

[No. 86]

JOURNAL  
of the  
Straits Branch  
of the  
Royal Asiatic Society

NOVEMBER 1922.

SINGAPORE :  
PRINTED AT THE METHODIST PUBLISHING HOUSE,  
1922.



**A general account of the Geology of the Malay Peninsula and the surrounding countries, including Burma, the Shan States, Yunnan, Indo-China, Siam, Sumatra, Java, Borneo and other Islands of the Dutch East Indies.**

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*Introduction.*

This account is a digest of the writings of many geologists. It would occupy too much space for me to detail all of them, but most of my information was derived from the following:— La Touche on the Northern Shan States, Middlemiss on the Southern Shan States and Karenni, Coggin Brown on Burma and Yunnan, Résultats de la mission géologique et minière du Yunnan méridional, Sept. 1903—Jan. 1904, Situation de l'Indo-Chine de 1902-1907, Scrivenor on the Malay Peninsula, Molengraaf on Borneo, Van Cappelle on the West Coast of Sumatra, Wing Easton on West Borneo, Verbeek on the Moluccas, Amboyna, Banka, and Billiton, and various authors in the *Jaarboek van het Mijnevezen in Nederlandsch Oost-Indië*.

The area dealt with includes Burma, the Shan States, Yunnan, Siam, Indo-China, the Malay Peninsula, Sumatra, Java, Borneo, and the intermediate islands. Unfortunately, the most satisfactory method of presenting a general idea of the geology, namely to prepare a geological map and to base the discussion on it, is not available, because the geological structure of most of the countries has not been mapped. In spite of this, enough is known, even in the least known regions, such as Yunnan, and parts of Indo-China, to compare the rock formations of any particular period in the different countries, and from the present features it is possible to trace the effects of certain wide-spread earth-movements which have affected all the countries in the area, and to compare them with the effects on neighbouring lands.

Large gaps occur in our knowledge of the area, so blanks must exist in our comparison of the structure of the different countries. It must be admitted, however, that these gaps are not always the result of imperfect knowledge of the countries in question, for, in more than one case, geologists are at a loss to account for phenomena in countries where the structure is

known in considerable detail. For example, no explanation has yet been given of the recently extinct volcanoes which occur in a belt of Tertiary beds in Burma, between the Irrawaddy and the Shan States. If they were situated near the great fault-plane which passes from north to south many miles to the east, their presence could easily be explained, but their occurrence in Tertiary beds, so far from this great fault, is a mystery.

### **Earth Movements.**

The geographical and geological features of the area were established as the result of folding-movements of at least three different periods, but the earth-movement in the late Mesozoic period (Hercynian), and the Tertiary earth-movement, which affected Europe, North Africa, and the other parts of Asia, have had a more widespread effect on our area than the earliest one. Folding movements before the Mesozoic period took place on a large scale only in the northern part of the area, Indo China and probably Yunnan, although the presence of fragments of granite in volcanic ashes and tuffs in Singapore, probably older than the Mesozoic granite of the Malay Peninsula, and the Palaeozoic granite, older than Permian, alluded to by Verbeek in describing the geology of Amboyna, are indications that this earth-movement took place to some extent also in the Malay Peninsula and East Indies.

The influence of the later movements is very marked in all of the countries under consideration, and successive parallel mountain folds, arranged roughly *en échelon*, can be traced through the area, beginning in the northwest, near Tibet, at the eastern end of the huge Himalayan mountain range. To these folds Suess gave the name "Coulisses," and, talking of our area, he says, "Then, in the Shan States of Burma, several of the coulisses which approach from the north and northeast disappear beneath a karst-like plateau of Palaeozoic limestone, which is folded and owes its tabular form to denudation. Fresh coulisses make their appearance in the south and form the Malay Peninsula. . . . "In this way the mighty swell of the Altaides in Thibet subsides and is dispersed. The whole continent becomes lower. Many coulisses disappear. Only a few long branches are continued on the east into the cordillera of Annam: on the west, always giving rise to fresh coulisses, through the Malay Peninsula, and still further, to Java and beyond."

The most prominent coulisse in the western part of the area is the Naga-Arakan-Andaman-Nicobar-Barissan fold, with its axis extending from Upper Burma in the northwest, running south through the Andaman Islands, and the Nicobar Islands, and turning east through Sumatra and Java. Another important coulisse can be traced as the Main Range in the Malay Peninsula, through Singkep and Banka, and the result of the earth-movement which caused this particular fold was the intrusion of the Mesozoic granite, accompanied by the mineralisation from which originated the



world's richest tin deposits. A coulisse between these two begins in Siam, and runs in a direction slightly west of south into Upper Perak whence it extends as a granite mountain range passing near Taiping to the Dindings, and, according to a Dutch geologist, along the east coast of Sumatra, masked by more recent beds, passing through Billiton in an easterly direction, and turning northeast through the centre of Borneo, and up through the Philippines out of our area. Another important fold or coulisse is represented by the Annam cordillera, perhaps continued south into either the Anamba Islands or the Natuna Islands, and thence into Borneo.

The Mesozoic folding was more intense, in the greater part of the area, than that which affected the Tertiary rocks, and this is shown by the fact that the Tertiary rocks often have gentle undulating folds, whereas the Palaeozoic rocks, upon which they unconformably rest, are vertical or highly inclined. However, the Tertiary beds were subjected to intense earth-movements in some districts, as, for example, in Eastern Yunnan, and after folds had been denuded away, great faults cut across the region, at about the end of the Pliocene, probably giving rise to the lakes in which the late Tertiary fresh-water beds were laid down.

In Western Yunnan there were strong folding movements after the Permo-Carboniferous and before the upper Permian period.

### ***Stratigraphical Sequence.***

The mountain folds which were described above have been eroded, with the result that there are now exposed strata of all ages, since the period before the dawn of life on the earth. All the countries of our area, south of Burma, formed part of the Palaeozoic continent of Gondwanaland, which remained as a permanent land surface from pre-Cambrian times until Devonian or Carboniferous, and no fossiliferous rocks of pre-Carboniferous age are known, except in the north. Earth-movements and aerial denudation of the later rocks, in Yunnan and the Shan States of Burma, have brought these old rocks to the surface.

### ***Pre-Cambrian.***

Many Dutch geologists have expressed the opinion that the "oudeschiefer" (old schist or old slate) formation of the East Indies is, in part, pre-Cambrian, though they admit that where it is not overlain by Carboniferous limestone it may be of Mesozoic age. Some of these geologists have correlated the "oudeschiefer" with the schist series of the Malay Peninsula, the greater part, and perhaps the whole, of which is of Rhaetic age and later, so it appears that there are good grounds for not yet accepting any part of the "oudeschiefer" as pre-Cambrian. In this account we will postpone a description of this "old schist" formation until we are describing the younger Palaeozoic and the Mesozoic formations.

In Yunnan the succession of pre-Cambrian rocks is as shewn below.

\* \* \* \* Unconformity \* \* \* \*

2. Kao Liang system. Phyllites, quartzites, slates, and an occasional calcareous horizon. In part pre-Cambrian and part Cambrian.

\* \* \* \* Unconformity \* \* \* \*

1. A basal mass of gneisses and schists underlying all recognised groups.

The basal gneisses and schists are so metamorphosed that it is impossible to determine their original character, except that a small proportion are recognised as metamorphosed sediments. They are intruded by granites which are relatively young, though some of them may be pre-Cambrian.

In the Northern Shan States there is a large development of Archaean gneisses resembling those of South Western Yunnan in that they possess a similar N.E.—S.W. strike. The general mass are of intermediate chemical composition, and they consist of biotite gneisses, which are often remarkably rich in garnets, and which are interfoliated with more acid rocks, including pegmatites and graphitic granites. The orthoclase of these last rocks is not infrequently converted into moonstone; often it is more completely altered into epidote, muscovite, and kaolin. In Nyounggonk district these acid rocks contain pink and blue tourmaline (rubellite and indicolite), and it is probably from rocks of this class that the fine gem rubellites are derived.

With the gneisses there occur certain subordinate rocks of basic and sometimes ultra-basic composition, including pyroxene gneisses and pyroxene granulites, and with these rocks, and particularly with the ultra-basic types, certain remarkable crystalline limestones, containing rubies and spinels, are most intimately associated.

A series of mica schists occurs to the south of the ruby mines area, and they seem to pass upwards into the Chaung Magyi series, so being either pre-Cambrian or Cambrian.

The Kao Liang system in Yunnan is certainly in part pre-Cambrian, and partly Cambrian. It occurs as bands, running from north to south, which widen somewhat as they are traced to the south. In the Northern Shan States, south of Yunnan, the pre-Cambrian is represented by the Chaung Magyi system of phyllites and quartzites, and here it differs from that of Yunnan in containing no calcareous bands. La Touche thinks, on lithological grounds, that the Chaung Magyi series may be Cambrian, for it shows only slight signs of alteration, but a careful search of many outcrops revealed no traces of fossils, and as the rocks had been deposited, consolidated, thrown into folds and dislocated, and final-

ly subjected to denudation, before the accumulation upon them of strata containing Ordovician fossils, the stratigraphical evidence points to pre-Cambrian age.

The Bawdwin volcanic rocks, a series of tuffs and ashes interstratified with layers of true rhyolites, occurs in some localities between the Chaung Magyi rocks and the lowest of the fossiliferous series (Ordovician). At Bawdwin the tuffs and ashes have been worked for silver for hundreds of years, and very large quantities of silver-bearing lead ores have been extracted. The mineralisation of the rocks occurred as a result of a great overthrust, in the neighbourhood of which they are intensely crushed and shattered.

### **Ordovician.**

Fossiliferous beds of this age are known in three localities, in Western Yunnan, at Pu-piao, where they consist of sandy shales or mudstones with bands of impure, hard, nodular limestone, at Shih-tien, earthy limestones and slates, and at La-mông, calcareous slates and mudstones. The fossils show a marked resemblance to those of the Northern Shan States of Burma, as is to be expected from the geographical proximity of the areas. In the Northern Shan States the lowest beds of the Ordovician (lower Naung-kangvis), on the west side of the Plateau, consist largely of limestones, while to the east of the river Nam-Tu they are represented by a soft sandy marl. The next highest beds (the upper Naung-kangvis) are represented, in the west, by intensely crushed shales in which all traces of the original bedding planes have been lost, and east of the Goktek gorge, (river Nam-Tu), by bright purple clay stones. These strata, after the Plateau Limestone to be described later, are the most important formation occurring in the Shan States.

The Ordovician faunas of Eastern Yunnan and Tongking are of a different type from those of Western Yunnan and the Shan States.

### **Silurian.**

In Western Yunnan fossiliferous slates of Silurian age occur on Shih-tien Hill and a few miles further to the south, and in East Yunnan Silurian shales pass conformably into the lower Devonian. In some parts of Tongking, the Silurian and Devonian are more or less non-fossiliferous owing to metamorphism.

In the Northern Shan States there are thin bands of graptolitic shales containing the only fossils of undoubtedly Llandovery age that have yet been found in the East. They are overlain by sandstones and conglomerates, followed conformably by sandy marls with layers of a very hard and compact limestone. The fauna is similar to that of a corresponding age in Northern and Western Europe, and absolutely distinct from the Himalayan fauna of the same period, as has been the case for all the underlying formations. With the close of the Silurian epoch, the barrier which separated

the Burmese and Himalayan life-provinces in Ordovician times was removed, changes in the distribution of land and sea brought a true middle Devonian fauna into Burma, and later a widespread transgression of the Permo-Carboniferous ocean took place over those tracts of Asia lying to the north of Gondwanaland. These changes are heralded by a series of limestones and shales, perhaps passing conformably upwards into the Plateau Limestone of Devonian age, and containing upper Silurian fossils characteristic of the Bohemian or Hercynian type, whereas, as described above, the rock formations before this contained fossils allied to Northern and Western European types.

### *Devonian.*

The shallow-water beds of the upper Silurian period near the northern coast of Gondwanaland, now known in the Northern Shan States, and the deeper-water graptolitic shales of Yunnan further from the shore, were succeeded by a uniform thick deposit of dolomitic limestone, which forms a great area of plateau land, extending from Yunnan into the Southern Shan States, and probably continuous with the limestones in which the guano caves of Moulemein are situated. It extends an unknown distance in an easterly direction, covering a wide area in China. On the west, in the Northern Shan States, it extends to the edge of the Irrawaddy alluvium, but to the north and south of this it is separated from the alluvium by a strip of Archaean rocks. In several places its thickness can be shown to be over 5000 ft. It is remarkably homogeneous, and it is sandy to the touch and granular, although it is very pure, and not at all siliceous in reality. It has a brecciated and intensely crushed appearance, perhaps due to the great earth-movements at the close of the Mesozoic, and perhaps to sinking of the rock into solution-cavities. It is non-fossiliferous, except at one place in the Northern Shan States, called Padaukpin, not more than one hundred square yards in area, where a rich middle Devonian fauna was found, with predominating Western European types, and at one or two places in the south and north of Yunnan, where there is a close resemblance to the Padaukpin type. It is unexpected to find this type of fauna, because, as mentioned above, the life in the north of our area changed in upper Silurian times from the Western European type to that of America and Bohemia. However, the fossils cannot be regarded as necessarily typical of the Plateau limestones, on account of their extremely local occurrence.

In Yunnan and China the Devonian limestones are more bituminous and shaley than in the Shan States and Malay Peninsula. In East Yunnan pure limestones are the exception, and in Indo-China the pre-Carboniferous beds are all sandy, suggesting that the sea of that period was more shallow and less open towards the north and northeast, and the fact that the Carboniferous lime-

stone of Yunnan, Indo China, and China resembles the limestone of the Shan States suggests that, with the close of the Devonian period, the submergence advanced northwards.

### ***Carboniferous and Permian.***

In Indo-China and Cochin-China there was an unconformity between the shallow-water Devonian rocks and the succeeding Carboniferous limestones. The lower horizons of the middle Carboniferous limestones of Eastern Yunnan are sandy, and of a shallow-water type, which passes upwards into a sandy coal-bearing series with subordinate limestones, and then, in the western part of East Yunnan, into deep-water limestones. In the eastern area earth-movements took place, resulting in folds running in a northeast-southwest direction, and the denudation of these folds resulted in sandy sediments during the middle Carboniferous period, while the limestones interbedded with basic lavas were laid down during local periods of stability.

Then slow submergence took place, and enormous thicknesses (about 5000 ft.) of massive limestones now cover the area. In the eastern area there is a distinct break in the stratigraphical sequence, between the lower part of the middle Carboniferous and the upper Carboniferous limestones, owing to the folding movements just described, but the conditions during the greater part of the upper Carboniferous period were uniform deep water, resulting in an uninterrupted series of limestones, which are responsible for the unusual scenery of Eastern Yunnan at the present day. In the case of the folded series of middle Carboniferous sands and interbedded limestones the sandy beds have been denuded away easily, leaving the limestone standing out as prominent scarps, but the upper Carboniferous series of limestones, without sandy bands, has given rise to the Karst type of scenery, so called from the Karst district in Austria, dry, and almost waterless, with pot-holes and underground streams.

These Carboniferous limestones are of a very widespread nature, occurring in practically the whole of Indo-China, the Malay Peninsula, Sumatra, and in the islands of Rotti and Timor in the Archipelago, where they pass conformably up into the Permian. Permian-Carboniferous limestones are not very strongly developed in the Northern Shan States, for they have been greatly denuded there, and merely form a band lying on the Plateau Limestone. They differ from the latter in not being so intensely crushed.

In the Malay Peninsula they form very prominent groups of hills, with vertical cliffs up to 2000 ft., separated by intervening expanses of flat land with an irregular surface of pinnacles and solution-hollows, covered and smoothed over with alluvium. The type of scenery here displayed is quite different from the karstic type of Yunnan and the Shan States, although the limestone in the Peninsula too is very uniformly free from sandy bands. The difference is due to the fact that, in the Peninsula, the limestone

has been converted into coarsely crystalline marble, by pressure and heat consequent on the intrusion of the Main Range granite in Mesozoic times, and, except for occasional fissures, the limestone mass is impervious to water. Caves, characteristic also of the Permo-Carboniferous limestone (and not of the Plateau Limestone) of Yunnan and the Shan States, are common in the Peninsula, and here they frequently contain phosphate deposits derived either from bats' guano, or from a concentration of the phosphatic minerals originally contained in the limestone now dissolved to form the caves. Guano deposits are known also in the limestone caves of Moulmein in Lower Burma. The wide depressions in the plateau country of the Shan States, due to subsidence after solution of the underlying limestone, and to the crushed limestone being unable to sustain its own weight, are not met with in the Malay Peninsula, but there was one well-known case of a village sinking several feet owing to the water being pumped from an underground cave.

The series has been subjected to intense folding, although this is not evident from an examination of the numerous cliff-exposures, except in certain occasional instances, for, in nearly all cases, the structure has been completely obliterated by the deposition of surface stalactitic deposits. One exception is Gunong Ginting, near Ipoh, where several distinct overfolds are seen, only a few hundred yards apart, with the axes of folding dipping in quite different directions, and numerous readings taken in limestone pinnacles, where the cover of alluvium has been removed in mining operations, also give very different dips. These folds were accompanied by faults, as would be expected in such a massive rock, and, in addition, a series of vertical faults was formed when the Main Range granite was intruded, independent of the folding, but due to the unequal subsidence or raising of different blocks of limestone and overlying Triassic and Jurassic rocks in the molten magma. Some of these vertical faults must have been of great magnitude, for schists, almost certainly of Triassic or Jurassic age, are found faulted down against the foot of a cliff, hundreds of feet high, of Permo-Carboniferous limestone.

The above description applies particularly to the limestone of the western States of the Malay Peninsula; the calcareous series of Raub rocks east of the Main Range is similar, except that here a shaley facies is strongly developed. It is probable that the absence of shales in the west is due in part to the intense metamorphism which the series has undergone, and that certain black streaks and bands which penetrate the limestone represent their remains. There is no evidence to show that the limestone hills in the east have been formed by faulting.

The fossils of the Shan States are similar types to those of the Salt Range of India, and they resemble a few fossils from the islands of Rotti and Timor in the Malay Archipelago. The fossils of the Malay Peninsula are found only in a few localities, as, in

most places, all traces of organism have been destroyed by the recrystallisation of the limestone, and specimens of homotaxial value have been found only in Pahang, east of the Main Range, and in Patalung, Siam. The Pahang fossils yield types ranging from lower Carboniferous to Permian, whereas the Siamese fossils have been described by one author as lower Carboniferous and by another as Permo-Carboniferous. South of a line drawn east and west through Kajang in South Selangor, the limestones and shales seem to pass into an unfossiliferous shaley series, devoid of sandy beds, and non-calcareous, except for calcareous shales and shaley limestones occurring in the Muar Valley.

In Sumatra Carboniferous limestones occur, forming mountains nearly 2000 feet high, crystalline and containing black nodular chert. There are also other Palaeozoic limestones with very scanty fossils whose age has not yet been determined. Probably they too are Carboniferous to Permian.

In the Malay Peninsula and Archipelago the Carboniferous and Permo-Carboniferous limestones just described are the oldest rocks known, with the following exceptions, (i) a granite in Ambon is said to be Palaeozoic, and the granite fragments in volcanic ash near Singapore may be of the same age, (ii) a series of shales and fine-grained quartzites underlying limestone in the Langkawi Islands, perhaps corresponding with the Mergui series of shales and arenaceous rocks in Burma, underlying the Moulmein Limestone. The *Oudeschiefer* formation of the Archipelago is believed to be of Permian to Jurassic age, in spite of the fact that many geologists in the past have considered it to be Palaeozoic or even pre-Cambrian.

Folding movements, which took place towards the close of the period of formation of this very widespread series of limestones, were heralded and accompanied by a big show of volcanic activity, not, however, displayed in all parts of the area. It is evident in Western Yunnan, where the greater part of the Permo-Carboniferous series is often made up of tuff and ash beds, intercalated with thick andesitic, doleritic, and basaltic lava flows; in Eastern Yunnan, where basic lavas are found interbedded with the upper part of the middle Carboniferous limestone; in the Malay Peninsula, particularly in Pahang, east of the Main Range, where it is represented by acid, intermediate, and occasionally basic, lavas, dykes, and tuffs; near Singapore; in South Sumatra, where a series similar to that in the Malay Peninsula occurs; and in Borneo.

In Pahang, volcanic activity began probably in the Carboniferous period and continued intermittently through the greater part of the Triassic, although, as land conditions followed the deposition of the limestone, a good deal of the series has been denuded away. Evidence of the persistence of volcanic activity, during the shallow-water and land conditions, is furnished by a remarkable deposit of boulders of volcanic rocks, dyke rocks lavas and tuffs, embedded

in volcanic tuff. It is supposed to be a beach deposit formed of boulders of volcanic rocks which were exposed along the shore line, and cemented by volcanic ashes which were all the time being ejected by neighbouring volcanoes. Tuffs and lavas are interbedded with the succeeding shallow-water series of quartzites, shales, and schists, of Triassic age, both in Pahang, and, on the western flanks of the Main Range, in South Selangor.

In Central Borneo volcanic rocks of an andesitic type are interbedded with rocks which are probably of Jurassic age, and certain amphibolites there are variously held to be pre-Cambrian crystalline slates, or eruptive rocks, belonging to this Jurassic period, which have been uraltised and altered by mountain-pressure.

Permo-Carboniferous and Mesozoic volcanic rocks, including serpentine and andesite, with corresponding tuffs and breccias, and occasionally dolerites, are very widespread throughout the smaller islands of the Archipelago, though only in a few of the places, such as at Letti, where volcanic breccias are overlain by fossiliferous Permian limestone, is it possible to be sure whether they are pre-Permian or Mesozoic. In Java there are volcanic rocks known to be pre-Eocene, but nothing more definite can be stated as to their age.

### ***Triassic and Rhaetic.***

Towards the middle of the Permian period the emergence of the land from the sea began in Eastern Yunnan, and the Permo-Carboniferous limestone masses were attacked by denudation, so much so, that, in some places, they were completely removed. The shore line retreated back far to the south and west. The thick Red Beds of upper Permian and perhaps lower Triassic age, were then deposited in Yunnan, the lower part of the series in East Yunnan consisting of conglomerates, and passing up into sandstones and shales, often containing salt and gypsum. Widespread basaltic and andesitic eruptions occurred at the close of the Permian. Triassic beds are preserved in East Yunnan only where they were faulted down, and so preserved from the severe erosion to which the country was subjected at the close of the Pliocene period. The beds are alternations of marine and land deposits, passing into deep-sea deposits at the top. After the deposition of the Red beds, no more marine sediments were formed, and Yunnan has been a land surface from the upper Triassic period to the present day.

