbler	<i>Malacopteron cinereum</i>
Black-capped Jungle Babbler	<i>Pellorneum capistratum</i>
Horsfield's Jungle Babbler	<i>Trichastoma sepiarium</i>
WARBLERS:	
Fantail Warbler	<i>Cisticola exilis</i>
FLYCATCHERS:	
Hill Blue Flycatcher	<i>Muscicapa banyumas</i>
Pied Fantail Flycatcher	<i>Rhipidura javanica</i>
Paradise Flycatcher	<i>Terpsiphone paradisi</i>
FLOWERPECKERS:	
Scarlet-headed Flowerpecker	<i>Dicaeum trochileum</i>
SUNBIRDS:	
Yellow-breasted Sunbird	<i>Nectarinia jugularis</i>
MYNAHS:	
Grackle	<i>Gracula religiosa</i>
DRONGOS:	
Grey Drongo	<i>Dicrurus leucophaeus</i>
Hair-crested Drongo	<i>Dicrurus hottentottus</i>
Chinese Black Drongo	<i>Dicrurus macrocerus</i>
ORIOLES:	
Black-naped Oriole	<i>Oriolus chinensis</i>



MOUNT KINABALU, NORTH BORNEO

By

E. J. H. BERWICK*

Tom Harrison tells a good story of Kinabalu, recalling a time when he was flying over Borneo in an American Liberator: "I was along with a crew one day and the pilot put it:— "Gee, say—that goddam peak can't be only 18,000 feet something. Why, it's as high as Everest." Americans have their own way of putting the world to rights. They solved this bit by overprinting all their airmaps, cancelling out the properly surveyed height of 13,455 feet, with a big black stamp which said, flatly, 19,000 feet." That may be overdoing it, but Kinabalu remains the highest mountain between Burma and New Guinea, and twice the height of most of the mountains in Malaya.

It is one of the most inspiring mountains I have ever seen and it is difficult to do it justice in a short article. It is part of the Crocker range which rises to 5,000-6,000 feet but it stands out sheer from it, a block of granite, ten to twelve miles long as seen from most directions. And it commands the whole of North Borneo; it can be seen clearly from Labuan, Keningau, Kota Belud (Plate XXV) and Kudat; one has only to go up in a plane a few hundred feet at Sandakan and Tawau and there it is in the distance like a lump of sugar; by cutting a few branches off a tree in Jesselton, I have got a wonderful view of it from my office desk. On the North and East sides of the mountain there is primary forest in abundance but on the South and West the local Dusuns have felled much of it to cultivate dry padi and there are large patches of secondary jungle. Above 6,000 feet the trees are smaller and at 8,000-10,000 there is moss forest such as you get on the top of Gunong Tahan in Malaya; above this, much is bare rock, but there are still many bushes and shrubs about and within fifty feet of the top there are *Potentillas* snuggling in the crevices between the rocks.

The plants are a delight. I have been fortunate enough to go up with two botanists, luckily on two separate trips; Betty Molesworth Allen darted about the place catching ferns while Ted Allen (no relation) made a bee-line for *Aeschynanthus splendens* and *A. magnifolia*. I have always been fascinated by the Rhododendrons and the Pitcher plants, both of which occur in abundance. As far as records go, the first person to climb Kinabalu was Hugh Low, Government Secretary in Labuan, who went up in March 1851, and the highest point on the mountain, Low's Peak, is named after him. He saw for the first time the huge *Nepenthes rajah*, the bowl of which can hold up to four pints of water. Spencer

* Founder member, Honorary Secretary/Treasurer 1948-1950.