The Shan States were dry land during the greater part of the Permian and the whole of the Triassic period, and no deposition took place, except for beach deposits derived from the denudation of the Plateau limestone and the underlying rocks. In the Malay Peninsula there was probably a land-period after the formation of the Permo-Carboniferous limestone, followed by shallow-water conditions, during which the sea was dotted with lagoons, probably formed by coral-reefs, enclosing clear water suitable for the growth



of radiolaria, the silica necessary for their growth being supplied by submarine volcanic emanations. Periodical slight changes in the sea level took place, which admitted detrital matter from the neighbouring land. These conditions produced the series of radiolarian cherts, interbedded with quartzites, sandstones, and grits, which cover a large area in Kedah, South Selangor, Negri Sembilan, and Pahang, in the Malay Peninsula, and in the island of Billiton. Radiolarian rocks probably of this period are common also in Borneo, Sumatra, Celebes, Timor, Rotti, and many other islands. In the Malay Peninsula the series, in some places, is built up of deposits of chert perhaps hundreds of feet in thickness, and thicker deposits of sandy beds, while in other places the series consists of alternating bands of chert and grit or quartzite, varying from several feet to only one inch in thickness. All the beds are contorted into sharp folds, and the rocks, particularly the shales and shaley grits, have been metamorphosed by earth-movements. In Perak this series occurs only in the extreme north, where it is a continuation of the extensive development in Kedah. Further south it probably corresponds roughly with a series of shallow-water quartzites and shales, which covers the greater part of the area for thirty miles north of Taiping, and which disappears, west of the Semanggol range, under Recent alluvium. The Triassic fossil *Estheriella* was found in these shales at Semanggol.

Certain boulder clays in the Kinta Valley, which are older than the Mesozoic granite, have been provisionally allotted to the Permo-Triassic period. They are very interesting because they are the source of the greatest part of the tin deposits of the Kinta Valley. For a long time they were spoken of as alluvial deposits, until geological investigation showed that they are undoubtedly older than the granite. It is possible that they have suffered considerable alteration since the granite was intruded, and one geologist holds that they were derived from quartzites and shales which had been mineralised by the Mesozoic granite. He says that the underlying rock, known in many cases to be limestone, has been partially dissolved by underground water, and that the quartzites and shales were let down into the resulting cavity, with a consequent destruction of the bedding. The result is a clay containing a large proportion of quartz sand with varying amounts of tin-ore. That the clays are older than the granite is seen by the following facts.

- (1) Near the granite the clays are often rich in tourmaline streaks and patches, and in quartz, whereas further from the junction the tourmaline and quartz are less evident.
- (2) The clays near the granite are often richer in tin than those further away.

The tourmaline patches and quartz are derived from veins of quartz and tourmaline which traversed the clays before they became jumbled up by the solution of the underlying limestone.

The chert series of South Selangor, Negri Sembilan and Pahang is overlain by grits, quartzites, and shales, the lower portion of which includes beds of conglomerate, in which the pebbles consist in the main of quartz, quartzite, radiolarian chert, and rocks of the Pahang Volcanic series. It is probable that this quartzite and shale series is separated by a considerable unconformity from the underlying cherts and quartzites, and that strong folding movements, which affected the latter, had ceased when the shallow-water conditions of the Rhaetic and Jurassic periods had set in.

In Yunnan and parts of Indo-China there were land conditions from the upper Triassic to the present day, but the Shan sea basin, described below, extended into Yunnan, so some Rhaetic beds were formed resembling the Napeng beds of the Shan States. The Napeng beds are fossiliferous clays, sometimes calcareous, laid down on the irregular surface of the Plateau Limestone. The fossils they contain are sometimes ill-developed, owing to the fact that they lived in cups in the limestone not in free communication with the open sea, while in other places the fossils are well grown. The number of new species shows that great changes in the distribution of sea and land had taken place between the deposition of the Permian-Carboniferous and the Napeng beds, and the basin of the Shan sea was isolated from the main ocean. It extended into Yunnan, as mentioned above, and into the Malay Peninsula, where characteristic Rhaetic fossils have been found in three or four places east of the Main Range, possibly also in Singapore Island, and certainly on the west coast of Sumatra. In French Indo-China the Rhaetic period was represented by shallow-water beds also, including the coal beds of Tien Yen Lang Then.

### *Jurassic.*

As already mentioned, there is an extensive series of shallow-water and estuarine shales and quartzites, of Jurassic age, in the Malay Peninsula. The shales have usually been converted into phyllites by the earth-movements which took place at the time of the intrusion of the Mesozoic granite masses, and they show sharp folds and faults. The shales are locally carbonaceous, and certain intrusions are known, consisting of about forty or fifty per cent carbon and the remainder siliceous material, which probably represent coal seams which were altered by the granite.

In Burma, the Mergui series of slates, argillites, clay-schists, and silicified tuffs, with subordinate quartzites and conglomerates, have been regarded as corresponding with the shallow-water Jurassic series of quartzites and shales further south in the Peninsula. However, as the Officiating Director of the Geological Survey of India in his General Report for 1920 (page 26), describes the series as underlying the Moulmein Limestone formation, it now appears that the rocks are of Carboniferous or pre-Carboniferous age, and that they correspond with the similar series

underlying the Carboniferous or Permo-Carboniferous limestone of the Langkawi Islands.

In the Dutch East Indies the pre-Cretaceous beds younger than the Permo-Carboniferous limestone are thought to be represented by the "old schist formation," already mentioned in the description of the pre-Cambrian rocks. As stated in that description, many authors have relegated it, largely on the ground of the lack of fossils, to the pre-Cambrian, and others to the Palaeozoic period, but it bears a strong resemblance to the altered shales and quartzites of the Malay Peninsula, and it was probably deposited at the same time. If this is so, the radiolarian chert beds and the Rhaetic of the Archipelago are part of the "old schist formation," or the "Malayan Series" as it was called by Volz.

In Sarawak a limestone containing middle Oolite fossils is known.

In the Northern Shan States of Burma, the Napeng beds of Rhaetic age pass conformably into the succeeding Nanyau series, which consists of basal conglomerates, overlain by sandstones, shales, and clays, with very subordinate carbonaceous layers. In the greater part of the north of our area, continental conditions were prevailing (as in the Rhaetic period), and the old land surface to the northeast was gradually rising, with a consequent advance southwards of the shore line, so that the sandy sediment from it was deposited as the Nanyau series. This series of beds once covered a wide area, but denudation has entirely removed it from the western portion of the Shan Plateau, and the portions still remaining only owe their preservation to the fact that they were faulted down, and so protected from the severe erosion in post-Jurassic times. The rocks are thrown into regular folds striking from N.N.E. to S.S.W.

### ***Cretaceous.***

It was probably during the Cretaceous period that the granite which runs from the Southern Shan States, through Tavoy and Mergui to the Malay States, to Singapore, and the islands of Banka and Billiton, was intruded, bringing with it tin and tungsten minerals. Dutch authors think that the granites and hornblende-granites of the Archipelago were intruded at different periods, and the granite of Amboyna is held to be older than the Permian. It may be of the same age as the granite from which the fragments in the Pahang Volcanic series ash of Singapore were derived.

Granitic rocks in Eastern Yunnan contain cassiterite, and the tin deposits of Ko-chin have been derived from them. Two French geologists agree in assigning to them a Palaeozoic age, and, if they are right, this is very interesting, as showing that the tin deposits of the area which we are considering were not all brought by granite of one period. Many of the couliisses, mentioned in the earlier part of this account, came into being as a result of the intrusion of the Mesozoic granite.

In Sumatra the granite is mostly syenitic, and whether it was intruded in Palaeozoic or Mesozoic times is not yet known. In the Malay Peninsula there are two distinct facies, a tin-bearing granite, and a hornblende-granite with associated syenite, the latter being found in the Benom Range. This hornblende-granite agrees with the hornblende-granites found in Sumatra, and elsewhere in the Archipelago, and there is no evidence of it being younger or older than the tin-bearing granite.

Sedimentary strata of Cretaceous age are known in Borneo, Java, Sumatra, and smaller islands of the Dutch East Indies, but all of the northern part of the area was a land surface subject to erosion, and no deposition was taking place there.

In Borneo certain strongly folded shallow-water sandstones and marls contain foraminifera, of which one species *Orbitolina*, makes it certain that the deposits are Cretaceous (Cenomanian). In Java there is a series of serpentinitous, mica-, chloritic, and clay-schists containing limestone bands, which, in one place, contained *Orbitolina*, the fossil characteristic of the Cretaceous beds in Borneo. These limestones are nearly always granular and crystalline, without fossils. The schists are traversed by thin quartz-veins, and they are penetrated also by dykes of quartz-porphry, gabbro and dolerite.

Cretaceous rocks are found in the Arakan Yoma of Burma, and along the same line of strike, to the south, in the Andaman Islands. Marine limestones occur at the base, while the upper part of the series consists of shallow-water and estuarine deposits. Besides the granite intrusion, masses of serpentines of Cretaceous age are known, and these are penetrated by veins of the semi-precious mineral jadeite.

### ***Tertiary.***

In our area, as in Europe, there is a blank between the upper Cretaceous and the overlying Eocene deposits, which is marked by an abrupt change in the nature of the fauna, rather than by a sharply marked stratigraphical break. The igneous activity in Cretaceous times was the forerunner of earth-movements which continued during Tertiary times, affecting both the lower and upper Tertiary, although they were much stronger in the north, and in the Andaman Islands, than in the Malay Peninsula and in the East Indies.

In the Northern Shan States there is no trace of the marine Tertiary rocks which are so well developed in the plains of Lower and Upper Burma, so it is clear that, when the Tertiary sea extended over what is now the valley of the Irrawaddy, the Shan Plateau had already been raised above its waters.

#### ***Tertiary of Burma.***

In Burma the Tertiary beds are represented by the following series:

Upper Tertiary	Irrawaddy system of fresh-water beds.
Middle Tertiary (lower Miocene and Oligocene)	Pegu system of marine beds.
* * *	* Unconformity * * *
Lower Tertiary (Eocene)	consisting of nummulitic limestones underlain by a shaley series containing interbedded seams of coal.
* * *	* Unconformity * * *

Cretaceous beds passing down into the Triassic.

The Tertiary coals of Burma are nearly all confined to the lower Tertiary or Eocene, being almost invariably associated with characteristic beds of nummulitic limestone. The series is about 1200 feet in thickness. Usually the coals are bright and non-laminated and they contain a large proportion of volatile matter. They are extremely friable and quickly break up under exposure. They do not cake, and they contain only a small proportion of ash.

In Tennasserim there are several localities where the coal has been reported on, and, in some cases, the seams have been shown to be of no practical value, because the seams are too small, or because of the poor quality of the coal. In Henzada district an attempt was made to exploit the coal, but the rocks are highly disturbed, (the general dip is about 60°), and transport and labour difficulties prevented operations. At Thayetmyo a mine was opened many years ago, in spite of the fact that the beds were nearly vertical, so making mining very difficult, but the two original seams gradually merged into one, and then died out, after only a little coal had been taken out, so operations were abandoned.

In Arakan district similar coal seams are found, which, on account of their highly disturbed nature, are not likely to provide large supplies, even for local use. In Shwebo district a company opened up extensive mines at Letkoben which worked for thirteen years with an annual output of 10,000 to 15,000 tons until the year 1904, when the workable coal became exhausted.

Near the Upper Chindwin River, coal seams are quite strongly developed, and, in the Nantahin-Peluswa area, of twenty five square miles, it is calculated that there are 210 million tons of workable coal. Near Pinlebu, a village twenty five miles north-west of Wuntho, there are promising coal seams of Miocene age, dipping at a low angle.

The Pegu system attains a thickness of 12,000 feet. It is important as containing the petroliferous beds which yield all the petroleum of Burma. It is marine throughout.

Pegu system	{	Kama clays	{	Fossiliferous blue clays and sandy beds. The main oil-bearing formation of Burma.
		Upper Prome series		{
	{	Lower Prome series		
		Sitsayan shales	{	Unfossiliferous shales, resting unconformably on Eocene nummulitic limestone.

The outcrop of Kama clays extends along the Irrawaddy Basin, and on it are situated the oil fields of Yenangyaung, Singu, Yenangyat, Minbu, and various smaller fields. The Petroleum, being lighter than water, has been imprisoned along the axes of the anticlines, wherever a layer of impermeable rock has formed a roof to prevent it from escaping, and bores are put down along the crests of the folds to tap it. Gases have also collected, and the mud volcanoes of the Arakan coast and at Minbu owe their origin to the escape of such gases along fissures.

The Kama clays are overlain by the Irrawaddy system of fluviatile deposits, attaining a thickness of 20,000 feet, which were once known as the "fossil-wood group" owing to the abundance of drift-wood contained in them. Emergence of the land took place in the north of our area sooner than in the south, and the retreat of the shore line from north to south began at the end of the Pegu period. In the north the Irrawaddy rocks are all fresh-water beds, whereas in the south, as in western Prome, the lower part of the Irrawaddy system includes some marine beds. Detailed work by oil geologists shows that in some districts there is considerable unconformity between the two series.

In the plain of Irrawaddy beds, east of the Irrawaddy River and in the southwest of Yunnan, strong volcanic activity took place, building up the great volcanoes of Popa and Hawshuenshan. As already mentioned, these eruptions are many miles to the west of the boundary-fault between the Tertiary rocks of the Irrawaddy Plain and the older rocks of the Shan Plateau. Popa is fifty miles northeast of the Yenangyaung oil field.

The basalt dyke at Loi Ling, in the Northern Shan States, is a Tertiary volcano, but here there was a much smaller display than in the Irrawaddy Plain and in Southwest Yunnan.

The fresh-water Tertiary beds of the Northern Shan States are silts and soft sandy rocks with seams of brown lignitic coal, filling lake basins. These basins in the older rocks are the result of faults which occurred towards the close of the Tertiary period, and the lacustrine beds in them are either of late Tertiary or Pleistocene age. They have been found in six places, the most

important being at Namma, where the area is fifteen miles long and three and a half miles wide. The coal seams are confined to the lower portion of the series. The dip averages  $20^{\circ}$ , but it varies considerably locally, perhaps due to underground solution of the limestone floor. The inferiority of the coal, and the distance of the field from the railway, make it doubtful if it is worth while to start mining operations.

Similar lacustrine deposits occur in different parts of Indo China.

#### *Tertiary of Malay Peninsula.*

In the Malay Peninsula Tertiary beds with interbedded coal seams are known in three localities, at Rantau Panjang (in Selangor), at Enggor (in Perak), and in Perlis.

At Rantau Panjang, the coal seams are being profitably worked, the fuel finding a ready sale, for use in the tin mines and railways of the Peninsula. The thickness of the beds is not known with certainty. It appears that coal seams, interbedded with sands and shales, form the lower portion of the series, and that they are overlain by several hundred feet of shales which contain a little oil, not enough to pay for distillation. According to the usual procedure, this coal should be classed as a lignite. Its percentage of fixed carbon is less, and its percentage of moisture is higher, than that of some cheap Indian coals, and these are unfavourable properties, but its low percentage of ash, and the fact that it does not clinker, are properties in its favour.

The percentage of moisture in the Rantau Panjang coal (about 20 %) indicates an upper Miocene age. The dips in these Miocene beds range from  $10^{\circ}$  to  $12^{\circ}$ .

When this occurrence was the only Tertiary deposit that had been prospected in the Peninsula, it was thought to be a lake or swamp deposit, similar to those in the Northern Shan States, although it was then also held to be probable that its present small area, (which amounts to only a few square miles), does not represent the whole of the original area of deposition, but that much of it has been removed by denudation. However, the discovery of over 90 feet of calcareous shale, at Enggor, lying under Tertiary sands, shales, (some of which are themselves calcareous), and interbedded coal seams, suggests that the Enggor deposits, at any rate, are probably not lacustrine deposits, but marine, and that the deposits might have been comparable in extent with those of Sumatra and Burma if the Peninsula had not been subjected to severe erosion in post-Miocene times.

In Perlis the area and thickness of the coal bearing beds is unproved. A bore was made to a depth of 205 feet and was then stopped in June 1921, owing to lack of casing. Sands, clays and

sandy clays were first encountered, followed by running sands with traces of coal from 125 feet to 205 feet below the surface. The coal at Enggor and at Perlis is similar in composition to that at Rantau Panjang, and is probably of the same age.

There are still considerable areas in the Peninsula, east of the Main Range, as yet unexplored, and it is possible that in these areas there may be extensive tracts of country covered with marine and fresh-water beds, equivalent to those of the Irrawaddy plains. Such tracts provide the only possibility of mineral oil being found in payable quantities in the Malay Peninsula. Unfortunately there is no evidence that any such beds exist.

### *Tertiary of Sumatra.*

In Sumatra there is a considerable area of Tertiary beds, both near the coast and in subsided areas inland. Near the east coast they are concealed by Pleistocene deposits. There is very little fossil evidence to go by, but the percentage of water in the interbedded brown coals gives information as to the age of the beds. The Ombilin coal field near Padang, which has been worked by the Government for many years, is of Eocene age, judging by the low percentage of moisture, and more Eocene coals occur at Gunong Tusam in North Sumatra. The younger Tertiaries in North Sumatra usually contain no coal at all, but the commonest coal occurrences in the south are in the upper Miocene beds (younger Tertiary), as at Palembang. In the Boekit Asam Field, where the estimated amount of workable coal is forty million tons, the seams are 6 to 7, 3 to 6, and 5 to 6 metres thick. This upper Miocene series with coal seams is recognised also in Djambi though the seams are diminishing in number and thickness, so it appears that the Djambi Province forms a transition from Palembang to Deli and Atjeh in the north.

No unconformity has been found in the coastal regions affecting the later Tertiaries, except that between Tertiary and very young Pleistocene strata. In the Andaman Islands, on the other hand, the Eocene is highly folded, and the Miocene, unconformable on the Eocene, is only slightly folded, showing that the main younger folding was pre-Miocene. A similar unconformity exists between the Eocene and Miocene inland in Sumatra. No information about this system of folding can be obtained from the small exposures of Tertiary (Miocene) rocks in the Malay Peninsula, except that the small dips indicate that no intense folding has occurred after Miocene times. In the Mesozoic granite there are sheared areas which are probably the result of Tertiary movements.

In the Tertiary-Quaternary period in Sumatra, there was considerable volcanic activity, generally of an andesitic type, accompanied by subordinate intrusions of quartz-porphry, porphyrite, gabbro, picrite, basalt and diorite. The upper Miocene lignite beds of Palembang have been subjected to the heat developed by the intrusion of such rocks, and their economic value has thereby been increased.



### *Tertiary of Java.*

The greater part of Java is covered with Tertiary, Quaternary, and Recent deposits, and all the divisions of the Tertiary seem to be represented in some part, or other, of the island. The Eocene beds include compact clays, marls, and the widespread nummulitic limestones common to this period all over the world. In west Java, at Bantam, dolerites and diorites are intercalated with them and at Nanggoulan, besides basalts and olivine dolerites, lignite beds are found interbedded with the sediments.

The lower Miocene are often very much folded, and may be even vertical. Some of the beds were laid down under water, and the andesitic lava flows of this period were sometimes laid down under the sea, and sometimes on dry land.

The middle Miocene beds are less strongly developed than the lower, and they are typically marly rocks. Pyroxene-andesites are interbedded with the series in Bantam and in Preanger, but not in east or central Java. The upper Miocene beds are essentially calcareous, sometimes consisting of hard, crystalline limestone, and sometimes being soft and marly. They are markedly dolomitic. No volcanic rocks are found in this part of the Miocene series. The middle and upper Miocene beds are often folded, but usually less strongly so than the lower Miocene.

There have been reports of rich gold deposits being present in Java, but there is no foundation for them. A little gold is present in the pyrites of certain Miocene clays which have been altered by andesitic flows in the Residency of Krawang, but the commercial value of the deposit is negligible.

Eocene deposits in Bantam contain a good coal, but they are so folded, and the position of the one metre seam is made so irregular by these foldings, that it would not pay to work. There are about two million tons of fuel available here. Lignites of upper Tertiary age are known in Nanggoulan and in Bantam. Oil is obtained from Miocene beds in many localities, perhaps formed from the foraminiferal remains which they contain.

### *Tertiary of Borneo.*

In Borneo, in the west, no Tertiary strata are found, this period being represented only by andesitic lava flows, whereas, in the southern, northern, and central parts of the island, Tertiary deposits are well developed. In Central Borneo boulders of Eocene age containing nummulites are contained in valley gravels, but these nummulitic Eocene beds are not met with *in situ*. A sandstone formation of estuarine origin, with interbedded coal seams in Central Borneo, is placed in the older Tertiary series. Generally the strata are horizontal, or only slightly tilted, but locally they are tilted and strongly disturbed and sometimes even vertical. Two seams of coal, two metres thick are being worked in Eocene beds on the island of Poeloe Laoet, off the southeast coast of Borneo. The field is estimated to contain eighty million tons of workable coal.

### ***Recent Deposits.***

They include many deposits of great economic value, such as the ruby gravels of the Mogok Valley, and the alluvial tin-deposits of Burma, the Malay Peninsula, and the islands of Banka and Billiton. Where they are devoid of minerals they usually provide very good agricultural land, and the clay beds which they contain are used for brick-making. In Borneo the old gravelly river-deposits generally contain gold, especially in west Borneo, but, although they are worked by the Chinese in certain rich spots, it has not yet been proved that they are worth working on a large scale. In the Malay Peninsula it is fairly certain that the amount of gold in similar deposits does not pay to work by European methods.

In the Malay Peninsula and in Sumatra there is evidence that the sea had a level, in recent times, higher than it has at present. In Sumatra it is indicated by raised sea-beaches, some more than 300 feet above sea-level, and also by high gravel terraces in river-basins close to the present sea shore. On the Peninsula, in Perlis, marine shells were found in a cave nearly 300 feet above sea-level, but they may have been carried there by human agency. However, biological and geological evidence combined indicate that the Peninsula was in Recent times connected to the Archipelago, so that Sumatra, Java, Borneo, and the Peninsula were united to form a continent. The sea level then rose until the Peninsula was a group of islands, and subsequent recession of the sea took place later which is believed to be still in progress at the present day. Molengraaf does not agree that Borneo has been affected by this cycle.

Under the heading of Recent deposits should be classed the deposits now being laid down by the active volcanoes in Sumatra, Java, and various islands. Barren Island, east of the Andamans, was last observed to be in eruption in 1789, and since then it has been dormant. In Borneo the Muller Mountains are built up of rhyolitic rocks, perhaps of Tertiary or of sub-Recent times, though it is also possible that they may be so old as the Cretaceous period.

It is interesting to observe that there is a close connection between the position of volcanoes, both active and recently extinct, and the lines of folding.

# The Early History

## OF

### Singapore, Johore & Malacca;

AN OUTLINE OF A PAPER BY G. P. ROUFFAER.

BY R. O. WINSTEDT, D. LITT. (OXON.)

In the *Bijdragen tot de Taal- Land- en Volkenkunde van Nederlandsch-Indië* (Deel 77), 1921, G. P. Rouffaer, who first identified *tanah Melayu* as the basin of the Jambi, has published a startling paper on the geography of the Malaya Peninsula. It is probable that his surmises as to the situation of Langkasuka and several other theories will not be accepted, but his paper should be in the hands of every serious student of Peninsular history.

Rouffaer brushes aside G. Ferrand's recent theory (*Journal Asiatique*, 1918) that Malacca existed, as the unreliable Gaspar Correa wrote, for 700 years before the coming of the Portuguese, under the name *Malayu*, Marco Polo's *Malayur*. *Malayur* is only a Tamil form of *Malayu*, the original home of the Malays in Jambi. Would Fra Odorigo van Pordenone and Ibn Batutah have been silent over the existence of such an early Malacca? Would the *Nagarakretagama* (1365 A.D.), recording the conquests of Hayam Wuruk, the famous ruler of Majapahit, have then referred to the Peninsula simply as Pahang?

On the other hand it is hardly likely that in 1403 Malacca "belonged to Siam," as the Ming annals say; from 1405-1413 was a Hindu state under Permaisura and becoming Muslim under Gujerati influence in 1414 suddenly won trade and empire. The *Pararaton* mentions two Malay princesses captured at the fall of Jambi and one Tuhan Wuruju (= Bongau), a *dewa-putera* (i.e. son of a Ksatriya *dewa*) of *Pamelekahan* or "Malacca lands," a captive in Majapahit in 1328 A.D. Again Gerini tells how Siamese laws enacted in 1360 A.D. cite as tributary to Siam "Ujong Tanah, *Malaka*, *Malayu*, *Worawari*" (Researches, 1909, pp. 531-2). Probably Barros (1553 A.D.) and the *Sêjarah Melayu* are right in saying that Malacca existed as early as the middle of the XIIIth century A.D. and became a commercial centre about 1400 A.D. owing to immigration of Malays from Singapore or Tumasik, the "sea-country."

Barros (1553), the most reliable of Portuguese chroniclers, relates how one Sangesinga (? Sangyang Singha) ruler of Singapore was murdered by his guest Permaisura, who was a fugitive from *East Java* owing to disturbances on the death of Pararisa (= O. J. Bhra Wicesa, who ascended the throne of Majapahit in

1389 A.D. and ruled some 40 years). The king of Siam attacked the usurper who fled to Pago on the Muar. His whilom followers, the *Cellates* (= *Orang Laut*) opened Bertam near Malacca.

D'Albuquerque (1557) relates how, when Malacca was founded, a Bhatara ruled *Tumapel* in Java and the Permaisura fled to *Singapore*, murdered its chief and ruled it for five years, until the ruler of Patani, brother of the murdered chief, drove him to Muar, whence he went to Bintao (Bertam) and founded Malacca. The reference to *Tumapel* is valuable.

The *Sĕjarah Mĕlayu* (Chapters 5 and 10) give the Malay tradition of Singapore's relationship with Java. The end of chapter 10 refers to its destruction by Hayam Wuruk after 1338 A.D. when according to the *Pararaton* Gajadmada took his famous oath not to eat *palapa* until 10 countries including Palembang Pahang and Tumasik had been subjected to Majapahit and before 1365 A.D. when the *Nagarakretagama* tells how all the islands and states in the east and west of the Malay Archipelago had been subdued. The lettering on the fragment of the Singapore monolith, now in Raffles' Museum, is said by Dr. Krom to resemble Majapahit characters and to antedate somewhat 1360 A.D. Dr. Krom is studying a cast of the fragment.

How old is Singapore? P'Tsing mentions in 690 A.D. a state "Mo-ho-hsin" at the south of the Peninsula = *Mahasin* "the great Salt state," which Rouffaer identifies with a Malay land "Hasin" recorded in a Majapahit inscription of 1034 A.D. to have been conquered by Erlangga, a prince in East Java (born 991 A.D.—reigned 1019-1042 A.D.). Probably it is Ibn Khordadbeh's "Schalahit" (*Sĕlat*). According to Rouffaer it was Tasik = Temasik (of the 14th century) = old Samudra = Singapura (of the 15th cent.), while on the mainland was Wura-wari (old Jav. = "clear water") from the 10th to 11th centuries = Ganggayu *i.e.* Gangga ayu (O. J. = "fresh water") before 1450 but still known at the time of the *Sĕjarah Mĕlayu* (1612 A.D.) = Johor of the XVIth century. An inscription of 1006 A.D. in Sanskrit and old Javanese, in the Calcutta Museum, tells how Wurawari had brought disaster to Java, and the Siamese laws of 1360 A.D. count it among places subject to Siam. In the Tanjore inscription of Rajendracola I (1030 A.D.), Kadaram = Kedah, Srivijayam = Palembang, Malayur = Jambi, and Rouffaer suggests Mayirudingam = Great Yirudingam = Chao Ju Kua's Great Ji-lo-t'ing = Mahasin = Singapore; Ilangacogam = Langkasuka = Ganggayu = Wurawari; Ma-Ppappalam = ? Pahang or Penang, and Mevilimbangam "the walled" may be the Dindings or Klang. Langkasuka = Chao Ju Kua's Ling-ya-ssi-kia (1225 A.D.) = the *Nagarakretagama's* Langkasuka (1365) = I-Tsing's Lang-ka-su (692) = langgasu or Langga of the Chinese annals of the Liang dynasty (502-556) = ? the Lanka of the *Ramayana*. The Calcutta inscription speaks of Luaram (= *lwah* O. J. "river, water" and *ram* Skt. = *rama* "sweet, charming") as its capital.

An inscription of 924 A.D. of prince Sri Wijayaloka of East Java speaks of Ujong Galoh = Ujong Putri = Jong Galoh or the Hujung Galoh of Erlangga's inscription. *Galoh* 'jewel' = *jauhar* (Arabic) = *Johore*, and the name fits the honorific *Ratna-parayana* of the old Javanese *Ramayana* and the "Golden Chersonese" of Ptolemy, whose Sabana will correspond with the XVIth century Straits of Sabang and be the Karimuhs, Hasin or Galoh. Was it from the Biduanda Kallang of Kallang river that the mysterious Kalangs, prisoners of war mentioned in old Javanese romance, came? Among the Solo regalia (*upachara*) are a Snake (*Ardawalike*) and a Roc (*Garuda*); among the Jokja regalia only the Snake. These must be symbols of the victory of Erlangga's as Vishnu's *Garuda* over the 'Snake' princes of Wurawari, Hasin, Langka, just as of the other regalia an Elephant symbolizes Patih Gajahmada, a Cock Hayam Wuruk and a Buffalo-Calf Java's victory over Menangke(r)bau and so on. To this day a *Garuda* is the symbol of Hindu Bali (first conquered by Java in Erlangga's time), while the Muslim mosques and art of Java took a Snake as the symbol of Islam's victory over Hinduism.

Apparently about 1135 A.D. Daha brought Galoh nearly to ruin. A Panji tale (Bij. Kon. Inst. 2, VII, 1863) speaks of a Klana Tunjong-Seta, prince of the island Kenchana, (= "gold" and ? the "Golden Chersonese"), who desiring to win a Daha princess, Dewi Angreni, (or Raden Galoh), attacked Java and failed, slain by Pangeran Klana Jayang Sari, *alias* Raden Panji Kuda Wanengpati, a prince of Jenggala in the service of the ruler of Kediri. The people of Kenchana and three princes were carried captive to Java. Perhaps the *Sĕjarah Mĕlayu* (chapters 14 and 19) show that Middle Java and Ujong Tanah once came to grips and that Malacca, or really Galoh, had to do with Daha in the Panji period.

Though the early Portuguese knew nothing of Galoh, Ganggayu or Langka, the *Sĕjarah Mĕlayu* (chapter 1) connects Ganggayu with Johore and interprets the word to mean "a treasure-house of jewels," which fits both *galoh* and *jauhar*.

Between 1275 when Kertanagara of Tumapel sent his ill-fated expedition against Palembang and Marco Polo's visit in 1292, apparently Kertanagara had destroyed Mahasin *i.e.* old Singapore (*Sĕjarah Mĕlayu*, chapter 5). But Marco Polo mentions "Pentam" or Bintan, whither perhaps one band of fugitives had fled, and the *Sĕjarah Mĕlayu* records how the founders of the new town Tumasik came from Bintan. The Javanese name, Tumasik, may have been given by men of Tumapel, who, after Majapahit triumphed over their country in 1293 owing to the absence of Tumapel's forces in Palembang, stayed in Sumatra and the Malay islands. Probably Kertanagara's attack on Hasin drove sea Malays (*wong asin*) not only to Bintan but to Muar and "Malacca lands," opposite which were the "Five Islands" that in early Chinese charts take the place of Malacca. Majapahit's attack about 1360

A.D. must have sent yet a further band in the same direction. From 1328 down to the death of Hayam Wuruk, the great Majapahit conqueror, in 1389, the Malacca Straits would be under Javanese influence and only later under the Siamese suzerainty of which Chinese annals and Siamese laws speak.

Such in briefest outline is Rouffaer's paper, which fills 174 pages and is to be continued further.

Though it has no direct bearing on this paper, it is interesting to note that Raffles' Museum has not only a neolithic celt from Singapore but also several from Kota Tinggi in Johore: all made from local stone.



## **Burong olok-olok ( jester-bird ) is the Brown Gannet.**

BY A. W. HAMILTON.

Burong olok-olok is mentioned in Wilkinson's Dictionary as an unidentified bird; but in reality the bird is not such a jest as its Malayan name would seem to imply, and it has been identified for me kindly by Mr. H. C. Robinson, as the Brown Gannet or *Sula sula* (Linn.).

The brown gannet or olok-olok as it is called in Kedah is a dark plumaged sea bird with webbed feet, solitary specimens of which are usually met with at sea off the coast of Kedah in company with a flock of gulls.

## A Malay Pantheist Charm.

BY R. O. WINSTEDT, D. LITT. (OXON.)

According to the Shi'ites Ali, the *baginda* 'Ali of Malay charms, was the repository of Islamic mystical knowledge. And there is a story how a great prince, who had been defeated by a mightier, asked him: "Teach me the charms which the Apostle of God taught you." It is certain that this was a request which the first Malay converts to Islam were always making to the early Indian missionaries. And the charms the missionaries taught them were held to be esoteric, like the *mantra* of the Brahmins and the secrets of Sufism. The Shi'ite heresies and the pantheism, orthodox and heterodox, to be detected in many Malay charms await closer study at any rate by English scholars. "The utterances put into the mouths of the eight or nine principal saints of Java betoken a rash mystic pantheism," says Snouck Hurgronje. "This same heretical mysticism found some opponents and many strong supporters in Acheen in the sixteenth and seventeenth centuries. The book of the "Perfect Man," al-Jili's *Insaan'l-Kamil*, was much studied in early days in Java and left its mark on the bizarre contents of numerous native tracts. Allah is the one, indivisible Being, exalted above time and space. Multiplicity is appearance. Only God exists." A full description of al-Jili's book can be read in Nicholson's "Studies in Islamic Mysticism" (Cambridge, 1921) or in Shaikh Muhammad Iqbal's "The Development of Metaphysics in Persia" (London, 1908). "Such mysticism" continues Snouck Hurgronje, "is found also in Arabian lands but only in small circles of the initiated, as half secret doctrines of the Sufis, cautiously concealed on account of the hunt of official theologians for heresy and of the suspicious fanaticism of the vulgar. In the East Indies, however, it formed woof and warp not only of learned speculation but of popular belief. Tracts with drawings and tables were used in the endeavour to realize the idea of the Absolute. The four elements, the four winds, the four righteous Khalifs, the four founders of the schools of law, the four sorts of attributes of God in dogma, the four grades of progress in mysticism, the four extremities of the human body and many other sets of four were for popular mysticism revelations of the one indivisible self of man; through the names of Muhammad and Allah, each in Arabic spelt with four letters, were symbolized the One Being. 'Who knows himself, knows his Lord and he who knows his Lord has knowledge of himself,' said these mystics." ("Arabie en Oost-Indie," Leiden, 1907). A *puwang*'s charm to call back to memory the medium in Kelantan's *main putëri*, for example, invokes

'Balang Abubakar, 'balang Umar,  
 'Balang U'thman, 'balang Ali!  
*Jaga sa-kali!*  
*Angin shari'at, roma dĕngan kulit!*  
*Angin 'itikad, daging dĕngan darah!*  
*Angin tarikat, urat dĕngan tulang!*  
*Angin ma'rifat, nyawa dĕngan bĕneh!*  
*Angin ĕmpat di-dalam, ĕmpat di-luar,*  
*Ēmpat di-kanan, ĕmpat di-kiri,*  
*Ēmpat di-bawah, ĕmpat di-atas,*  
*Jaga kĕluar*  
*Di-pintu sir, pintu 'itikad, pintu chinta, pintu rasa.*

Dr. Gimlette has collected and is printing the full charm in a new edition of his "Malay Poisons." I quote the extract to illustrate the *pawang's* use of the mystic four.

Snouck Hurgronje's book on "The Achehnese," D. A. Rinkes' "Abdoerraoef van Singkel" (Friesland, 1909), B. J. O. Schrieke's "Het Boek van Bonang" and H. Kraemer's "Een Javaansche primbon uit de zestiende eeuw" (Leiden, 1921) should all be in the hands of the student of Malayan pantheism.

The Malay magician has a strange pedigree: first, animist, then Hindu and lastly, as Sufi mystic, the unconscious inheritor of Gnostic and Neo-Platonic doctrines. Brahminical *mantra*, to which even the Gods are subject, perhaps prepared his mind for the audacities of the Sufi. I will take one instance from Skeat's "Malay Magic" (pp. 587-588):—

*"Jibrail, Mikail, Israfil, 'Azrail;  
 Ye are four but with me five!  
 I sit on the seat of God!  
 I lean against the pillar of God's throne."*

Is this a misconception or wilful corruption of al-Jih's description of the Perfect Man:—"he furnishes from himself an antitype to everything in existence—his heart stands over against the Pen, his soul over against the Guarded Tablet, his nature over against the elements. He stands over against the angels with his good thoughts." Another of Skeat's *pawang* (p. 581) speaks of "a white learned Shaikh who leans against the pillar of the Throne, who knows the Guarded Tablet, who writes down the Creed," (and, I suppose, of Muhammad in the phrase "the Sovereign Jewel who dwells above the Throne, controlling all the children of Adam.")

In this paper I translate a charm obtained in an East coast State of the Malay Peninsula: a promise to its possessor forbids me to divulge its home exactly. It was copied by me from a begrimed book probably a century old and transcribed according to the colophon from a still older manuscript:—

"A chapter to explain the charm called the Fortress of the Unity of God, practised by Maklab Setam. Whosoever would practise it should recite the *fatihah* first and give a present to its owner.



"A beginning should be made on Thursday night and the charm should be continued until the night of the following Thursday.

"It should be recited four times a night with a sincere vowing of the heart to unity with Allah and the vision of Him implanted in one's heart, until His Being permeates one and one has faith: 'I am lost in the universal and absolute Essence of God;' and one is lost to self and one's self becomes absolute and universal too:—

"In the name of God the Merciful the Compassionate. Oh God! grant peace to our lord Muhammad and the household of Muhammad who watcheth over my self and my friends and all my children and all the contents of my house and my property and the possessions of my hands with a sevenfold fortress from the fortress of God Most High: its roof—'There is no God but God,' and my wall 'Muhammad the Apostle of God,' and my key 'the might of God,' which may not be opened for ever save with His permission. Muhammad is like man and unlike man; he is like a chrysolite among stones.

"Now the import of the term 'fortress' is that we know that we come from not-being and to not-being shall return. For there is nothing evidently save the Being of God. And of a surety the Being of God never parts from His absolute essence, which carries out all His will, according to His word: 'His desire is accomplished by Himself and goes forth to no other than Himself save to not-being.'

"The intention of the term self is 'spirit,' one of the attributes of the knowledge of God Most High, which parts not from His essence and it becomes an objectified idea and is called man. Now the spirit is distinct and determined. Always the spirit yearns towards God.

"The intention of 'the house' is the body. The body is the place of the spirit and so the veritable place that reveals the Real God according to the saying of the Prophet, on whom be the peace of God: 'Whoever knows himself, knows his Lord.' The house was built of itself and though it will pass away, yet He whose house it is is the Reality who with His absolute essence is eternal.

"The intention of our 'property' is the liver and heart and lungs and gall and all that God Most High has created: according to His word:—'There is no strength in any one save the strength of Allah, lord of all the worlds both as regards things revealed and things hidden.'

"The intention of our 'possessions' is the ten senses, firstly the outward and secondly the inner. The outward are five: the sight of the eyes, the hearing of the ears, the taste of the tongue, the smelling of the nose and the touch of the hand. The inner also are five: consciousness, faith, insight, perception and judgment.

"The intention of the sevenfold 'fortress' is the creation by God Most High of man with seven attributes: life, knowledge,

power, will, hearing, sight and speech. And seven parts of the body must be bowed to God in prayer: the forehead, the palms of the hands, the knees and the toes of the feet.

"The intention of the 'key' is because we have utter trust and union by surrendering ourselves to God Most High, according to His word: 'Hold yourselves fast to the cord of God which breaks not neither is there concealment of His will from mystical knowledge;' as said the Prophet on whom be God's peace:—'Nothing at all moves save by permission of Allah.' For we cannot behold aught if the cord break and it cannot break save by the will of God Most High, and there is no other can break it.

"And the intention of the 'key' is Muhammad Apostle of God for God is utterly hidden; none other save himself knoweth Him, for He cherisheth His glory. And the Reality of God Most High was revealed to the spirit of Muhammad our Prophet and from that Spirit God Most High created all this universe, and all the attributes of His secret wisdom were revealed; and so it is that Muhammad is called the 'key,' because he opened the treasure-house that was hidden, according to His word:—'I opened that which was closed.'

"And the intention of the protection of God is according to His word: 'God Most High is with thee wheresoever thou art,' according to His word: 'God is nearer to thee than the muscles of thy neck.'

"And the intention of 'roof' is the power of God to cover any of His servants with mercy according to His will, so that he be locked away from all enemies and danger in this world and the next, neither shall the lock be opened by genie or man save with the permission of God Most High."

Was it some such charm as this that Sultan Ahmad of old Malacca was expecting to learn from the Makhdum, whom he took on his elephant into battle against the Portuguese and who cried clutching the howdah with both hands, "Sultan! This is no place to study the Unity of God. Let us return." (*Sējarah Mēlayu*. Chapter 34). In chapter 20 of the *Sējarah Mēlayu* we have a reference to a Meccan, Maulana Abu Ishak a mystic (*fahan padū 'ilmu tasawwuf*) practising austerities, the author of a work the *Dar al-mathlum*, who despatched a pupil Abu Bakar to Malacca to teach the doctrine of Essence and Attributes and Works contained in his book. Sultan Mansur Shah got a Pasai pundit to translate it. All the notabilities of Malacca became pupils of the Meccan and even the Kathi sat at his feet after he had seen the newcomer with a halo of light about him. Then Sultan Mansur Shah offered a present of gold and two female slaves to any Pasai theologian who could solve the problems whether those in heaven and those in hell remain in their respective places for ever. A Pasai pundit replied openly that they did, quoting the authority of the Koran. But the Sultan of Pasai summoned him, hinted that an embassy could not

have come from Malacca in quest of such an obvious answer and suggested giving in private a deeper esoteric meaning communicable, like all Sufi mysteries, only to the elect. The pundit took the hint and won the prize offered by Malacca. His esoteric solution is not recorded but al-Jili has given apposite Sufi answers:—"The powers of endurance of the sufferers in hell continues to grow—God never takes back his gifts and these powers come from God—until there appears in them a Divine power which extinguishes the fire, because no one is doomed to misery after the Divine attributes become manifest in him," or again "You may say, if you like, that Hell-fire remains as it was, but that the torment of the damned is changed to pleasure." (Nicholson, *op. cit.* pp. 136-7).

There is a record of one flagrant example of heterodox pantheism from Perak 30 years ago. Its exponent was sentenced to gaol. The creed he taught found God in man: "There is no God but God. I am God." (*La ilaha illa'llah! Aku Allah! Allah ia aku! Allahu aku! Allah ta'ala itu tiada mēlainkan diri ini Allah.*) The creed, alms, the pilgrimage, the turban, the sixteen pillars of a mosque, the steps of its pulpit, the holding of a staff by the preacher, the kissing of the Black Stone at Mecca were all ascribed to disgusting sexual analogies. Not 44 but 40 members are required for the congregation of a mosque because man and woman together have 40 fingers and toes. Hell is anger and heaven sexual love. The Angel of Death is a man's eyes; the seven furnaces of Hell his knees; the bridge across the Fire his back-bone. One's right eye is Kiramun and one's left Katibin. And so on, a rignmarole of nonsense and an obscene travesty at an immeasurable distance of the Divine Love celebrated by the mystics of Persia.

### The Malay Charm.

"Fasal pada mēnyatakan 'ilmu kota tauhid yang di-amalkan oleh Tuan Maklab Setam (مکلب ستم). Dan barang siapa hēndak mēngamalkan dia, maka di-bacha fatihah dahulu, di-hadiahkan kapada yang ēmpunya dia.

Maka di-mulaī kapada malam Jumaat hingga sampai kapada malam Jumaat pula; maka di-bacha-nya ēmpat kali pada sa-malam sērta di-nadzarkan hati kita bērsunggōh-sunggōh kita mēngēsakan kapada Allah sērta di-shuhudkan masuk ka-dalam fuad kita, sa-hingga pēnoh maujud di-dalam diri kita pun di-'itikadkan-lah: 'Aku ghaib di-dalam dzat mutlak dan itlak,' maka fana-lah diri kita sa-kali mēlainkan diri mutlak dan itlak itu jua.

اللهم صلي على سيدنا محمد وعلي آل محمد حوطت علي نفسي ورفتي  
وابنافي واهلي ومالي وماملك يدي سبع دورمن دورالله تعالي سقفا  
لا اله الا الله ودرقها محمد رسول الله وقعلها قدرة الله لايفتح ابدا  
ياذن الله محمد بشر لالك البصر بل هو كاليقوت بين الحجر.

Shahadan ada pun murad daripada 'kota' itu, telah kita ketahui asal kita itu daripada 'adam, melainkan kembali kepada 'adam pula kita. Ada pun yang ada nyata-nya itu hanya ujud Allah jua sa-  
yata-mata-nya. Bahawa akan ujud Allah itu sa-kali-kali tiada berchêrai dengan dzat-nya yang mutlak itu bagi dzat-nya; maka ia-itu-lah yang melakukan barang-barang kehendak-nya seperti firman-nya: **فَعَالَ لِمَا يُرِيدُ**, herti-nya 'Berlaku barang kehendak-nya di-atas diri-nya jua,' tiada berkehendak kepada yang lain-nya daripada-nya itu, sa-sungguh-nya pun kepada 'adam jua. Tamat.

Shahadan ada pun murad daripada 'diri' itu roh nama-nya, suatu sifat daripada Allah ta'ala, tiada berchêrai dengan dzat-nya; dan ia-lah jadi suatu hakikat-nya, maka di-namai 'insan.' Ada pun roh itu mufassil lagi mukaiyad. Bahawa sa-nya roh itu berkehendak sentiasa kepada Tuhan-nya. Tamat.

Shahadan ada pun murad daripada 'rumah' itu jasad nama-nya. Ada pun jasad itu tempat ( **رُكْنَان** ) roh itu, kerana itu-lah sa-bênar-bênar-nya tempat kenyataan Hakku'llah ta'ala, seperti sabda Nabi salla'llahu 'alaihi wa-sallama: 'Man 'arafa nafsahu fakad 'araf rabbahu,' herti-nya, 'Barang siapa mengenal diri-nya, maka bahawa sa-nya mengenal-lah Tuhan-nya.' Ada pun rumah itu di-jadi sendiri-nya, sungguh pun akan fana melainkan empunya rumah-nya Hak yang kekal dengan dzat-nya yang mutlak itu.

Shahadan ada pun murad daripada 'harta' kita itu ia-itu seperti hati dan jantung dan paru-paru dan hêmpedu dan barang yang di-jadikan Allah ta'ala sa-mata-mata-nya seperti firman-nya:

**وَمَا تَشَاءُونَ إِلَّا أَنْ يَشَاءَ اللَّهُ رَبُّ الْعَالَمِينَ** herti-nya, 'Tiada kuasa sa-orang jua melainkan dengan kuasa Allah kepada sakalian 'alam ini daripada dzahir-nya dan batin-nya.' Tamat.

Shahadan ada pun murad daripada 'milek' pada kita itu pancha indêra yang sa-puloh itu, pertama-nya dzahir, kedua-nya batin. Ada pun yang dzahir itu lima perkara: penglihatan mata, pêngngaran telinga, perasaan lidah, pênchium dengan hidung, pênjabat dengan tangan. Ada pun pancha indêra yang batin itu lima perkara pula: sir, itikad, chita, rasa dan waham.

Shahadan ada pun murad daripada tujuh 'kota' itu, kerana Allah ta'ala menjadikan kita ini tujuh sifat, maka di-sempurnakan insan itu tujuh sifat: sifat hayat, ilmu, kudrat, iradat, sama', basar, kalam. Dan wajib sujud kepada Allah ta'ala tujuh anggota: pertama-nya dahi, kedua-nya tapak tangan, dan ketiga-nya lutut, dan keempat-nya kaki dengan perut-nya jari.

Shahadan ada pun murad daripada 'kunchi' itu sebab-nya sangat-sangat yakin kita dan tauhid kita pada menyêrahkan diri kita kepada Allah ta'ala, seperti firman-nya: **وَعَصَوْا حَبْلَ اللَّهِ**,

herti-nya, 'Bêrpêgang kamu dengan tali Allah yang tiada putus-nya lagi tiada terlindung barang sa-kehendak-nya itu

daripada ma'rifat-nya,' saperti kata Nabi salla'llahu 'alaihi wa-sallama: 'La takhriku dzarratin illa bi-idzni'llah,' herti-nya, 'Tidak berggerak barang suatu jua pun, melainkan dengan izin Allah? Kërana tiada dapat di-pandang dengan memutuskan dan tiada putusan melainkan dengan kehendak Allah sa-mata-mata, maka tiada dapat lain-nya. Tamat.

Shahadan ada pun murad daripada 'anak kunchi' itu Muham-mad Rasulu'llah. Kërana Allah itu sangat-lah terbunyi, tiada siapa mēngētahui-nya akan dia melainkan pada diri-nya. Sēbab itu-lah Allah ta'ala mēmēliharakan kēbēsaran-nya itu, maka Hakku'llah ta'ala pun tajalli kapada roh Nabi kita Muhammad, maka roh itu-lah Allah ta'ala mēnjadikan sakalian 'alam ini; maka dzahir-lah sakalian-nya sifat 'ilmu-nya yang batin itu. Maka sēbab itu-lah di-katakan 'anak kunchi,' kërna mēmbukakan pēr-bēndaharaan yang terbunyi, saperti firman-nya: **كنت كنز مخفي** herti-nya, 'Ada aku bērharta yang terbunyi-nya.' Tamat.

Shahadan ada pun murad daripada pēlihara Allah saperti firman-nya: **وهو معكم انما كنتم** herti-nya, 'Allah ta'ala itu sērtā kamu barang di-mana kamu,' saperti firman-nya: 'Allah tērlēbeh hampir daripada urat lēher.'

Shahadan ada pun murad daripada 'atap' itu kuasa Allah atas barang yang di-kēhēndaki-nya pada mēnudong daripada sa-orang hamba dēngan rahmat; maka jadi-lah tērkunchi daripada sakalian sētēru-nya dan bala-nya daripada dunia akhirat; maka tiada-lah tērbuka kapada sakalian jin dan manusia melainkan dēngan izin Allah ta'ala. Tamat.



# Notes on the Enemies of Butterflies.

BY C. L. COLLENETTE.

On 24th January, 1922 while collecting larvae and pupae of the common Skipper (*Hidari irava*) which can be found plentifully in Singapore in rolled up sections of the banana leaf, I noticed that three or four butterflies of the species were flying round the flowers of a neighbouring Papaya tree. After watching them at close quarters for a minute or two, I espied one which appeared to have deformed wings, at rest on a flower. Looking more closely, I found that it was in the clutches of a Praying Mantis, (*Rhombodera basalis*). The Mantis held the butterfly in its fore legs and occasionally brought it up to its mouth to suck the juices, holding it away again while it considered them. After watching this for a few minutes I took the Skipper away, the Mantis holding on until it was nearly pulled from the tree and with no apparent fear of my fingers.

The Mantis was stationed on a small bunch of the Papaya flower buds, with an open flower half an inch in front of its doubled fore legs. Skippers were flying from flower to flower, and I waited in the hope that one would fly within its reach. A foolish individual finally blundered right on to its back and then settled on the very flower which it guarded. The Mantis flinched a little at the touch, drew its front legs close to its body and then made what I considered a rather clumsy grab at the insect. The Skipper flew away none the worse.

Other Skippers visited flowers three or four inches away, being followed by the Mantis with a turn of the head.

Then, as dusk came on, a Hawk Moth with pink in its wings, probably *Hippotion boerhaviae*, paused in space opposite the special flower, but apparently saw the preliminary inward swing of the Mantis' fore legs, and darted off.

Shortly afterwards, the same Hawk Moth, or another of the same species, hovered in front of the flower and put its proboscis down the long tube. The Mantis made the same grab as before, but again missed its quarry. Darkness and mosquitoes prevented further observations.

Another Mantis had been sitting all this time on the under-side of a leaf, but beyond turning its head when a butterfly passed, with the very smallest chance of being able to make a capture, it did not move.

During the following three weeks I visited the Papaya tree on several occasions and always found the same two Mantids. They were the same shade of light green as their background and it needed the closest scrutiny to detect them. On each visit they were either at rest under leaves or walking about on the leaf stems, although butterflies and other insects were often present on the flowers.

I do not think that these Mantids were capable of reasoning out that insects were to be caught on the flowers. Although they were plainly interested in anything moving within six inches of them, they would remain just out of reach of a promising spot without attempting to go nearer to it.

In the Botanic Gardens, at midday on 5th February 1922, I was watching four or five "brown" butterflies (*Ypthima*) settled on a single head of flowers on a shrub. A patch of yellow and blue higher up the branch caught my eye, and revealed a large "Chameleon" (*Calotes cristatellus*). It was some six inches from the butterflies, with its head turned towards them in a position of attention. I went quietly back to a distance and watched for twenty minutes, but the lizard did not stir in the slightest, possibly because I had alarmed it. From a distance at which the butterflies could easily be seen, it was most difficult to pick it out from the surrounding leaves. At subsequent visits I did not see it, although the flower-head continued to attract butterflies for some time.

Another danger to butterflies is the spider. In the Changi jungle, on 29th January, 1922, I found an *Euthalia merta*, a powerful butterfly with a strong flight, completely helpless but undamaged in a web spun across a path. The spider could not be found.

Instances of butterflies being preyed upon by their enemies are not easy to observe, but the dangers which they are exposed to, such as those indicated in these notes, are very many.



# The Irregularity of a Spider's Feeding.

By I. H. BURKILL.

One afternoon in 1908 my attention was drawn to an iridescent green hunting spider upon the wall of my house in Calcutta. There were many mosquitoes about at the time; and I asked myself if this spider fed upon them, and accordingly caught it for the purpose of observation. The source of the mosquitoes was quickly found in the servants' quarters, the brood of larvae appropriated, and by means of a glass funnel over the vessel containing the larvae and pupae, the flies as they emerged were forced to enter a glass fronted box which became a cage for the spider. A small vessel of water was placed in the cage so that the air was constantly moist. The temperature went uncontrolled, and as it was the hot weather ran to maxima above 100° F. The cage was not moved from the room where the spider had been caught. The spider was now supplied with fresh mosquitoes daily and the "kills" counted over 63 days, *i.e.* from May 25th. to July 26th. On July 26th. as I was proceeding on tour, the observations were discontinued, and the spider, a female, weighed: she weighed .075 grammes. The spider put into spirit, was posted to a specialist in spiders, for determination, but the parcel miscarried, and the name of the species is not known.

The spider in the 63 days over which the observations were extended, killed and devoured 355 mosquitoes; but most irregularly. When caught she was hunting; on the next day she laid eggs, and then fasted on and off over a week: for two days after this she fed ravenously, killing 17 on the first of the two and 10 on the second; then followed a fast day, a day when 2 were killed, and another fast day; after this on five days she fed considerably, killing in all 58 mosquitoes; then came a three days complete fast; three days of moderate feeding, a day's fast, and so on. Once in July she fasted completely for seven days. Her maximum was 17; and this she reached on three occasions.

Newly a copy of the *Transactions of the Wisconsin Academy of Sciences, Arts and Letters*, vol. XIX. has come into my hands, wherein at p. 524 is an account by Miss Catherine Elizabeth Nebel of the feeding of seven individuals of the spider, *Aramea sericata*, which she watched for periods up to fifteen weeks, feeding them upon the fruit fly,—*Drosophila ampelophila*. Her spiders fasted and fed as irregularly as mine: but she noted that if the temperature of her laboratory were raised to 100° F. the spiders responded by an increased feeding upon the second day.

It should be noted that these were voluntary fasts, not involuntary which spiders are well known to endure for very long periods.

My spider was never seen to take any notice of a mosquito which did not move. What an advantage rest by day would seem to confer on the mosquito!

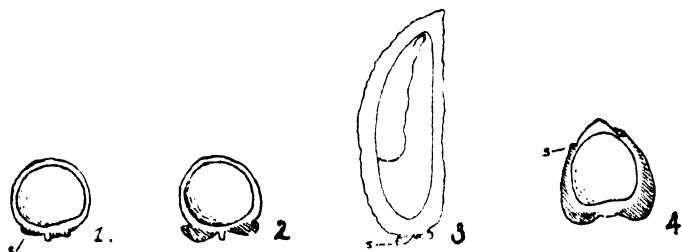


# Notes on Dipterocarps.

## No 6. On the genus *Pachynocarpus*.

By I. H. BURKILL AND F. W. FOXWORTHY.

*Pachynocarpus* is a small genus of the natural order Dipterocarpaceae, with its nearest affinity to the somewhat polymorphic genus *Vatica*. If *Vatica* be divided into two or more genera, then *Pachynocarpus* is abundantly distinct; but if, as several botanists think, *Vatica* in its variety is still rightly considered a single genus, then it is a debateable point whether *Pachynocarpus* should be kept apart from it. It was defined in 1860 by Sir Joseph Hooker (Trans. Linn. Soc. XXIII., p. 159) upon material collected by James Motley in Borneo and sent by Mr. E. S. Barber\* of the Eastern Archipelago Company to Sir William Hooker at Kew from Labuan. *Vatica* had been defined long before,—first in 1771 by Linnaeus (Mantissa II, p. 152) upon a specimen from Ceylon (mislabelled China); then it had been recognized as appearing in the Philippine Islands in a second species (Blanco, Fl. Filip., ed. 1. 1837, p. 401) and in the islands of Borneo and Sumatra in two more species (Blume, Mus. Bot., 1852, p. 31). To these have been added other species up to the number of 55,



Figs. 1 and 2, the shells of two fruits of *Vatica Wallichii* gathered from under the same tree in the Tasek Gelugor Forest Reserve, Province Wellesley, showing extremes in the development of the calyx (shaded): 3, a fruit of *Vatica ridleyana* in vertical section; 4, shell of the fruit of *Pachynocarpus umbonatus* in vertical section. All reduced to one-half and in all the calyx shaded. The cotyledons are indicated in 3.

\* The Director of the Royal Botanic Gardens, Kew, kindly informs us that Edmund Scott Barber was Resident Director of the Eastern Archipelago Company at Labuan at the time of the murder of Motley (see Jour. Straits Branch, Roy. Asiatic Soc. No. 79, 1918, p. 37) and purchased at the sale of Motley's effects, the latter's herbarium. Under the date Nov. 16th, 1859, he wrote to Sir William Hooker at Kew, telling him this and that he would forward the herbarium; and explained that Motley when alive had intended to do so. He also offered a collection of mosses. In a second letter he stated that Motley's herbarium consisted of about 400 specimens, and advised the sending to Kew of numerous small packets of mosses and "a remnant of Motley's herbarium not arranged."

with a distribution from Ceylon to New Guinea, and northwards as far as the eastern extremity of the Himalaya. More or less in the middle of the area occupied by *Vaticas* occurs *Pachynocarpus*.

From the species of *Vatica* nearest to it, the first described *Pachynocarpus*,—*P. umbonatus*,—differs in the degree of adnation of the calyx, as the diagrams above indicate.

Upon this adnation Hooker defined the genus: and in 1862 in the *Genera Plantarum* (i., p. 192), he remarked succinctly that *Pachynocarpus* differs in no other way from *Vatica*, of which genus but seven species were known to him. Alphonse de Candolle in 1868 (*Prodromus*, XVI, part 2, p. 605) retained *Pachynocarpus*, altering the definition by pointing out that the stamens may be 15 in number, instead of 10, as had been stated. Burck, nineteen years later (*Ann. Jard. Bot. Britenz.* VI, 1887, p. 223), sunk the genus to the position of a section of *Vatica*, at the same time describing as a new species *Vatica verrucosa*. Heim followed (*Recherches sur les Diptérocarpacées*, Paris, 1892, p. 107) with the restoration of *Pachynocarpus*, and with a subdivision of *Vatica*. Sir George King (*Journ. As. Soc. Beng.*, LXII, 1893, p. 136) took Heim's view: and at the same time he transferred *Vatica Wallichii*, Dyer, and *Vatica ruminata*, Burck, to *Pachynocarpus*, in a way which we find wrong, and he added a new species,—*P. Stapfianus*. Sir Dietrich Brandis, the last comprehensive writer upon the order, followed suit (*Journ. Linn. Soc. Bot.* XXXI, 1895, p. 136): he placed the species as King had done, except that he did not reduce *Vatica ruminata*, but called it *Pachynocarpus ruminatus*. He had described a *Vatica Ridleyana* (Hooker's *Icones* t. 2401), which, from its obviously close relationship to *Vatica Wallichii*, Dyer, Ridley in the Singapore herbarium, and as a follower King, transferred to the genus *Pachynocarpus*; and this transference appeared in Mr. James Anderson's "*Index of Plants, Botanic Gardens, Singapore*" as *P. Ridleyana*, but wrongly ascribed to Brandis. The result of all these writings is that we have six names under *Pachynocarpus*:—

*P. umbonatus*, Hook. f.;

*P. verrucosus*, Heim, transferred from the genus *Vatica*, where it stood as *V. verrucosa*, Burck;

*P. Wallichii*, King, including *Vatica Wallichii*, Dyer;

*P. Stapfianus*, King;

*P. ruminatus*, Brandis, submerged from *V. ruminata*, Burck, by King into *P. Wallichii*, but restored to *Pachynocarpus* by Brandis; and

*P. Ridleyanus*, J. W. Anderson, transferred from *Vatica Ridleyana*, Brandis.

Burck had described a *Vatica obtusa* (l.c., p. 228) placing it next to *V. ruminata* with the remark "anne rectius *V. ruminatae* varietas." If so near *V. ruminata* as that and if *V. ruminata* is a species of *Pachynocarpus*, then so also must this species be; and therefore we may have seven to deal with.

For our work we have borrowed the specimens left in the herbarium of the Royal Botanic Gardens, Calcutta, by Sir George King, and examined them carefully, along with the material which we have been able to accumulate ourselves from within the Malay Peninsula. The result is a great reduction and a return towards older views. While reserving an opinion upon the advisability of retaining *Vatica* as it stands, we cut out of *Pachynocarpus* most of the species added to it. We consider *P. verrucosus*, Heim, unlikely to differ from one of the other species of the genus: *P. Wallichii*, King, to consist of *Vatica Wallichii*, Dyer, and a *Pachynocarpus* confused; *P. Stappianus* not to differ from the second part of King's *P. Wallichii*; *ruminatus* to be the same as *Vatica Wallichii*; and *P. Ridleyanus* to be a *Vatica* likewise. Moreover we find at present no reason to keep up the two species *Vatica obtusifolia*, Ridley, and *V. Kelsalli*, Ridley, described in the Journal of the Straits Branch of the Royal Asiatic Society, No. 34, 1910, pp. 26-27: both appear to be *Vatica Wallichii*, Dyer.

In the Calcutta herbarium are two sheets of *Pachynocarpus umbonatus* from the "Herbarium Hookerianum" with flowers; and in a capsule upon one of them is a detached fruit. It is clear that they were part of the material upon which the species was described. Attached to one of the sheets is a fragment of Chinese paper bearing this note:—"160, Dipterocarpacee—? *Vatica*. A tree 1 to 1½ feet diameter; wood very hard close and lasting, when cut yellowish brown, turning nearly black on drying; bark smooth, light coloured; yields a yellow transparent copal-like resin. The gum called in Europe "dutch copal." Rassak bunga—flowering rassak: blooms cream-coloured, said to be very showy; tinged with pink when in blossom; very sweet scented. Loobook dana." In the Transactions of the Linnean Society the wood of *Pachynocarpus* was described by Sir Joseph Hooker, not as in this note, but as soft and white, and the wood of *Cotylelobium melanoxyylon* Hook. f. which is also called "rassak" § was described as yellow, when seasoned turning black. Both species are said by him to have been got upon the north coast of Labuan, but Mr. T. H. Eley now Resident at Labuan, is unable to ascertain for us that there is a bay or stream-bend there, known at Labok dana: and we are not confident that Labok dana cannot be for instance on the Sungei Banyu Irang in Banjermassin. The note quoted appears to have been Motley's. It is to be asked not only if Sir Joseph Hooker wrongly assumed Labok dana to be in Labuan, but why the discrepancy in the description of the wood, or if the note has been placed upon a wrong sheet, and belongs to *Cotylelobium melanoxyylon*: but then the number 160 Hooker gives to the other. Sir George King had these specimens before him when he wrote his account of *Pachynocarpus*. It is to be observed that he held his material of *Pachynocarpus* from the Malay Peninsula to differ from

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§ "Rapak" the name quoted by Hooker is an error—a misreading of the word "rassak" written by Motley with the first s long.

them; and his opinion always deserves consideration: but beyond that he went wrong in not seeing that the peninsular material was different from the really unlike *Vatica Wallichii*.

In considering whether King was right to keep apart that Malayan material from the Bornean type, and right also to distinguish specifically *P. Stapfianus*, we have met with much difficulty. We have ended in keeping the peninsular and the Bornean material apart, more from caution than from conviction, and find the *Pachynocarpus*-portion of King's *P. Wallichii* not separable specifically from his *P. Stapfianus*. If however, there is a confusion in Motley's specimens, and it can be of a *Vatica* in flower mixed with a *Pachynocarpus* in fruit (flowers and fruit were probably gathered months apart), then the flowering specimen is likely to be a flowering *Vatica* and perhaps *V. Wallichii*, while the fruiting specimen (which is *P. umbonatus*) may not differ from *P. Stapfianus*. More study in Borneo is needed to decide this both near Labuan, and because Motley's last years were at Banjarmasin in the south east.

At flowering time there is no sure mark in a herbarium specimen by which *Pachynocarpus* can be distinguished from *Vatica Wallichii*. That led to King's mistake of identifying the two; and a fair measure of variability in the calyx caused him to think that the adhesion which is not visible in the flower, came quite late in fruit-development, whereas it commences from the fall of the petals. The diagrams printed above indicate some of the variation in the calyx. We have had good opportunities of studying *Vatica Wallichii* alive, because it is a tree cultivated in the Economic Garden, Singapore, and because also it is by no means uncommon round the coasts of the Malay Peninsula. It has been planted on dry ground in the Economic Garden and has grown well; but its natural habitat is upon ground liable to flooding. Herbarium specimens prove its occurrence down the west coast of the Peninsula, certainly from Province Wellesley, and possibly from Trang in Lower Siam, to Singapore; and down the east coast from Kuantan to Singapore. It, by being identified with Burck's *Vatica ruminata*, is known also from Bangka. It is possible that Dr. Haviland's flowering specimens, Nos. 1907 and 1908, from near Kuching, Sarawak, may be it; but fruits are necessary for making this sure.

To Malays it is one of the several trees called Resak. Resak paya (swamp resak) is a name for it in Pahang and so are Resak pasir (pasir may mean sand, sea beach, or a certain quality in a wood which causes it to take the edge off cutting tools) and Resak laru,\* which last belongs also to *Pachynocarpus Stapfianus*. Goodenough, Ridley's collector, called it Damar Mata Kuching on specimens collected in Singapore island and in Malacca. Derry in Malacca called it Kayu Merbatu Pasir.

\* Laru is a substance used in making sugar. In this particular case, it is said that punctures or cuts are made in the bark; the resin which exudes is collected and placed into syrup which is being boiled, causing it to harden into sugar with a yellow colour.

The wood of *Vatica* and *Pachynocarpus* seems to be very much alike. The sapwood of *Vatica Wallichii* is white or pale yellow and the heartwood is brownish yellow, becoming much darker after exposure to the air. There is less of resin in the wood than is usually found in most members of the order.

A pale damar runs out of injuries and glazes over the stem.

The tree attains no great height, reaching say 60 feet and the spread of its branches is narrow, say 10 feet from the trunk. If grown in the open it keeps its lower branches and is then leafy nearly to the ground; but in high forest its trunk is straight and branchless to 30 feet or more. A tree 50 feet high may possess a diameter at breast height of 20-30 inches. The bark is light grey and smooth.

Its times of flowering in Singapore are uncertain doubtless in response to the uncertainty of the weather. All trees flower together. Flowering however in the Peninsula seems to be most common in April or May.

Individual trees differ from each other in small points. The leaves of some dry darker than the leaves of others. The flowers vary from a pale cream to milk-white; in some there is a touch of red upon the outside of the bud; examined at sun-down the petals may be bent just to a right angle on their claw, in others more. These variations characterise whole trees. It may be that the trees whose flowers are most pigmented, are the trees whose leaves dry darkest; but this has not been proved. A flower whose petals are bent through a right angle is figured below. The small eye is noteworthy.

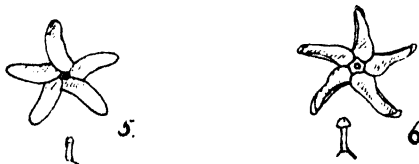


Fig. 5 on the left, a flower of *Vatica Wallichii* in face view: Fig. 6 on the right, a flower of *Vatica Ridleyana*, also in face view. Both nat. size. Below each is the stigma and style enlarged.

The flowers have a strong and pleasant scent. By their multitude they make the tree conspicuous at flowering. They open about dawn, and fall about the next dawn. The stamens number 15;—if 10 in such plants as that upon which *Vatica Kelsalli* was founded, then so by reduction, accidental probably. The flowers face downwards and outwards chiefly. Three or four distinct patches of glandular tissue occur in a row upon the underside of the leaves where the lateral veins break into loops. These leaves last for about 3 years. Six months pass before the fruit is ripe. The fruit is dry and water-distributed chiefly by means of floods. We have seen this process in operation in the Tasek Gelugor Forest Reserve in Province Wellesley, where heavy rain had flooded the

low and level ground, and the fruits were stranded in lines at the limit of the flooding. The duration of the floating was tested and described in a note by one of us (Journ. Straits Branch Roy. As. Soc. 81, 1920, p. 75) where the wrong generic name *Pachynocarpus* was used for it. The average duration of floating in that experiment was found to be 22 days. The germination was described in the same place. The capsule is ruptured along three lines predetermined by weaknesses in the walls. These three lines are more clearly shown in the capsule of the related *Vatica Zollingeriana*, A. DC., which is figured here, because it is instructive in regard to the nature of the less clearly marked lines of rupture in *Vatica Wallichii*.



Fig. 7. Shell of the fruit of *Vatica Zollingeriana*, A. DC., in vertical section showing the sepals (s), and the wall cut on one side down one of the lines of rupture, and on the other through the thick swollen mid-part between. Doubtless *V. Zollingeriana* is water-distributed, for the swollen part is such as would keep it floating.

The fruiting calyx of *V. Wallichii* is developed to a somewhat variable extent: sometimes it is humped as in the first figure above; sometimes it is rather flat, as in the second. The two figures were from fruits picked from the ground of the Tasek Gelugor Forest Reserve at the same spot, and appeared to be the product of a tree immediately above them.

Our material of *Vatica Wallichii* is as follows:—

PROVINCE WELLESLEY. In the Tasek Gelugor Forest Reserve, with fruit, in September 1921, *Burkill* 6599!

PENANG. Without precise locality, *Wallich Cat.* 9018!

PERAK. Ulu Sapetang, with young fruit in Feb. 1909, *M. Hashim* 228!; Larut, within 100 ft. of sea level in dense jungle, with young fruit in January 1884, *King's Collector* 5423!; on low hills, with fruit in February 1884, *King's Collector* 5546!; Briah upon the Larut plain, with young fruit in December 1892, *Wray* 4223!; banks of the Bernam river at 300-400 ft., with young fruit, in April 1886, *King's Collector* 8857!

PAHANG. Temerloh, with fruit in November 1921, *Awang Lela* 5470!; Kuantan in the Baloh Forest Reserve, with fruit in March 1920, *Yeob* 873!; Kelebor near Kuala Rompin, with fruit in April 1921, *Bidin* 4182!

SELANGOR. Kelamber Forest Reserve near Klang, in swamp with fruit in September 1919, *Hamid and Yeob*, 3295!

MALACCA. Without locality, in flower and with young fruit, *Main-gay* 201!; Sungei Udang, with fruit in July, 1894, *Good-enough* 1968!

JOHORE. Kuala Sembrong, with fruit in October 1892, *Lake and Kelsall!*; Kota Tinggi, on the riverside, with fruit in December 1892, *Ridley!*

SINGAPORE. Kranji with fruit in 1893, *Goodenough!*; Changi, with flowers and detached fruit in May 1889, *Goodenough!*; in flower and with half ripe fruit in April 1893, *Ridley 4740!*, and with flowers and fruit in May 1889, but fruit detached and may not be of this date, *Ridley 1839!*; Toas with fruit in March 1893, *Goodenough 5075!*; Tampinis road, with young fruit, in (? April) 1893, *Ridley 4739!*; Botanic Gardens in flower March 1916, November 1919, January 1921 and in fruit October 1916, July 1921, *Burkill 1077!*, *1265!*, *1267!*, *1266!*, *1270!*, *5969!*, *5970!*, *5971!*, *5972!*, *5973!*, *6434!*, *6435!*, *6436!*

BANGKA. Without precise locality (the type of *V. ruminata* Burek) *Teysmann!* cult. in Hort. Bog. VII. c. 4a with fruit, No. 204! and with flowers and fruits, *van Slooten!*

It is exceedingly probable that the following also belong to *Vatica Wallichii*, but they lack fruit.

LOWER SIAM. Trang upon the bank of the river, in dense jungle, with flowers in March 1881, *Kunstler 1437!*

PROVINCE WELLESLEY. Nibong Tebal with flowers, in January 1900, *Curtis 3458!* (part of which is the type of *V. ovalifolia*, Ridl.).

PERAK. Larut in open jungle with flowers in September 1884, *King's Collector, 6594!*, and in May 1884, *King's Collector 6070!*, *5763!*

PAHANG. Kuantan, with flowers, in June 1921, *Mohamad 3733!*; at the Chini Lake with flowers in April 1919, *Lambak 3173!*; on the Rompin river in the Menchali Forest Reserve, with flower in May 1919, *Foxworthy 3232!*

MALACCA. Sungei Udang with flowers in 1892, *Derry 961!*

JOHORE. Penyabong, with flowers in May 1918, *Foxworthy 1197!*; Skudai river with flowers in August 1879, *King!*; Jaffaria with flowers in August 1879, *King!*

SINGAPORE. Pulau Seletar in flower, 1892, *Ridley 4942!* and in flower April 1892, *Ridley 6202!*, and in 1894, *Ridley 6205!*; Chan Chu Kang by a stream, in flower in October 1892, *Ridley 4449!*; Changi in flower in May 1889, *Goodenough!*; Tampinis in flower in April 1916, *Burkill!*

*Vatica Ridleyana* is a species which occurs in a state of nature in the Botanic Gardens, Singapore, where it flowers and fruits at rather wide intervals. It may be that a specimen in the herbarium of the Royal Botanic Gardens, Calcutta, collected on Bukit Timah in Singapore island, is also *Vatica Ridleyana*, but as it is without

the characteristic fruits it is impossible to make sure of this: it was collected in 1894: in 1892 Mr. Ridley got the species on Bukit Mandai (No. 8943) and also at Changi (Nos. 4447! and 4448!), since which dates clearing has been extensive; and the tree has not been recognised in recent years outside the Botanic Gardens. In the Gardens there are several individuals. The tallest is in area N, tree No. 795: the second tree No. 815 in area V, and others are in area U and V. It is not a tree of lowlying ground; and its large fruits sink at once in water. Such distribution as they get must be by being rolled along the floor of the forest or (and this is the usual distribution of many forest trees of the second rank) by transport through small distances by animals seeking food.

Tree No. 795 in the Botanic Gardens is about 100 feet high. Its trunk is 62 in. in circumference at breast height: the bark is medium grey. The spread of the branches is about 30 feet from the trunk, the lower 60 feet of which are straight smooth and branchless.

The flower drawn above was produced by tree 815 in January 1921; and fruits were not ripe until the following November. They fell very deliberately through three months or more.



Fig. 8. A half ripe fruit of *Vatica moluccana*, Burek, showing the development of the reflexed calyx. The fruit is figured to illustrate a stage in the series of species connecting *Vatica Wallichii* with *Vaticas* of the section *Retinodendron*.

The fruit of *Vatica Ridleyana*, if elongated, is always turned to one side as drawn; but tree No. 815 produces longer fruits by  $\frac{3}{4}$  in. than tree No. 795, in which the apex is nearly straight. The leaves have glandular patches just as those of *Vatica Wallichii*.

These glands are slightly concave, and carry brown hairs.

The spongy parenchyma of the lower surface of the leaf gives place over their area to something denser. No excretion has been observed to occur on them; but probably there is one.

*Pachynocarpus umbonatus*, by the view taken here, is the tree of Borneo sent by Barber to Sir William Hooker at Kew,—certainly the fruiting part of the specimens, but not quite so certainly the flowering part. These flowering branches show thinner leaves with less prominent veins than any peninsular specimen which we ascribe to the genus. And as leaves so thin seem to be within the range of variation of the leaves of *Vatica Wallichii*; and as



dried flowers offer no character by which the two can be distinguished, it is well not to state dogmatically yet that *P. umbonatus* and *P. Stapfianus* are distinct species.

*Pachynocarpus verrucosus*, (Burck) Heim, described upon a specimen from Sungei Landak in Borneo, north east of Pontianak, collected by Teysmann, will probably be united with one of the other species when fully studied.

*Pachynocarpus Stapfianus* is like *Vatica Ridleyana* a tree of rising land. The result is that flowering herbarium specimens unauthenticated by fruits, if from the interior of the Peninsula, are more likely to be it than the similar *Vatica Wallichii*. We know it to occur in the Siamese Malay States, Penang, Perak, Selangor, and Pahang. King's Collector records it as 80-100 ft. high, with a girth up to 3 ft. As it occurs at Bangi, Selangor, it is a tree 38 ft. 2 in. high, and 3 ft. 1 in. in girth at breast height. The height to the first branch is 6 ft. 4 in., and the girth just below the first branch 2 ft. 11 in. The spread of the crown is 26 ft. 4 in.

We have not measurements of any other trees. Its leaves in most cases dry dark as in some specimens of *Vatica Wallichii*, so that by their colour there is no means of separating the two when dry. Of the flower in life we are not able to give a figure. We have records of flowering in July and October in different places and different years; and of fruiting in January, February, April and July.

The fruit when half ripe is acute to blunt; and when fully ripe by the rounding of the fertile loculus becomes globose and generally loses the minute apiculus representing the style. It has not the dimensions ascribed to it by Sir George King in any of the type specimens but is about one inch long. The calyx is adherent through  $\frac{1}{2}$ - $\frac{2}{3}$  of the length of the fruit. It and the exposed surface of the carpellary wall above it are lenticellate, sometimes little, sometimes much. The tip of the sepals persists and is free until the fruit is half ripe, then it generally falls off. The months when fruit is most likely to be found are March, April and May.

The embryo is quite unlike that of *Vatica Wallichii*. The outer cotyledon is half-wrapped half-folded round the placental cotyledon; and both reach the apex of the fruit cavity:



Figs. 9 and 10, the embryo of *Pachynocarpus stapfianus*  $\frac{1}{2}$  nat. size.

Our material of *Pachynocarpus Stapfianus* is as follows:—

LOWER SIAM. Tapli Klong Wan towards the Tenasserim border in fruit in March 1919, *Hamid 3781!*

- KEDAH. Lankawi island, at Sungei Batu Asah, in fruit February 1911, *Mohamed Haniff 15553!*
- PENANG. Telok Bahang, at 500 ft., with fruits in July, 1888, *Curtis 1161* in one part!; Batu Feringgi in fruit without any date, *Forest Guard!*; Government Hill at 500 ft., with flowers in February 1887, *Curtis 1161* in the other part!, and in April 1890, with flower and fruit in March 1900 (obviously date of flowering; date of fruit uncertain) *Curtis 11!*; Bukit Penara, with flowers and detached fruit, in March, *Curtis 1391!*
- PERAK. Larut, in open jungle at 300-850 ft., in April 1885, *King's Collector 1466!*; Gopeng in open jungle, in April 1884, *King's Collector 5932!*, and in open jungle with fruit in May 1884, *King's Collector 6132!*, September 1885, *King's Collector 8186!* near the Bernam river at 300-400 ft. with fruit in April 1886, *King's Collector 8857!*
- SELANGOR. Bangi, with fruit in January 1920 and with flower in October 1921, *Forest Guard Ahmet 5008!*
- PAHANG. Baloh Forest Reserve, Kuantan District, in fruit in March 1919, *Forest Guards Yeop and Abdul Rahim 3145!* (a condition having the fruit so covered with lenticels that it appears different, and it is possible that when more fully known it will have to be distinguished.)

Flowering specimens which seem to be *Pachynocarpus Stapfianus* but cannot be assigned to it positively are King's collector's No. 6594 from Larut, 500-800 ft., with flowers in September 1884, his No. 5763 from Gopeng with flowers in April 1884, his No. 6070 from Gopeng, with flowers in May 1884, *Curtis' No. 1218* from Sungei Penang Road at 1,000 ft. (doubtless the more western Sungei Penang of the two in the island of Penang); another collected by *Curtis*, without number, in September 1887, from the Experimental Nursery at 2,000 ft. on Government Hill, Penang, and a third with flowers in August 1880; King's collector's further specimens from the Bernam river bearing his number 8753, having been got in flower in April 1886; and lastly Barnes' No. 10872 from Kluang Terbang at 5,000 ft. on Gunong Benom, Pahang, with buds.

Maisak is the Siamese name for this tree, and it is a *Resak* to the Malays. *Resak laru* is a name from Kuantan and also from Penang.

Our conclusion is that *Pachynocarpus* stands with two or possibly three species, i.e. *P. umbonatus*, Hook. f., possibly *P. verrucosus*, Burck, and *P. Stapfianus*, King; but that *P. umbonatus* must be collected again to remove some doubt as to the correct identification of the flowering specimens with the fruit. The rest of the species put by various authors into the genus go to *Vatica*.

## Notes on Dipterocarps.

### No. 7. On the fruit and germination of *Isoptera borneensis*.

By I. H. BURKILL.

*Isoptera borneensis*, Scheff., is a tree which yields much of the Tangkawang fat produced in Malaya. Borneo, where its extension is through the island, is the centre of its distribution: eastwards it reaches Mindanao and westwards the Malay Peninsula, Bangka and south Sumatra. It is a large, but apparently not a very large tree. Its habitat is the margins of rivers of moderate size. Into their waters it drops its fruits, and they are distributed by them.

The following is a figure of the fruit in the position in which it floats, the buoyant sepals upwards.



Fig. 1. A seed of *Isoptera borneensis*, in the position in which it floats.  $\frac{1}{2}$  nat. size.

Deprived of the corky sepals, the fruits within 60 hours, sink however dry at the starting of the experiment.

In Note no. 4 of this series (Journ. Straits branch Roy. As. Soc. no. 81, 1920, p. 75) an account was given of the floating fruit of *Vatica Wallichii*, Dyer (*Pachynocarpus Wallichii*, King) wherein the buoyant tissue is the fruit-wall, i.e. the same end is attained but by different means.

It is not possible to regard water-distribution as in any way ancestral in the order; but it appears in *Vatica* as an ultimate modification at the end of a series which has lost the advantage of height and thereby lost the wind that does not reach a small tree deep in high forest: and it would seem to be connected with fruiting before the tree is of any great height in *Isoptera borneensis*; for the tree commences to fruit at the early age of six years (fide van Romburgh and Ridley). But though *Vatica Wallichii* and *Isoptera borneensis* use water as a means for the distributing of their seeds they have little else in common, being wide apart in their order.

The embryo of *Isoptera borneensis* is very like that of some Shoreas, say of *S. costata*, in being grooved down the sides and in end-view, as figured here; but both its cotyledons reach the apex of the fruit-cavity, though the outer is so much the larger that it possesses anything from 240 to 280 degrees of the circumference at the equator of the seed.

Fig. 2. Embryo of *Isoptera borneensis* seen from the end showing the outer cotyledon folded over the placental cotyledon.  $\frac{1}{2}$  nat. size.

The vitality of the seed is not great. The fruit floats and germinates floating if the purpose of floating has not been achieved by a stranding in some new spot. Probably the end of germinated floating fruits arrives very quickly and the seedling perishes: it is heavier than water, and falling from the fruit sinks.

In germination the fruit-wall ruptures at no constant place, but in response to the pressure of the variable young plant within and not at any weak lines in the wall. Here are four diagrams



Figs. 3—6. Diagrams of the position of the cracking of the fruit-wall in the germination of the seed of *Isoptera borneensis*. No. 3 is the most usual way. No. 4 is not uncommon being No. 3 as it were incomplete; No. 5 is No. 4 oblique; No. 6 is the reverse of No. 3.

showing the cotyledons in transverse section: the outer cotyledon in germination has a tendency to flatten itself, which tendency pushes chiefly right and left, and is fortified by a similar tendency in the inner or placental cotyledon; this results further in a second direction of pressure,—towards the part of the wall where the placenta is, i.e. upwards in the diagrams. Under these pressures the wall gives way, first as a rule on the right and on the left, and either later near the placenta, or (diagram 4) not at all. The commonest form of splitting is that in diagram 3, the third, last and often not extensive, crack being close against one side of the attachment of the placenta to the wall.

In diagram 5 is a case where the lobes of the placental cotyledon were unequal and the splitting unusually oblique.

If the fruit is split into two, as in diagram 4, the two parts are nearly halves. Here are approximate measurement in degrees of a circle of six fruits split into two:—

173°  
187°    placenta attached about the middle of the smaller part.

180°  
180°    placenta attached about the middle of one of the parts.

189°  
171°    placenta attached about the middle of the larger part.

201°  
159° placenta attached about the middle of the larger part.

187°  
113° do.

180°  
180° placenta attached at 45° from the centre of one half.

When the fruit wall is split into three parts after the manner of diagram 3, ascertained measurements were

120°  $\wedge$  136°  
84

124°  $\wedge$  112°  
124°

125°  $\wedge$  110°  
125°

138°  $\wedge$  84°  
138°

162°  $\wedge$  93°  
105°

131°  $\wedge$  120°  
109°

It is easy to understand what happens in these seeds from these few measurements. Take the diagrams, which have purposely been oriented for the sake of this explanation; the pressure of the embryo is greater transversely than in any other direction and results in the giving way of the fruit-wall at either side: if the giving way occurs at points more or less diametrically opposite, the pressure needs no further cracking: but if the first cracks appear rather to the lower side of the diagrams, then the embryo continuing to grow produces a new crack more or less mid way upon the larger part, that is generally in the neighbourhood of the attachment of the placenta. If as in diagram 6 the crack is too much to the upper side then a third crack must appear upon the lower or larger part to allow of the germination proceeding. I measured only two fruits of this type and I found them:—

106  
127 Y 127

97  
146 Y 117

This method of fruit-splitting, easy to demonstrate in *Isotoma borneensis*, is characteristic of the greater part of the order. It is not dehiscence, for the product of fertilisation in the order never ceases growing from the moment of fertilisation to the time when the produced plant dies: the embryo grows into the seed and devours its albumen, which done it is normally cast from the parent tree, not quiescent as so many seeds are, but still growing, and in the course of its growth it ruptures the fruit-wall as described. Under abnormal conditions it may not be cast from the parent tree, and then germinates suspended (van Romburgh).

If only we knew the workings of the process by which the tree cuts off nutriment from its offspring, we should know the strength of the barrier preventing vivipary from being anything but a phenomenon exhibited by few and peculiar Phanerogams.

As far as is known, it is universal for the Dipterocarps to possess in the ovary three chambers and six ovules, two in each: one ovule only in all normal cases matures. One flower only, shall we say, in 10,000 matures fruit. It is remarkable then, that the production of the six ovules to each flower should be so constant, and it suggests an ancestry which had not winged fruits as so many modern Dipterocarps have, because six seeds carried away together on the wind would be too heavy a load for efficient wind-distribution and, settled together, would compete unprofitably. Wind-distribution appears, therefore, a less ancient phenomenon than their six ovules, but yet it is so general as to be characteristic of the order. It is easiest to consider it as co-aeval in the order with its separation from something more ancient, and to consider the absence of it to be subsequent or secondary. *Isotoma* has lost it,—has taken to water-distribution as an alternative. *Vatica Wallichii* has done the same. Some species of *Shorea* such as *S. Thiseltoni*, some of *Dryobalanops*, some of *Vatica*, the species of *Balanocarpus*, and the species of *Pachynocarpus* hold their own producing fruits very heavy for wind to lift them, and are distributed through small distances by being rolled or carried along the floor of the forest. They too have lost their wings. If we think of the evolution of the order as suggested it is of the greatest importance to understand that the splitting of the fruit-wall is not along definite lines, that is to say there is in it no sign of a pre-Dipterocarp dehiscent condition when six seeds might mature and need for the sake of efficiency that they be scattered singly.

Against this line of argument it has to be admitted that some species of the genus *Vatica* possess weak lines in the walls of their fruits where rupture occurs. The lines seem tertiary however, and are being studied.

The cotyledons of *Isotoma borneensis* contain chlorophyll in abundance before germination, and on germination are exposed to the light and held, like the cotyledons of most species of *Shorea*, upon short petioles.



## Notes on Dipterocarps.

### No. 8. On some large-fruited species, and in particular upon the effects of the pressure of the embryo against the interior of the fruit-wall.

BY I. H. BURKILL.

Dipterocarps with large fruits that are not wind-distributed occur in the genera *Dryobalanops*, *Shorea*, *Balanocarpus*, *Vatica*, *Pachynocarpus* and *Vateria*. By the kindness of Dr. F. W. Foxworthy, I have had material of some of them for study, and one *Balanocarpus maximus*, King, was the subject of Note no. 5 of this series (Jour. Str. Br. Roy. As. Soc. no. 81, 1920, p. 3). I am adding in this note observations upon *Shorea Thiseltoni*, King, and *Vatica Ridleyana*, Brandis, and also a few remarks upon a *Dryobalanops* which has the Malay name of "Koladan."

The weight of a fruit of *Shorea Thiseltoni* from the Weld Hill Forest Reserve, Kuala Kumpur, is found to be about 5.5 grammes: that of *Vatica Ridleyana* from tree no. 815 in the Botanic Gardens, Singapore, about 12.5 grammes. Neither is wind-distributed: but falls to the floor of the forest where it may be carried through small distances by rolling or by animals.

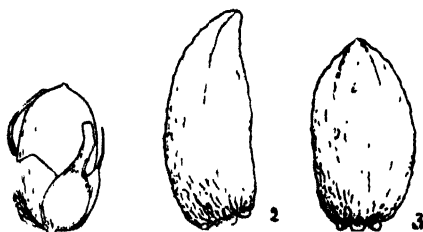


Fig. 1, a fruit of *Shorea Thiseltoni*; figs. 2 and 3, fruits of *Vatica Ridleyana*. All  $\frac{1}{2}$  nat. size.

*Shorea Thiseltoni* is one of a small number of species in the genus whose seeds contain oil as well as starch. That having been noticed, an analysis was requested from the Department of Agriculture, Federated Malay States and Straits Settlements, and kindly made through the good offices of Mr. L. Lewton-Brain by Mr. R. O. Bishop. The following is his report on seeds submitted to him from the Weld Hill Forest Reserve. "A certain number of the kernels were found to be mouldy and were excluded: the remainder were sampled and dried. The dry kernels were extracted for oil-content. The residue from oil extraction was examined for albuminoids and ash. Results:—

Kernel.	Moisture	..	..	34.8 per cent	
	Oil	..	..	19.5	(29.9 on dry kernel)
	Nitrogen	..	..	0.72	(4.5 albuminoids)
	Ash	..	..	1.56	

Dry residue after oil extraction

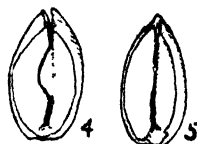
Nitrogen .. .. 1.33 per cent (8.3 per cent albuminoid)

Ash .. .. 2.87

Organic and volatile 97.13

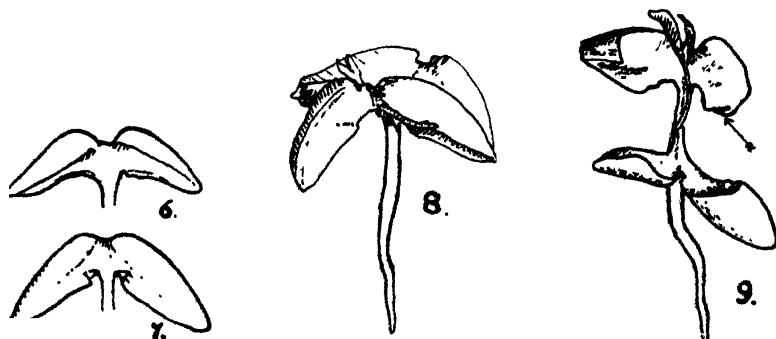
The oil immediately after extraction was liquid and with a green colour. It solidified on standing overnight and had the appearance of a tallow with a distinct odour of cocoa butter. The fat was found to have a very low acid value, the actual figure being 0.83."

The embryo has its cotyledons slightly unequal as in the following drawings where two are seen from the placental side: the outer cotyledon is seen to be by a little the larger and alone to reach the very apex of the fruit-cavity. Great irregularity was found in the embryo: for instance in figure 4 one lobe of the placental cotyledon is crossed partially to the wrong side of the dissepiment, and in figure 9 the two cotyledons are seen to be



Figures 4 and 5. Two embryos of *Shorea Thiseltoni* removed from the seed coats. No. 4 is slightly abnormal in that one or the lobes of the placental cotyledon has trespassed upon the room of the other lobe.  $\frac{1}{2}$  nat. size.

uneven. Normal expanded cotyledons are as in figures 6 and 7: in outline they are quite typical of the genus *Shorea*. Figures 8 and 9 represent the seedling, figure 8 a normal individual,—but

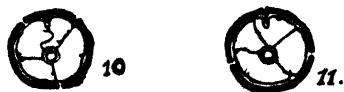


Figures 6 and 7, the expanded cotyledons of a seedling, No. 6 is the placental cotyledon seen from the side towards the outer cotyledon; fig. 7 is the outer cotyledon from outside. Figures 8 and 9 two seedlings, the latter abnormal as a result of injury (? insect-puncture) at the point of the arrow. All  $\frac{1}{2}$  nat. size.



figure 9 one in which a lobe of the outer cotyledon has suffered injury (the arrow indicates the place), and its arrested growth has given the other lobe and the lobe of the placental cotyledon in contact an opportunity for expansion beyond the normal. That this should happen is indicative of the pressure set up within the fruit,—the pressure which continued is also the cause of the rupture of the fruit-wall in germination, however at that period with a small amount of altered tension, due to the outer layer of the fruit wall contracting in drying somewhat more than the inner.

In my study of germinating Dipterocarps I have found no exactly similar case of a tendency in the ruptured fruit to gape and therefore it must be described in detail. The lines of rupture are variable in place, as in *Isotoma* (vide this Journal above) and are quite clearly brought about by the pressure of the growing embryo; but when they have been produced, the drying of the outer layer of the fruit-wall continues the tearing and causes the split wall to assume the appearance which is represented in figures 12, 13 and 14. This is not a hygroscopic action; and therefore no soaking of the seed brings the edges of the gaping crack together. Obviously it greatly facilitates the escape of the young plant from the imprisoning fruit-wall.



Figures 10 and 11, sections through the fruit of *Shorea Thiseltoni*, showing the packing of the cotyledon-lobes, and the places where in these cases the fruit wall was split.

The fruit of *Shorea Thiseltoni* germinates without resting, and in germination the lines of splitting commence at the apex of the fruit, and extend downwards. The most usual course of events is for there to be three splits, and for two of them to extend to the base, whereon a panel of the fruit-wall is free and forced out. This panel is usually rather less than one third of the circumference: but there is great variability. The variability is accompanied by a great variability in the relative size of the lobes of the two cotyledons; and may be considered as a consequence of it, as has been suggested in the note upon *Isotoma borneensis*; and the most unusual forms of splitting were found to occur with unusual twisting or unequal development in the cotyledons.

The fruits sink in water, and may germinate submerged:\* doubtless if such should happen in nature germination would be

\* Lewkowitsch, (Chemical technology and analysis of Oils, Fats and Waxes, ii, London, 1914, p. 601) has a statement that submersion of the fruits of Dipterocarps is resorted to in Borneo in the preparation of Tangkawang oil because it prevents germination. This reason appears wholly incorrect: but submersion by killing the caterpillars and grubs which so freely devour the embryo within the fruits may prevent loss in manufacture.

followed very quickly by death. An experiment was made with six fruits in order to see if submergence inhibited the splitting of the fruit wall: apparently it did not; for all the six germinated in six days under water. The splitting is the work of the germinating young plant pushing itself free.



\* Figures 12, 13 and 14. Three empty fruits showing various degrees of gaping.

The petioles of the cotyledons elongate in germination so much as to attain 2-7 cm. pushing the radicle out to the soil before they free themselves from the fruit-wall. They possess abundant chlorophyll.

Leaving *Shorea Thiseltoni*, attention will now be directed to *Vatica Ridleyana*, Brandis.

This species grows wild in the Botanic Gardens, Singapore. It flowered in January, 1921, and bore ripe fruits from near the end of the year into the first quarter of 1922;—flowering had lasted a couple of weeks, but fruit-fall lasted three months. The considerable weight of the fruits has already been remarked: it remains to call attention to the circumstance that their growth from flowering to maturity takes twice as long as that of the smaller and closely allied *V. Wallichii*.



Figure 15. A seedling of *Vatica Ridleyana* in germination, the stalks of the cotyledons pushing the plantlet into the soil. The outer cotyledon is towards the observer; above it a little of the placental cotyledon is visible. Figure 16, the placental cotyledon from the surface in contact with the outer cotyledon. Figure 17, the outer cotyledon from outside. All  $\frac{1}{2}$  nat. size.

The placental cotyledon is the larger and fills the lower part of the fruit-cavity to the exclusion of the outer cotyledon; but it shares equally the upper part of the cavity. The result is that its bulk is nearly twice that of the outer cotyledon. In *Balanocar-*

*pus maximus* the placental cotyledon occupies the basal part of the cavity of the fruit and the outer cotyledon the apical; and they are of nearly equal bulk: in *Vatica Wallichii*, they are also of nearly equal bulk and they share the fruit-cavity equally, but side by side instead of as in *Balanocarpus* the one above the other: but in *Vatica Ridleyana* with inequality, the placental cotyledon occupies the basal and shares the apical part.

There is enwrapping neither in *Vatica Ridleyana* nor in *Vatica Wallichii*; and the cells in both are gorged with starch. The young plant after emergence is singularly similar in the two, the leaves are exactly alike, even to the 6-8 large glands upon the lower surface at the looping of the veins, surrounded by the richest green, of chlorophyll. Unlike the fruits of *Vatica Wallichii*, the fruits of *Vatica Ridleyana* do not float in water, not even if dried.

In germination the fibrous fruit-wall splits from the apex downwards along pre-determined lines, possibly along one line to its base and for a short way only along others: the radicle is thrust out by the elongation of the petioles of the cotyledons, as in *Vatica Wallichii*, *Shorea robusta*, the genus *Dipterocarpus*. The blades of the cotyledons never leave the fruit-cavity, but develop a little,—very little—chlorophyll where they become exposed to the light.

The lines where the fruit-wall is split in germination, can be seen beforehand upon the outer side of the fruit, as they are depressed and free from the elsewhere abundant lenticels. The fruit-wall is thinner at them and the cell-structure differs.

These lines are usually three, but may be four and may be five in number. In studying the flower when it was available in January, 1921, (see this Journal p. 276), five-locular ovaries were not observed; but as their presence was not suspected, no search was made for them: it was only when, twelve months later, the fruit was ripe that their existence was suggested by finding five lines of splitting in a small percentage of the fruits.

Out of 263 fruits, 201 had three lines, 57 had four lines, and 5 had five lines.

It is most interesting that when the fruit shows four depressed lines upon the outside, three only as a rule are burst open, so that out of 17 fruits with four lines, set to germinate together, 15 were split along three and 2 only along four lines. Of the first fifteen in 13 the line which was not split was that close to the placenta.

Four fruits with five depressed lines, set to germinate at the same time likewise became split along three only of the lines, and again a line not split was that closest to the placenta.

That these lines are the places where the carpels are connate into the ovary admits of doubt because in fruits with four lines, the placenta is rarely central upon any one of the valves. The development must be followed out to demonstrate that it is as one would expect. The fruit-wall is composed of brown parenchymatous cells, white sclerenchyma fibres and a margin of cork with numerous powdery lenticels.

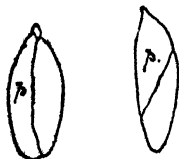
The sclerenchyma fibres are in bundles of 8-30 and anastomose; but not across the lines where the fruit-wall is ruptured. In their absence at these spots lies the weakness: which associated with a slightly lesser thickness, locates the rupture of the dead tissues under the pressure of the growing seedling within.

A comparative study of the distribution of these sclerenchyma fibres in the fruit-wall of the Dipterocarps, and above all of their relationship to the way in which the young plant makes it way out, seems to be most desirable; but it will be a long time before sufficient material for it can be got together.

Before the fruit-wall gives way, the growing embryo has endured a period of compression: and if the distribution of the pressure is made abnormal, it stows itself in a modified way. Insect-punctures and other forms of injury to the fruit-wall change this pressure: and a slightly greater resistance to being pushed against the wall in the placenta of the tree 815 appears to be the force which leads to so many of that tree's fruits curving as in figure 2 above. In these curved fruits the placenta is along the less convex side, and the dorsal cotyledon almost always just excludes the placental from the apex of the fruit cavity. In a more or less straight fruit the embryo in side view is thus:—



both cotyledons reaching the apex, but the placental along the base. But with the pressure abnormal and particularly if the injury has passed through the fruit wall reaching the embryo as for instance a Hemipteron's tongue is generally meant to do, various changes affecting sometimes one side, sometimes another side of the embryo, appear; the embryo may then be unilateral or the dorsal cotyledon may have lost position or the placental cotyledon as in the two further diagrams here following. In the one the placental cotyledon seems to have sustained a set back; and in the other the



dorsal, the results of which have been in the one to produce an embryo closely similar to that of *Vatica Wallichii* (see Jour. Str. Br. Roy. As. Soc. no. 81, p. 76, figures 209-212), and in the other an embryo suggesting somewhat that of *Balanocarpus maximus* (see p. 4 of the same).

The lesson to which these observations seems to point, is that the embryo of *Dipterocarps* possesses a considerable amount of plasticity.

This note closes with a few remarks upon the Malayan *Dryobalanops* known as "Koladan,"\* a member of its genus which uses the wind in no way for the transport of its fruits. They are as here drawn, and in germination the wall is split along three lines

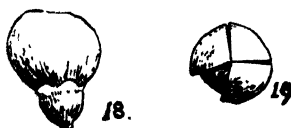


Figure 18. A fruit of Koladan, showing an obliquity by no means uncommon, the placental side being smaller than the other. Figure 19 the same seen from the end showing which of the cracks usually it forced open the most: the placenta is uppermost.

in exactly the same way as in *Dryobalanops aromatica*. The embryo is further as in that species (vide No. 4, Jour. Straits Branch Roy. As. Soc., No. 81, 1920, p. 56) and so also is the young seedling. It was not remarked of that species; but may now be remarked after studying *Koladan* somewhat, that the seedling has a great tendency to force rupture along two lines and to come to the light by pushing aside a panel of the wall which is diametrically opposite to the placenta.

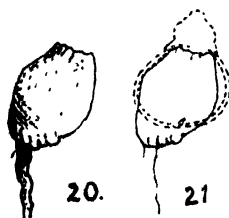


Figure 20. A seedling of "Koladan" in the position in which it throws off its seedcoats and the fruit wall.

Figure 21 shows the fruit wall in broken dotted lines imposed over an outline of a seedling in germination to indicate where the greatest pressure appears to occur.

\* *Dryobalanops* sp.—Koladan, Foxworthy in Malayan Science Bulletin, vol. 1, 1921, p. 76.



# New and Rare Malayan Plants.

SERIES XII.

BY H. N. RIDLEY.

The forest of the Malay Peninsula still continues to supply to the botanist many new and interesting species; and it will doubtless be many years before it becomes difficult to add to the list of our flora. The following additions continue the series published in the Journal of the Straits Branch of the Royal Asiatic Society. Some of them are of plants collected by myself in Selangor, and in a short but productive excursion to Bukit Tangga in Negri Sembilan in December 1920, and to the Semangkok Pass in January 1921. Others were collected by Mr. H. C. Robinson, C. B. Kloss and Mr. Seimund in various parts of the Peninsula.

The Bukit Tangga locality is 14 miles from Seremban where there is a small rest house situated at the top of the pass to Jekebu. The hill behind the bungalow rises to about 2,400 feet elevation and is densely afforested to the top. Although generally speaking this area has a flora closely resembling that of the Selangor hills, it contained quite a number of novelties which are certainly absent from Selangor. Many years ago Mr. Cantley had a collector in this district and it was probably near here that he obtained a number of plants never since collected.

## POLYGALACEAE.

***Polygala (Chamaebuxus) pulchra***, Hassk. Flor. XXV. 142.

Beibl. 32.

A slender woody shrub about 4 feet tall. Leaves membranous thin, oblong-lanceolate; nerves slender, 9 pairs: 8 in. long, 3 in. wide; petiole .25 in. long. Racemes short, about 1 in. long, pendulous. Sepals 2, outer ones short, one succate ovate acute, the other smaller ovate, green petaloid. Sepals ovate round, .25 in. long. Petals 2, short, oblong blunt; keel 4-lobed, fleshy, not crested. All white tinted yellow. Capsule obovoid orbicular, deeply retuse, not winged except at the tip, green tipped purple or nearly all purple violet, .2 in. long, .3 in. wide. Seed subglobose, aril scarlet.

*Hab.* In hill woods, Negri Sembilan, Bukit Tangga, *Ridley*. Selangor, Ginting Bidai, *Ridley*. Also in Java and Sumatra.

This species is quite distinct, especially in life, from *P. venenosa* in its slender woody stem, its thinner leaves, short racemes not elongating to 5 inches long or more, the smaller flowers with small obovate rounded petaloid sepals and the smaller capsule not winged along the sides. It is not so striking a plant as the great succulent *P. venenosa* so common and conspicuous in our forests, nor are the flowers so brightly coloured in spite of its name.

## MELIACEAE.

**Turraea breviflora** Ridley, n. sp.

A glabrous shrub. Leaves thin membranous, alternate, lanceolate acuminate cuspidate, narrowed and cuneate at the base, nerves about 10 pairs distinct beneath; 6.5 in. long, 2 in. wide; petiole .3 in. long. Flowers 3 or 4 on a very short .1 in. long axillary pubescent raceme, green; pedicels very short. Bracts minute ovate. Sepals connate at base with 5 short acute points. Petals 5, linear blunt, .25 in. long. Stamen-tube stout cylindric, shorter than petals with rather long filaments alternating with the anthers from the top of the tube; anthers elliptic 10, sessile with a long terminal process. Disc short and thin, lining the base of the tube. Style rather stout, hairy. Stigma capitate. Ovary conic hairy.

*Hab.* In woods; not common. Singapore, Serangoon, *Ridley* 9114; Selangor, Ulu Selangor, *Goodenough* 10612; Kauching, on limestone rocks, *Ridley*.

This species is very unlike the others of the genus in its very short green flowers, but there are a few in Africa which resemble it to some extent. The fruit has not been collected and till it is known it would be better to leave this plant in the genus *Turroea* to which at least it is nearest.

## RHAMNACEAE.

**Zizyphus pernettyoides** Ridley, n. sp.

A spiny creeper with slender stems covered with scattered brown hairs. Leaves ovate acuminate, base round obscurely crenulate, coriaceous sparsely hairy on the edge, nerves 3, prominent and reticulations conspicuous when dry; .5 in. long, .25 in. wide; petiole very short hairy, spines straight slender .25 in. long. Flowers .1 in. wide, greenish yellow in axillary fascicles of three in upper axils; pedicels very short .1 in. long. Sepals 5, triangular ovate with a few long hairs at the tips. Petals 5, half as long, spoon-shaped, clawed with an elliptic blunt limb. Stamens 5, very slender wrapped in the petals. Disc fleshy filling the tube. Ovary sunk in the disc with 2 short stigmas.

*Hab.* Lankawi, Dayang Bunting, *Robinson* 6193. Creeper; flowers greenish yellow, December 7, 1916.

A remarkable little plant with the smallest leaves of any *Zizyphus* known to me.

## MYRTACEAE.

**Eugenia alata** Ridley, n. sp.

Tree, glabrous; branches 4-angled and winged in the upper part with 4 low wings along the angles. Leaves thinly stiff cori-

aceous, elliptic acuminate cuspidate; nerves 14 pairs prominent beneath, secondaries nearly as prominent, intramarginal nerve .1 in. from the edge, midrib prominent beneath; 6 to 8 in. long, 2.5 to 5 in. wide; petiole thick, grooved, above. Corymb compound, cymes 4 in. long and wide. Flowers numerous, congested at the branch ends; branches flattened, 4-angled. Calyx and pedicel club-shaped .2 in. long. Corolla small calyptrate. Stamens short and rather few.

*Hab.* Selangor, Semangkok Pass, track to Bukit Tegala, Ridley.

The flowers were in young condition and may perhaps when fully developed be larger. In one tree the inflorescence bore numerous bodies like round flattened lobed fruits; these proved to be flowers aborted by a number of galls in the ovary. The petals appear to be completely joined together so that it belongs to the calyptrate section, the curiously angled and winged branches and inflorescence branches is different from any other species I have seen.

## ARALIACEAE.

### *Trevesia rufo-setosa* Ridley n. sp.

A shrub with the habit of *Trevesia sundaica* Miq. Leaf palmate of seven lobes, base cordate, lobes more or less elliptic shortly cuspidate, edges undulate with short upcurved thorns, above glabrous except the nerves, and centre red-hairy and covered with small raised dots apparently hair bases; nerves 9, two on the lowest lobes, whole about 12 inches long and wide, the lobes cut down for 9 inches, and 3 to 4 inches wide, the lowest pair dilate on the lower edge at the base; petiole stout at the base and narrower upwards, 2 feet long, densely covered with red brown bristly hairs nearly .2 in. long. Inflorescence 8 in. long, flexuous, stout with a few short branches densely covered with similar hairs. Flowers unisexual on the same inflorescence .25 in. across with pedicels .4 in. long in umbels subsessile on the branches. Bracts linear acuminate caudate, very narrow .5 in. long. Calyx obconic densely red hairy; limb very short and obscure, lobed. Corolla stellate, spreading, lobes 5, triangular hairy beneath, coriaceous. Stamens 5, glabrous; filaments thick at base as long as the corolla; anthers large ovate cordate. Style in female flowers rather tall cylindric; stigma bifid with two short lobed oblong arms recurved. Ovary 5-celled.

*Hab.* Hill forests. Selangor, Semangkok Pass at 2500 feet alt., Ridley.

Nearest to *T. Beccarii* Boerlage, of Sumatra; but the dense indumentum of red brown hairs flattened at the base and acuminate-covering the petiole and the whole of the inflorescence except the inner face of the petals, stamens, style and disc, is very distinct. The few stamens, 5 only, is also unusual.



## RUBIACEAE.

**Tarenna calcarea** Ridley, n. sp.

A shrub with white shining branches. Leaves membranous ovate cuspidate with a long point drying black; base cuneate; nerves 4 to 5 pairs; 4 to 5 in. long, 2 to 3 inches wide; petiole 1 in. long, slender. Stipules short, broad, triangular with short points. Cymes 1.5 inches long, terminal, lax, few-flowered; peduncles .25 inches long. Bracts short lanceolate acute. Calyx very small under .05 in. long, cup-shaped with 5 short acute points. Corolla-tube cylindric, rather thick, .12 inches long, lobes oblong, blunt nearly as long; anthers acuminate nearly as long as the sepals. A little white hair at the base of the corolla-lobes.

*Hab.* Limestone rocks. Perak, Ipoh, *Ridley*.

Its set of *Tarennas* are somewhat closely allied and this is nearest to *T. adangensis* Ridley, but the leaves are larger and thinner and the corolla rather small, the throat being only sparsely white hairy. Nearly all of the set are inhabitants of limestone rocks and each area of limestone seems to have a distinct species or variety.

**Pavetta indica** Linn.

This species was based mainly on a drawing of Rheede's Hortus Malabaricus v. p. 19, t. 20. and in the Flora of British India, nearly all the *Pavettas* with large corymbs are put underneath *Pavetta indica* as the species intended by Linnaeus or as varieties of it. It seems to me however, that there are a good many distinct species included in *Pavetta indica* Hook. fil., Flora of British India iii. p. 150.

I make out the following species.

**Pavetta indica** var. **canescens**. *P. canescens*, Wallich Cat. 6181. Singapore.

Bush; branches softly velvety hairy. Leaves thin, lanceolate narrowed to the base with the nerves and sometimes the whole leaf beneath softly thinly hairy 6 to 8 in. long, 1.75 to 3 in. wide; petiole 1 to 1.25 in. long. Corymbs 2 in. long, 3 in. wide on a peduncle 2 inches long or less, pubescent. Stipules ovate with a long terete point. Flowers white; pedicels slender .1 in. long, pubescent. Calyx very small, cup-shaped with very short points pubescent. Corolla-tube .5 in. long, slender, lobes oblong blunt, .1 in. long. Style .6 in. long.

*Hab.* Singapore, *Wallich*; Kranji, *Ridley* 2880. Malacca, *Griffith*. Negri Sembilan, Johol. Selangor, Ginting Sempah, *Robinson and Kloss*. Perak, Gunong Hijau, *Mohamed Haniff and Mohamed Nur*, 2451, flowers shorter. Changkat Mentri, *Kloss* 6510, nearly quite glabrous.

**Var. typica.**

Similar but glabrous. Leaves smaller. Flowers shorter, corolla-tube much thicker.

*Hab.* Perlis, Chuping, *Ridley* 14991.

**P. tomentosa** Roxb. ex Smith in Rees Cyclop. XXVI. No. 2.

*P. indica* var. *tomentosa* Hook. fil. Fl. Brit. Ind. iii. 150 (in part).

Shrub; stem, underside of leaves and inflorescence densely soft velvety tomentose. Leaves thickly membranous drying black, above sparsely hairy; midrib tomentose elliptic-lanceolate, 3 to 5 inches long, 1.5 to 1.75 in. wide; nerves 9 pairs not distinct above; petiole 1 inch long. Stipules ovate cuspidate, tomentose. Inflorescence on short lateral leafy branches and terminal, branches 3 inches long. Corymb 3 inches wide; pedicels rather slender. .25 in. long. Calyx small; limb short with 5 short acute points. All tomentose. Corolla-tube .12 to .25 in. long; lobes oblong, subacute .1 in. long or less. Fruit globose, .15 inches through when dry.

*Hab.* Singapore, Changi. Johor, Batu Pahat and Sedenak. Malacca, *Maingay*, *Griffith*, *Cuming* 2304; near the town of Malacca, *Ridley*.

*Distrib.* India.

**P. graciliflora** Wall. Cat. 6178. *P. petiolaris* Wall. Cat. 6186.

Glabrous shrub about 6 feet tall. Leaves thin, elliptic-lanceolate cuspidate acuminate, base long narrowed; nerves 8 pairs in-arching well within the margin, 7 in. long, 2 inches wide; petiole slender .5 in. to 2 in. long. Stipules triangular blunt. Inflorescence borne on lateral branches, 6 to 8 inches long, base except for a pair of leaves usually smaller at the top. Corymbs many flowered, 3 to 4 in. wide, lax. Pedicels very slender, filiform .25 to .5 in. long. Calyx very small; limb cup-shaped with 5 minute points. Corolla pure white, tube slender, .75 in. long, lobes oblong blunt, narrow .12 in. long. Style .5 in. longer. Fruit globose pear-shaped, grey green to black, .25 in. through.

*Hab.* Common in forests; a very pretty shrub. Malacca, Chabau forests, *Griffith*. Negri Sembilan, Bukit Tangga at 2000 ft. alt., *Ridley*. Selangor, Menuang Gasing, *Kloss*; Sempang, *Ridley* 15663, a form with lanceolate leaves 4 in. long, .75 in. wide; Ginting Sempah, *Ridley*. Perak, Ulu Bubong, *Kunstler* 10202; Temengoh; Tapah. Penang, *Wallich and Maingay*. Kelantan, Chaning, *Ridley*. Kedah, Kedah Peak, *Robinson and Kloss* 6119.

This species was referred by King to var. *polyantha* Hook. fil., —a distinct Indian plant. Wallich had a specimen from Finlayson in flower, No. 6178, and one from Penang in fruit 6186, and did not recognise them as the same thing. The plant varies chiefly in the size of the leaves. A plant obtained by me in Kelantan has leaves nearly 12 in. long, and 3.75 in. wide, and the pedicels are much shorter than in the type.

**P. pauciflora** Ridley, n. sp.

A small glabrous tree. Leaves thin, elliptic lanceolate, long acuminate, acute, long narrowed to the base; nerves 6 pairs in-arching; 4 to 6 in. long, .5 to 1.5 in. wide; petiole slender, .5 in. long. Stipules triangular, cuspidate. Corymb very lax, 1.5 in. long with three very slender branches one inch long bearing cymes of three or more flowers on filiform pedicels .5 in. long. Bracts at base of branches stipuliform rather large. Calyx-tube subglobose with 4 short lobes. Corolla white, tube very slender .5 in. long, lobes 4, oblong blunt, .2 in. long. Stamens as long; anthers linear twisted. Style projecting for .5 in. long. Stigma gradually clavate. Fruit globose crowned with the tubular calyx.

*Hab.* Dense forests on limestone rocks. Selangor, Batu Caves, Dec. 1920, *Ridley*.

Allied to *P. graciliflora* Wall. but differing in the lanceolate leaves with very much smaller cymes and fewer flowers, more slender and smaller, and anthers as long as the corolla-lobes.

**Psychotria lanceolaria** Ridley, n. sp.

Slender shrub, glabrous. Leaves lanceolate acuminate, long narrowed to the base, membranous; nerves 10 pairs, slender forming bold arches within the margin, 6 in. long, 2 in. wide; petiole very slender 1.5 in. long. Stipules ovate acuminate, .12 in. long. Cyme 1 in. wide and as long; peduncle .25 in. long; branches few and few flowered; bracts and branch bases large like the stipules. Flowers small on very short slender pedicels. Calyx cup-shaped with 4 short ovate acute points. Corolla .1 in. long, tube longer than calyx silky within, lobes as long as tube oblong blunt. Fruit .2 in. long, globose, very obscurely 4-ridged.

*Hab.* Selangor, Batu Caves, *Ridley*.

Near *P. minutiflora* Ridley and *rostrata* but the larger flowers and differently shaped calyx distinguishes it from the former and the narrow leaves and more condensed cyme from the latter.

**Psychotrea atroviridis** Ridley, n. sp.

Shrub 12 in. tall; stem hairy. Leaves oblanceolate-obovate, coriaceous glabrous; midrib prominent, nerves 11 pairs prominent on both sides, 7 in. long, 4.25 in. wide; petiole .5 in. long, thick. Stipules oblong. Cymes 3, terminal 1 in. across. Peduncle 2 in. long. All puberulous. Flowers many, white, very shortly pedicelled. Calyx cup-shaped with 5 short ovate blunt lobes. Corolla-tube as long, lobes oblong, blunt. Fruit ellipsoid slightly flattened with 12 ribs, .25 in. long.

*Hab.* Negri Sembilan, top of Bukit Tangga, at 2500 ft. alt., *Ridley*.

Allied to *P. stipulacea* but quite dwarf, almost stemless, the leaves larger and the inflorescence puberulous.

**Cephaelis melanocarpa** Ridley, n. sp.

Shrubby plant 3 feet tall, glabrous. Leaves narrow oblanceolate acuminate cuspidate, long narrowed to the base; nerves 20 pairs, curved ascending, paler beneath; 8 in. long, 2 in. wide; petiole slender, 1.5 in. long. Stipules broad blunt oblong-ovate. Peduncles stout, white and fleshy in fruit, 2 to 3 in. long. Bracts lanceolate, keeled and cuspidate 1 in. long. Flowers not seen. Fruit black elliptic narrowed to the base, .25 in. long. Seed flattened, ellipsoid with both edges keeled and a central rib, making in fruit when dry 4 ribs.

*Hab.* Negri Sembilan, forests near the top of Bukit Tangga Ridley.

Dried specimens much resemble *C. singapurensis* Ridley but the lanceolate mucronate bracts distinguish it and in life the swollen white peduncle and black, not pale blue, fruits distinguish it readily.

**Spermacoce** Linn.

This genus was originally based on several species of small herbs from S. America and two Asiatic ones of which one, *Spermacoce hispida*, occurs in our area, but lately this latter with a number of other Asiatic species has been separated from the American ones under the name of *Borreria*, while the *Spermacoce sarmentosa* Bl. is separated under the name of *Diodia sarmentosa* Sw. It is not rare in the Malay Peninsula, and occurs also in Banca, Java and Sumatra, and also in S. America whence it has probably been introduced into Asia. *Diodia* differs from *Borreria* in the cocci of the fruit, not dehiscent on the inner face. Of *Borreria* we have the following species in the Malay Peninsula.

1. **Borreria latifolia** K. Schum. in Mart. Fl. Brazil, vi. 63.

This was the plant described by me by error as *Diodia sarmentosa* in Journ. Roy. As. Soc. S. Br. 73, p. 145. It first appeared in Singapore in 1915, and curiously no specimens have been seen from any other part of the Old World. It is a native of S. America.

2. **B. hispida** K. Schum. in Engl. Pflanzenfam. iv. 4, p. 144.  
*Spermacoce hispida* Linn. Sp. Pl. 102.

This is common all over the Peninsula and occurs in India and the Malay islands. It does not appear to have been met with in S. America and is the only species with pink flowers.

3. **B. laevicaulis** Ridley. *Bigelovia laevicaulis* Miq., Fl. Ind. Bat. ii. 335. *Spermacoce stricta* King, in Journ. As. Soc. Beng. p. 90, 189, not of Linnaeus.

Common in the Malay Peninsula and occurring in Bombay and Java.

4. **B. setidens** Ridley. *Bigelovia setidens* Miq., Fl. Ind. Bat. ii. 336.

Common all over the Malay Peninsula and occurring in Java.

**3. *B. pilulifera* Ridley, n. sp.**

Slender erect, branched herb with few branches 14 in. tall; stems angled, ciliate along the angles. Leaves elliptic-lanceolate, narrowed to the base, rather fleshy, glabrous, pale beneath; nerves 5 pairs, 1 in. long, .4 in. wide; petiole .1 in. long; 2 shorter leaves usually at the base of the heads. Stipules very short, with short bristle. Heads .25 in. through, numerous bristles between the flowers. Calyx glabrous bifid. Corolla very short, white. Capsule obovoid. Seed rather large ellipsoid, dark brown, very obscurely reticulate.

*Hab.* Roadsides, Selangor, Klang Gates, *Ridley*.

**6. *B. parviceps* Ridley, n. sp.**

Very slender erect herb, simple or with one or two branches; stems angled with low wings, glabrous, 18 in. tall. Leaves in simple pairs lanceolate acute and narrowed to the base sprinkled with white hairs above, paler and scabrid beneath, .5 in. long, .25 in. wide; nerves 3 pairs sparsely hairy beneath; no petiole. Stipules very short with very numerous setae. Heads .12 in. through; flowers small with fewer and shorter bristles than the last. Calyx glabrous, bifid. Corolla white, very short. Capsule smooth glabrous. Seeds ellipsoid, dark brown, smaller than the preceding and deeply pitted.

*Hab.* Roadsides, Negri Sembilan, Bukit Tangga Pass, *Ridley*.

**MYRSINACEAE.*****Embelia subcordata* Ridley, n. sp.**

Slender climber; branches covered with red brown glandular hairs. Leaves distichous, oblong-lanceolate, blunt base broad subcordate, chartaceous, densely gland-dotted beneath glabrous except the hairy midrib; nerves very faint, about 10 pairs, 1.5 in. long, .6 in. wide; petiole hairy very short under .1 in. long. Flowers minute in axillary fascicles of 2 to 5; pedicels puberulous, .025 in. long. Calyx-lobes 5, ovate blunt, glabrous with 8 red glands outside. Corolla twice as long, lobes ovate, blunt, glabrous except the ciliate tip. Anthers oblong ovoid with 4 warts on the back. Pistil glabrous.

*Hab.* Selangor, Semangkok Pass on the track to Fraser's hill, *Ridley*.

This species has the appearance of *E. pulchella* of Siam, but the flowers are much smaller and almost completely glabrous.

**APOCYNACEAE.*****Ervatamia pauciflora* Ridley, n. sp.**

Shrub about 8 feet tall; bark pale whitish. Leaves thin membranous elliptic, blunt cuspidate, base narrowed, 7 inches long, 3 in. wide; nerves 10 pairs; nervules invisible; petiole .75 in. long.

Cymes in upper axils; peduncle .25 in. long; pedicels .5 in. long. Flowers white, 2 to 3 in a cyme. Calyx-lobes separate half way down oblong blunt, edge ciliate, whole calyx .1 in. long. Corolla-tube cylindric .5 in. long, lobes linear blunt. Stamens small; anthers oblong not apiculate. Style very slender. Follicles oblong narrowed and acute at both ends falcate, 1.25 in. long, .5 in. thick.

*Hab.* Mountain forests, Selangor, Ginting Sempah, *Ridley*.

Var. **minor** *Ridley*.

Leaves 4 in. long, 1 in. wide with about 8 pairs of nerves; petiole .2 in. long. Peduncle .1 in. long; pedicels .2 in. long. Calyx .8 in. long. Corolla-tube .6 in. long; lobes linear blunt, .25 in. long.

*Hab.* Negri Sembilan, Bukit Tangga at 2400 ft. alt., *Ridley*.

Allied to *E. jasminiflora* *Ridley*, but the flowers are smaller with shorter corolla-tube and small stamens.

## ASCLEPIADACEAE.

***Hoya citrina*** *Ridley*, n. sp.

Stout, long, pendent plant. Leaves thick, fleshy stiffly coriaceous ovate, base broad, round, subcordate; nerves three conspicuous when dry with about 4 pairs of lateral nerves from the central nerve broken up into reticulations large and lax, 4 to 4.5 in. long, 3 in. wide; petiole very thick .75 in. long. Peduncles stout, 2.24 in. long; raceme thickened lengthening to over 1 in. long with very numerous close set broad bracts. Pedicels .6 in. long. Flowers 3 in. wide; sepals ovate blunt. Corolla-lobes triangular ovate acute, light yellow. Corona pinkish red, lower lobe long acute, lanceolate.

*Hab.* Limestone precipices, Selangor, Batu Caves, *Ridley*. Perak, Ulu Bubong on a tree in jungle, *Kunstler* 10316; Batu Kurau, *Scortechini* 1626.

The Perak plants were referred by King and Gamble to *H. parasitica* Wall. from which they differ in the ovate cordate leaves, with three distinct nerves from the central one of which rise about 4 pairs of lateral nerves quickly broken up into reticulations. The flowers are very similar in both species except in colour, these being yellow with a red corona; those of *H. parasitica* pinkish white with a white corona, the corolla-lobes in this species are also triangular acute, not cordate.

***Cynanchum Seimundii*** *Ridley*, n. sp.

Herbaceous climber, glabrous except inflorescence. Leaves thin membranous, ovate acute, base cordate; nerves 6 pairs, 6 in. long 5 in. wide; petiole 3 in. long or smaller. Corymbs axillary; peduncle 1.5 in. long. Flowers about 20; pedicels .5 in. long puberulous. Calyx-lobes very short, rounded ovate. Corolla .25 in. across, tube very short, lobes valvate lanceolate acute, spotted at the tips.

Corona fleshy at base attached to the corolla above with lanceolate retuse lobes shorter than the stamens. Anthers square, truncate with 3 inflexed points. Pollinia pendulous oblong with a long slender pedicel.

*Hab.* Pahang, Kwala Tahan, *Seimund*.

## LOGANIACEAE.

### **Gaertnera ovata** Ridley, n. sp.

Woody shrublet. Leaves glabrous, broadly obovate, shortly cuspidate, base narrowed gradually; nerves 9 pairs prominent beneath, 9 in. long, 4 in. wide; petiole winged to the base, .25 in. long, stout. Stipules connate rather large with a broad lanceolate point. Peduncles below the leaves slender, 3 in. long with 2 branches and distant stipules forming a tube with the midribs prominent and ending in mucros as long as the tube, slender acute. Cymes small 1 in. long with about 6 short branches, the lowest under .5 in. long. Flowers sessile about 4 in a small head at the end of each branch. Calyx short, cup-shaped with very short points. Corolla .1 in. long, tube thick shorter than the lobes, the lobes oblong round at tip, white, hairy at mouth of tube.

*Hab.* Selangor, Semangkok Pass, *Ridley*.

### **Gaertnera rigida** Ridley, n. sp.

Low shrub about 3 feet tall, quite glabrous. Leaves stiff, rigid drying grey, coriaceous, lanceolate acuminate, long narrowed to the base, smooth shining above with prominent midrib, beneath minutely papillose all over; nerves 8 or 9 pairs with the nervules and reticulations prominent beneath, 9 in. long, 3.5 inches wide; petiole 1.25 inches long flattened above and slightly winged to the base. Stipules .75 inches long, forming a tube split on lower face half way down and prolonged into a lanceolate bifid point above. Inflorescences borne on long lateral branches 9 inches long bare except for a pair of narrow lanceolate acuminate leaves 4 in. long, .75 inches wide at the top subtending the inflorescence. Cymes 1 in. long of 3 branches. Calyx-lobes very short. Flowers not seen. Fruit globose or double with one or two seeds .25 in. through.

*Hab.* Dense forest, Negri Sembilan, Bukit Tangga, base of hill, *Ridley*.

I was unable to find flowers of this species: in foliage it resembles *G. lanceolata* Ridl., but the inflorescence is very short.

## CONVOLVULACEAE.

### **Ipomoea Pes-Caprae** Roth.

I was surprised to find a considerable sized patch of this sea-shore plant on a track leading to a saw-pit at Bukit Tangga. It was flowering and fruiting well. I have seen it some way from the sea

on a sandy bank on the railway near Kota Bharu in Kelantan, but never before as far from the sea shore as at Bukit Tangga, about 35 miles away. It is probable that a cart load of seed and containing seeds of this convolvulus had somehow been sent to this spot, and the seeds had germinated and grown on a sandy spot near the stream edge where I found it.

### CYRTANDRACEAE.

#### **Didissandra castaneaefolia** Ridley, n. sp.

Stem 3 in. tall. Leaves oblong to lanceolate-oblong, base narrowed minutely unequally cordate, edge coarsely serrate, membranous glabrous above; nerves 15 pairs and midrib coarsely hairy beneath 5.5 to 7 in. long, 1.75 to 2 in. wide; petiole 1.75 to 3 in. long, coarsely hairy. Peduncles 4 in. long, coarsely hairy. Flowers in a terminal cyme of 3. Bracts linear-oblong, .12 in. long. Sepals lanceolate acuminate, blunt .3 in. long, .1 in. wide, hairy. Corolla .75 in. long sparsely short hairy, lobes small, limb .4 in. wide (when dry).

*Hab.* Pahang, Kwala Teku, *Seimund*.

I have no clue as to the colour of the flowers of this species which is most nearly allied to *D. glabrescens* Ridley, but it is much more hairy and has more and smaller flowers.

#### **Didymocarpus castaneaefolia** Ridley, n. sp.

Stem erect, woody over 4 in. long, .2 in. thick corky. Leaves chartaceous lanceolate elliptic subacute, base cuneate, edge closely serrate, glabrous above except the midrib and nerves in young leaves; nerves about 25 pairs parallel, sunk above inarching within the margin, 5 in. long, 2 in. wide; petiole .5 in. long, hairy. Scapes 7 in. long hairy, in upper axils with about 5 flowers, the lower pair distant from the terminal ones. Bracts narrow lanceolate linear, green hairy .4 in. long. Pedicels .25 in. long, purple hairy. Sepals lanceolate-acuminate .12 in. long. Corolla 1.5 in. long, tube cylindric at base gradually dilate upwards, limb .5 in. wide, lobes blunt rounded. Capsule 2.5 in. long, narrow, cylindric.

*Hab.* Mountains at 5,000 ft. Perak, Gunong Inas, *Yapp* 438.

Allied to *D. venusta* but the leaves more closely serrate and distinctly petioled.

#### **Loxocarpus minimus** Ridley, n. sp.

Small stemless herb. Leaves 2 or 3 ovate to oblong-lanceolate or oblanceolate, densely white silky all over, .5 to .75 in. long, .2 to .25 in. wide; petiole .5 in. long or less. Peduncle 1.5 in. long slender, silky bearing one to two flowers at the top. Pedicel .1 in. long. Bract small linear. Sepals lanceolate .10 in. long, silky. Corolla hardly longer campanulate, .2 in. long, light blue-violet.

*Jour. Straits Branch*



sub-regular, hairy outside. Style longer; stigma large, round. Capsule ovoid beaked, hardly longer than calyx, splitting on the upper edge. Seeds oblong acute, pitted reticulate, dark green.

*Hab.* On two damp rocks in the forests, Negri Sembilan, Bukit Tangga, *Ridley*.

This remarkable little plant differs from the typical *Loxocarp* in the short regular corolla and ovoid capsule which however, dehisces normally on the upper edge.

***Cyrtandra patula* Ridley, n. sp.**

A big spreading shrub about 6 feet tall, bark corky wrinkled transversely pale, below glabrous; young parts tomentose. Leaves opposite, chartaceous oblanceolate acute, base long-narrowed blunt, edge serrate, glabrous above; nerves slender 15 pairs and midrib hairy beneath; young leaves thickly tomentose, 11 to 12 inches long, 4 inches wide; petiole thick .25 to .5 in. long, when young densely tomentose eventually glabrous. Cyme .4 in. long with about 7 or 8 flowers, silky hairy. Bracts small, hairy. Pedicels .1 to .2 in. long. Calyx tubular with 5 very slender points silky hairy, .1 in. long, yellowish. Corolla .5 in. long, campanulate, lobes rounded hairy outside, dull white with brown mottling in the throat. Stamens white; anthers connivent. Fruit .5 in. long, slender cylindric, narrowed to the style.

*Hab.* Negri Sembilan, Bukit Tangga. In muddy streams in dense forest behind the Bungalow, *Ridley*.

Allied to *C. batariensis* Clarke of Java.

**ACANTHACEAE.**

***Ebermaiera longispica* Ridley, n. sp.**

Herb over 12 in. tall, quite glabrous. Leaves rather thin, broad lanceolate, narrowed to both ends; nerves 18 pairs parallel; 6 in. long, 2 in. wide; petiole slender, 2 inches long. Inflorescence racemose, racemes solitary axillary solitary or 2 to 4 in a panicle, with peduncle 3 inches long. Flowers numerous distant. Bracts ovate or oblong blunt foliaceous, petioled, .25 in. long and .12 in. wide. Pedicel .1 in. long. Sepals lanceolate acuminate. Corolla .75 in. long, tube narrow cylindric at base, .25 in. long, gradually dilate to limb, .5 in. long, dull pink outside, and within tube, limb lobes blunt, .1 in. long, white. Stamens 4, diadelphous, shorter than tube. Style included; stigma bifid. Capsule oblong .15 in. long.

*Hab.* Woods, Negri Sembilan, Bukit Tangga. Selangor, Ulu Gombak, *Ridley*.

The only plant this seems to be at all near is *E. Griffithiana* which has the same kind of broad oblong bracts.

***Strobilanthes latebrosa* Ridley, n. sp.**

Big spreading shrub 8 feet tall, glabrous. Leaves chartaceous, ovate-lanceolate cuspidate blunt, base decurrent on petiole, edge undulate; nerves 10 pairs, secondary nerves almost as conspicuous; 9 in. long, 4 in. wide; petiole 1.5 in. long. Flower heads solitary or in threes axillary or on short lateral shoots, 1.25 in. long; peduncle .3 in. long. Bracts numerous, large leaflike, outer ones ovate 1 in. long, .5 in. wide, inner ones linear-lanceolate blunt, narrower, hairy, all green. Corolla 2 in. long, 1 in. across the limb, white, tube slender, cylindric at base .5 in. long, above abruptly dilated, urn-shaped, lobes short, round. Stamens enclosed in tube. Capsule .75 in. long subacute, not dilated at tip, 4-seeded. Seeds rounded ellipsoid.

*Hab.* Negri Sembilan, Bukit Tangga forests, *Ridley*.

Allied to a Javanese plant named *S. grandis*, Clarke in Herb. Kew, collected by Forbes.

***Strobilanthes leucopogon* Ridley, n. sp.**

Shrubby branches angled glabrous. Leaves chartaceous, lanceolate acuminate narrowed to a blunt sub-truncate base, edge slightly undulate; nerves 7 pairs, elevate, transverse nervules few, sub-horizontal elevate beneath; 6 in. long, 2 in. wide; petiole under .1 in. long. Racemes in terminal axils, on branches .5 in. long with a pair of much reduced leaves at their bases 1.5 in. long, cylindric. Bracts ovate-oblong blunt, .15 in. long, .08 in. wide covered with long white spreading hairs, corolla-lobes narrow linear spatulate, white hairy, shorter than sepals. Corolla .75 in. long pure blue, tube at base slender then funnel-shaped; lobes sub-equal, mouth .4 in. across.

*Hab.* Kedah, Lankawi Islands, Dayong Bunting, *Robinson 6196*; flowers pure blue.

This is nearest to *S. niveus*, Craib.

***Barleria siamensis* Craib, var. *glabrescens* Ridley, n. var.**

Plant much smaller in vegetative parts than the type, 12 in. tall, glabrescent. Leaves oblong acuminate rather abruptly, tip blunt, 3.5 in. long, 1.5 in. wide, glabrous above, roughly appressed hairy on nerves and nervules beneath; petiole roughly hairy. Flowers 2 in. long. Bracts ovate hairy on nerves but much more glabrous than in type.

*Hab.* Kedah, Lankawi Islands, Dayong Bunting, *Robinson*, Nov. 1916.

The type of this, *B. siamensis*, Craib in Kew Bull., 1911, p. 431, was collected at Doi Sutep at 2,300 to 2,500 feet. It attains the height of 5 feet, the leaves 8 in. long by 3 in. wide with a longer acuminate point and the whole plant is much more hairy. The Lankawi plant is dwarfer with smaller leaves, more glabrous.

**Gymnostachyum Robinsonii** Ridley, n. sp.

Stem shortly creeping, ascending, woody, 2 in. long. Leaves elliptic-ovate to round blunt, base shortly decurrent on the petiole, scabrid above and beneath; midrib above and beneath and 5 pairs of nerves scurfy pubescent 1.25 to 2.25 in. long, 1.1 to 1.75 in. wide; petiole flattened .5 to 1.25 in. long. Raceme 3 in. long, sometimes branched, pubescent, slender. Flowers solitary about 10 in the raceme. Bracts narrow linear pubescent .1 in. long. Calyx shorter, lobes linear acuminate with broader base, very narrow pubescent. Corolla .4 in. long, puberulous.

*Hab.* Kedah, Lankawi islands, Dayong Bunting, *Robinson*, Nov. 1916.

Allied to *G. diversifolium* but the flowers much smaller.

**Eranthemum candidum** Ridley, n. sp.

Glabrous simple, shrubby plant. Leaves lanceolate acuminate at both ends, membranous; nerves 8 pairs ascending, 5 to 6 in. long, 1.5 to 2 in. wide; petiole .75 in. long. Raceme 6 in. long; peduncle 6 to 9 in. long. Flowers distant, solitary or paired; pedicels .1 in. long; bracts lanceolate acuminate from a broad base shorter. Calyx puberulous; lobes linear acuminate, .1 in. long. Corolla pure white, tube .5 in. long, base cylindric then about midway thickened upwards; lobes elliptic blunt .5 in. long, by .25 in. wide subequal. Stamens in the base of the dilate portion of the tube.

*Hab.* Forests by the stream at Ulu Gombak, Selangor, *Ridley*.

This is allied to *E. Kingianum* but has smaller corollas and pedicelled flowers.

**Justicia Robinsonii** Ridley, n. sp.

Shrubby, glabrous except inflorescence. Leaves chartaceous lanceolate acuminate, base cuneate; nerves 7 pairs, 7 to 10 in. long, 2 to 3 in. wide; petiole .5 in. long. Raceme solitary or paired terminal, subsessile 1 in. long; rachis pubescent. Bracts ovate acute sessile .2 in. long, acute puberulous. Flowers crowded, subsessile. Sepals 5, lanceolate linear acuminate, pubescent. Corolla .25 in. long, tube thick cylindric, little longer than sepals, dirty white spotted purple, upper limb shorter than lower limb, woody, blunt, lower 3-lobed, lobes rather broad blunt. Stamens 2; anther-cells not parallel, shortly prolonged below, slightly shorter than the corolla. Style very slender, filiform. Capsule .5 in. long, lower half fawn-colour pustulate, seeds strong retinacula.

*Hab.* Kedah, Lankawi islands, Dayong Bunting and Burau, *Robinson* 6191. Shrubby plant. Flowers dirty white spotted purple.

**Justicia microcarpa** Ridley, n. sp.

A thin, weak plant, glabrous. Leaves lanceolate ovate thin, very shortly bluntly narrowed to base; nerves 10 pairs 6 in. long, 2 in. wide; petiole 1.75 in. long. Racemes solitary axillary and terminal, 2 in. long. Flowers crowded, secund. Bracts lanceolate acuminate slightly shorter than the calyx. Sepals linear acuminate. Corolla .3 in. long, cream with pink spots in the mouth. Fruit .4 in. long. Seeds 4, ovoid, flat acute, pustular.

*Hab.* Selangor, Batu Caves, *Ridley*.

Allied to *J. uber* but smaller, weaker with differently coloured flowers and very small fruit with seeds of a different shape.

**Sphinctacanthus malayanus** Ridley, n. sp.

Shrub about 2 feet tall; stems pale fawn colour. Leaves membranous, lanceolate acuminate, base cuncate, glabrous above, sparingly short hairy beneath especially on the midrib; nerves 8 pairs ascending and inarching 6 to 8 in. long, 1.5 to 2.75 in. wide; petiole .5 in. long. Panicle racemiform, 7 in. long, with many short branches .5 in. long to .75 in. in fruit, all hairy; peduncle 3 to 4 in. long. Flowers white, 2 to 7 on a branch. Bracts very small lanceolate. Sepals free to base lanceolate subulate .08 in. long. Corolla .25 in. long, tube cylindric limb 2-lipped, upper lip oblong bilobed longer than the lower lip. Stamens 2 in the mouth of the tube; anthers elliptic; cells equal and parallel. Style as short. Fruit base solid, .25 in. long above ovoid acute, hairy. Seeds 4, round, flat, strongly pustular, pale.

*Hab.* Negri Sembilan, forests on Bukit Tangga, *Ridley*.

**LORANTHACEAE.****Elytranthe tubaeiflora** Ridley, n. sp.

Stems stout, pale emitting long creeping and rooting suckers. Leaves stiffly coriaceous ovate to lanceolate-acute, base round; nerves about 6 pairs usually invisible; 3 to 3.5 in. long, 1.75 to 2.5 in. wide; petiole thick, .25 in. long. Raceme short, 1 in. long, about 8-flowered; pedicels .1 in. long. Bracts 3, lower one lanceolate, upper smaller, ovate acute, all shorter than corolla-tube. Corolla 3 in. long gradually dilate upwards, trumpet-shaped, .5 in. across at the mouth, lobes 6, narrow-linear lanceolate acute .75 in. long. Stamens 6, very narrow as long as corolla-lobes, anthers basifixed. Style longer; stigma ovoid.

*Hab.* Perak, Gunong Inas 5,500 at feet, *Tapp* 501.

**URTICACEAE.****Ficus patens** Ridley, n. sp.

Large spreading shrub; branches hairy with large pith. Leaves large ovate cordate, lobes at base round; nerves 3 from base, 2 outer with about 7 nervules running to the edge, midrib with 6

pairs of nerves almost opposite, transverse nervules and reticulations prominent beneath, above sparsely scabrid hairy, nerves densely hairy, beneath shortly bristly hairy on nerves and reticulations, under-side paler than upper; 11 in. long, 9 in. wide; petiole hairy sheathing at base 3 in. long. Figs globose roughly hairy .5 in. through. Peduncle very short. Bracts 3, small ovate, connate hairy. Umbilicus short blunt. Bracts small. Female flowers stalked with 4 spathulate petals, dark purple when dry. Achene oblique round, stalked as long as petals; style long, slender lateral towards the top. Male flowers not seen.

*Hab.* Selangor, Ginting Sempah: Semangkok; near Kan-ching, Negri Sembilan, Bukit Tangga Pass, *Ridley*.

This plant is very common along the roads in low jungle in Selangor and Negri Sembilan at about 1 to 4,000 feet alt., but comparatively rarely produces figs. It is a very large spreading shrub with the lower parts of branches bare, about 20 feet tall. It is allied to *P. fulva* but has cordate leaves except in the young state and very different flowers.

### ***Elatostemma inaequilobum* Ridley, n. sp.**

Herb; stem slender succulent, long creeping ascending to a foot tall, glabrous. Leaves alternate with no trace of the second one of the pair, thin inaequilaterally lanceolate long acuminate, base very unequally bilobed, larger lobe rounded, edge crenate, serrate in the upper half, trinerved the outer pair looped with the nervules joining them, 4.5 in. long, 1.5 in. wide or less; petiole .1 in. long or less. Female heads .12 in. through on slender filiform peduncles .2 in. long axillary. Flowers numerous shortly pedicelled. Sepals 3, very narrow linear caudate with a broader base. Achene ellipsoid, strongly tubercled. Male plants not seen.

*Hab.* Selangor, Ginting Sempah, *Ridley, Robinson and Kloss*. Tonkin, Rocks on edge of torrents, Mount Bausi, *Balansa* 2562.

This is a very distinct plant of which we have only females. The completely alternate leaves and small heads with very narrow sepals and slender peduncles are unlike those of any other species I have seen. The leaves in the Tonkin plant are much smaller than in the Selangor one, which with the long rhizome is over 2 feet long.

## **ORCHIDACEAE.**

### ***Thrixspermum iodochilus* Ridley, n. sp.**

Stem 4 in. long, 2 in. wide; sheaths strongly ribbed. Leaves coriaceous, oblong-linear, 3 to 5 in. long, .5 in. wide. Peduncle 2 in. long. Raceme flat 1.5 in. long or more. Bracts flat, boat-shaped. Flowers on pedicels slender .3 in. long. Sepals and petals triangular lanceolate at base with very slender tails, .75 in. long, ochre yellow, not spotted; spur short blunt, .12 in. long, pink. Lip violet, narrow, tongue-shaped .25 in. long.

*Hab.* Negri Sembilan, Bukit Tangga Pass, on trees, *Ridley*.

This has quite the habit of *T. arachnites*, but apart from the colouring of the flowers, the peculiar long slender lip distinguishes it clearly.

### APOSTASIACEAE.

***Neuwiedia ocrea*** Ridley, n. sp.

Stem below leaves 1.5 in. long. Leaves 7 or 8 elliptic, long acuminate, 10 in. long, 2.25 in. wide; petiole 4 in. long, strongly ribbed. Raceme 5 in. long. Bracts at base lanceolate acuminate .75 in. long above .5 in. long, terminal ones .2 in. long all but the lowest hairy and conspicuously nerved. Flowers about 40, buff colour, glandular hairy; pedicels hairy .1 in. long. Sepals and petals .5 in. long lanceolate with small caudicles at tip. Petals narrower than sepals, keeled; keel hairy. Stamens 3; anthers oblong; filaments free at the top below connate with the style. Style curved, stout, shorter than the stamen with a rather large stigma. Ovary ellipsoid narrowed at both ends, hairy.

*Hab.* Very rare, one plant only found on Bukit Tangga, Negri Sembilan at 2,000 feet.

Very distinct from all other species in its pubescence and buff-ochre flowers. Nearest to *N. Zollingeri*.

### SCITAMINEAE.

***Kaempferia cyanescens*** Ridley. *Elettariopsis cyanescens* Ridley in Jour. Straits Branch Roy. As. Soc. 41, p. 31.

Rhizome short, stout. Leafy stems 2 feet 3 in. tall, slender, glabrous. Leaves oblong-lanceolate, long acuminate thin, base gradually narrowed blunt, 6 in. long, 1.25 in. wide; petiole very short or none; ligule ovate blunt .12 in. long. Flowers appearing with the leaves in a basal tuft an inch long; peduncle .25 in. long. Bracts lower ones ovate, upper ones lanceolate, 5 in. long, reddish-white. Ovary .1 in. long pubescent. Calyx slender tubular, spathaceous split on one side more than half way down with 3 small points 1.5 in. long. Corolla-tube 2 in. long, slender, lobes lanceolate acute, thin, white, 1 in. long, .12 in. wide. Staminodes lanceolate-acute as long but broader, white. Lip large obovate rather long-clawed, bilobed, violet veined with white. Anther white hairy.

*Hab.* Negri Sembilan, Bukit Tangga. Common on the hill behind the bungalow to the top.

This plant was collected first by Mr. Napier who brought me a specimen, the flower of which was of poor condition and I put it down as *Elettariopsis*. Having now seen plenty in the same locality I see it is a *Kaempferia* and re-describe it.

***Alpinia campanaria*** Ridley, n. sp.

Tall plant. Leaves oblong cuspidate acuminate, glabrous except the ciliate edge, 2 feet long, 5 in. wide narrowed to base;

petiole 4 in. long, glabrous, ligule oblong .4 in. long. Raceme stout pubescent velvety, 11 in. long; flowers distant; peduncles 1.25 in. long, stout velvety. Bracts lanceolate, the lowest 2.25 in. long, upper ones broad and short, .5 in. long, silky. Involucral bracts cupular-campanulate .4 in. long .5 in. wide, silky containing 4 round, silky bracts each with a single flower on short silky pedicel. Calyx campanulate, silky with obscure points, white .5 in. long and as wide. Ovary small, silky. Corolla silky, tube .5 in. long, lobes oblong blunt, buff with white knobs at the top, .6 in. long. Lip broad obovate convolute, 1.5 in. long, 2 in. wide when expanded, white with a yellow base, and red bars. Stamen filaments broad linear, anther yellow, oblong, no crest. Staminodes large, broad, rhomboid with acute points at base of filaments.

*Hab.* Negri Sembilan, Bukit Tangga, at 2,400 feet alt., *Ridley*.

This is distinctly allied to *A. javanica* which it somewhat resembles in the form of bracts and flowers, but the inflorescence is laxly racemose.

***Alpinia Seimundii* Ridley, n. sp.**

Stem slender, sheaths and petiole pubescent. Leaves lanceolate acuminate with a long point, base narrowed unequal, midrib at back pubescent, 12 in. long, 2 in. wide; petiole .25 in. long, ligule oblong round silky. Panicle 5 in. long, pubescent with tufts of hairs below the branches; branches distant .5 in. long, usually 1-flowered. Bracts persistent broad, tubular with a rounded mouth silky .5 in. long. Calyx entire tubular dilate upwards with 3 small points, nearly .5 in. long silky. Corolla-tube slightly longer; lobes oblong blunt hairy .5 in. long. Lip obovate trilobed, .4 in. long and .3 in. wide, base narrowed, slender, lobes 2 rounded, median smaller bifid at tip with two slender points, 3 strong red nerves running to the tip of the midlobe and one shorter on each side. Staminodes very short obscure points at the base of the stamen. Stamen, filament rather slender; anther cells elliptic pointed below, hairy on the back.

*Hab.* Pahang, Kwala Teku, *Seimund*.

This has remarkably small flowers for the *Catimbium* section. It is apparently nearest to *A. multica*.

***Amomum spiceum* Ridley, n. sp.**

Plant forming a very large tuft of leafy stems 6 feet tall. Leaves narrow linear oblong acuminate narrowed to base, 18 in. long, 1 in. wide; ligule oblong, tip round entire, adnate to petiole. Flower spikes at base, 8 in. long peduncle 1 in. long, velvety as is rachis. Bracts erect lanceolate acuminate, edges hairy, papery 3 in. long, .5 in. wide, uppermost 2 in. long. Spikelets about a dozen consisting of three papery bracts containing a solitary flower.

Calyx spathaceous split in front, 1.5 in. long, buff. Corolla-tube as short, upper lobe broad oblong, 1.5 in. long, blunt, lower ones linear, buff. Lip large obovate entire, yellow finely punctate red on both sides at the base. Stamen shorter than corolla-lobes; filament longer than anther. Anther oblong, crest of two recurved horns with a small central process. Ovary silky.

*Hab.* Negri Sembilan, Bukit Tangga, abundant at 2,000 feet alt., in thick forest, *Ridley*.

## ARACEAE.

### **Amorphophallus elegans** Ridley, n. sp.

Tuber small, flattened, globose, 3 in. through. Leaf, petiole slender mottled grey green, 1 to 2 feet tall, limb green, of 3 branches, outer pair rebranched; petiolules 3 inches long, leaflets 3 to 4 oblong, long cuspidate, base cuneate inaequilateral, nerves 11 pairs, secondary nerves nearly as conspicuous, all joining an intra-marginal nerve, 6 in. long, 1.5 in. wide, cusp 1 in. long; secondary petiolules .12 in. long. Peduncle slender, 3 feet tall, mottled grey green, and pink with scattered light green blotches. Spathe narrow lanceolate acute, 5 in. long, pale green with small dark green blotches. Female portion of spike .5 in. long, green with yellow sessile stigmas. Male portion cylindric, 3 in. long. Stamens white; anther-cells pink. Appendage rugose cylindric, 4 in. long, white.

*Hab.* Mountain woods, Negri Sembilan, Bukit Tangga, *Ridley*.

### **Pothos lorispatha** Ridley, n. sp.

Climber, stem slender woody, internodes 1 in. long. Leaf thinly subcoriaceous, inaequilateral lanceolate long-acuminate; nerves numerous inconspicuous intramarginal .5 in. from the edge, base narrowed; 12 in. long, 3 in. wide; petiole 1.5 to 3 in. long, narrowly winged to the top, knee obscure, base shortly sheathing. Peduncle slender 1.25 in. long. Spathe narrow, strap-shaped acuminate acute, 4 inches long, .4 in. wide, dark green. Spadix narrow cylindric, 3 in. long, .12 in. through; peduncle .25 in. long. Bracts bluntly triangular at top, strongly keeled beneath. Sepals small, blunt triangular, hooded. Stamens shorter. Ovary oblong subquadrate at top. Stigma small circular.

*Hab.* Limestone cliffs, Selangor, Batu Caves, *Ridley*.

The leaves are thinner in texture than in most species and the spathe is strap-shaped.

## PALMAE.

### **Areca latiloba** Ridley, n. sp.

Stem simple 4 to 5 feet tall, .5 in. through. Leaves three feet or more long with few broad sigmoid rhomboid lobes, broad at the



base, very long acuminate at the tip with 10 to 12 prominent nerves 1 foot long, 3 in. wide, the top pair very unequal. Spadix 9 in. long; branches slender in pairs on short .2 in. peduncles below, solitary above. Male flowers .18 in. long. Sepals very small, round. Petals lanceolate acute. Stamens 3, filaments connate at the base. Female flowers one on each branch or only on the middle branches. Sepals ovate acute. Petals broad oblong blunt .4 in. long. Fruit 1 in. long, .5 in. through, thin, fibrous coat.

*Hab.* Mountain forests, Negri Sembilan, Bukit Tangga at 2,400 feet alt., *Ridley*.

This is distinguished from *Areca pumila* Bl. by its smaller size, more slender stem, and broad sigmoid leaflets, resembling those of *Pinanga canina*.

***Pinanga glaucescens* Ridley, n. sp.**

A dwarf palm. Leaves 3 feet or more long, lobes very broad, oblong-lanceolate, long-acuminate with 6 to 12 prominent nerves, glaucous beneath 14 in. long, 3.5 in. wide, terminal pair connate at base for 6 inches, separate at top for 7 inches, with numerous terminal teeth, midrib spotted brown, young leaves maculate with darker spots. Spadix erect with two or three branches, stout peduncle 1.5 in. long; branches 4 in. long. Flowers spirally arranged. Sepals in female round, short. Fruit black on a red spadix ellipsoid, .5 in. long. Stigmas short sessile. Seed ellipsoid .4 in. long sparsely ruminant.

*Hab.* Mountain forests Negri Sembilan, Bukit Tangga at 2,400 feet alt., *Ridley*.

This species is near *P. scarlechinii*; but it is a shorter palm with much broader lobes to the leaves.

**PANDANACEAE.**

***Pandanus pilaris* Ridley, n. sp.**

Short bushy plant. Leaves dark green 8 feet long, 1 in. wide, 3-nerved linear acuminate with numerous very small thorns on the edges and 3 nerves in the upper part. Peduncles stout 8 in. long, obscurely 3-angled at the top with a broad lanceolate bract over 6 in. long. Male unknown. Female head globose, 4 in. through. Ovaries cylindric angled, nearly 1 in. long, .18 in. through slightly curved, acute. Stigma linear on the underside running to the tip.

*Hab.* Mountain forests 2,000 feet alt., Negri Sembilan, Bukit Tangga, *Ridley*.

# New or Noteworthy Bornean Plants

## PART II.

BY ELMER D. MERRILL.

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This account of Bornean plants is continued from page 201 of the Journal for this year, No. 85.

### LEGUMINOSAE.

*Derris Loureiro.*

***Derris pachycarpa* sp. nov.**

Frutex scandens, glaber (floribus ignotis); ramis lenticellatis: foliis 20—30 cm. longis, foliolis 7 vel 9, elliptico-ovatis vel oblongo-subcaudato-acuminatis, nervis utrinque circiter 10, tenuibus; infructescentiis 10—18 cm. longis; leguminibus brunneis, nitidis, laevibus, oblongis vel oblongo-ellipticis, inflatis, 4.5—7 cm. longis, 2.2—3.5 cm. latis, usque ad 1 cm. crassis, suturis superioribus anguste crasseque alatis vel carinatis, inferioribus rotundatis vel obscurissime carinatis; seminibus solitariis, oblongo-ellipsoideis vel oblongis, 2.5 cm. longis.

A scandent woody vine apparently glabrous (flowers unknown), the branches brown or reddish-brown, lenticellate, smooth or somewhat rugose, the branchlets somewhat angled or compressed when dry. Leaves 20 to 30 cm. long; leaflets 7 or 9, elliptic-ovate to oblong-elliptic, chartaceous, smooth, shining, brownish-olivaceous, the lower surface somewhat paler than the upper, 7 to 12 cm. long, 3 to 6 cm. wide, the apex conspicuously and rather abruptly acuminate, the acumen often subcaudate, blunt, up to 1.5 cm. long, base rounded; lateral nerves about 10 on each side of the midrib, slender, not prominent, the reticulations obscure; petiolules 7 to 9 mm. long. Infructescences 10 to 18 cm. long. Pods oblong to oblong-elliptic, inflated, brown, smooth, shining, 4.5 to 7 cm. long, 2.2 to 3.5 cm. wide, up to 1 cm. thick, the upper suture narrowly and very thickly winged or carinate, the lower one rounded or very obscurely carinate, the upper wing at most 3 mm. wide. Seeds solitary, oblong-ellipsoid or oblong, 2.5 cm. long.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1250 (type), 1257, October, 1920. In thickets and in forests at low altitudes. A species well characterized by being entirely gla-

brous, so far as known, and in its inflated, obscurely winged, or sometimes merely carinate pods which very strongly resemble those of *Pongamia pinnata* Merr.

***Canavalia*** Adanson.

***Canavalia bracteolata*** sp. nov.

Suffruticosa, scandens, partibus junioribus et subtus foliis ferrugineo-pubescentibus; petiolis perspicue ferrugineo-pubescentibus; foliolis ovato-ellipticis vel ellipticis, membranaceis vel chartaceis, acuminatis, 7—9 cm. longis; racemis longe pedunculatis, floribus 3 cm. longis, glabris, bracteolis binis ellipticis membranaceis 8—10 mm. longis instructis; leguminibus anguste-oblongis, compressis, leviter pubescentibus, 12 cm. longis, 15—18 mm. latis, seminibus circiter 12, ellipticis, compressis, 8 mm. longis, atro-brunneis, obscure variegatis.

A suffrutescent vine, the younger parts and the lower surface of the leaflets conspicuously ferruginous-pubescent. Branches terete, smooth, glabrous, about 4 mm. in diameter, pale or brownish when dry. Leaves 3-foliolate, their petioles ferruginous-pubescent, 3 to 5 cm. long; leaflets ovate-elliptic to elliptic, membranaceous to chartaceous, 7 to 9 cm. long, 3 to 5 cm. wide, rather abruptly acuminate, the acumens broad and distinctly apiculate, base usually obtuse, the upper surface olivaceous, glabrous or nearly so except the somewhat pubescent midrib, the lower surface ferruginous-pubescent on the midrib, nerves and reticulations; lateral nerves about 8 on each side of the midrib, distinct. Inflorescences long-peduncled, 40 to 50 cm. long, when young more or less ferruginous-pubescent, in age glabrous or nearly so. Flowers purplish-pink, mostly in the upper 10 cm., about 3 cm. long, somewhat fascicled on the thickened nodes, their pedicels slender, pubescent, about 5 mm. long, the calyces subtended by 2, elliptic, subsistent, membranaceous, distinctly nerved bracteoles which are about 10 mm. long, 6 mm. wide, sparingly pubescent, and rounded at the apices. Calyx rather strongly curved, the tube about 12 mm. long, base cuneate, the upper lip entire, ovate, 7 mm. long, the lower lip 3-lobed, the lateral lobes oblong-ovate, 5 mm. long, subacute, the middle one similar but slightly longer. Limb of the standard obovate, 2.5 cm. long, 2 cm. wide, obscurely auricled at the base, the claw 7 mm. long; wings oblong-elliptic, nearly equalling the standard, about 8 mm. wide, obtuse, conspicuously auricled at the base, the claws 7 mm. long; keel equalling the wings, oblong-obovate, inequilateral, rounded, scarcely falcate, the inner margin in the median part conspicuously toothed, base inequilateral, obtuse, not auricled. Filaments glabrous, the free parts 6 to 7 mm. long; anthers ellipsoid, 1.2 mm. long; staminal tube distinctly geniculate near its base. Ovary linear, pubescent, stipitate; ovules about 15; style glabrous, 6 to 8 mm. long. Pods flattened, about 12 cm. long, 15 to 18 mm. wide, about 4 mm. thick along the upper

suture, the marginal keels scarcely exceeding the upper suture in height, valves coriaceous, somewhat acuminate, sparingly ferruginous-pubescent, slightly horizontally sulcate between the seeds; seeds about 12, elliptic, compressed, 8 mm. long, dark-brown when dry, obscurely mottled.

British North Borneo, Sandakan, *Ramos 1511* (type), September, 1920. In damp thickets at low altitudes. The same species is represented by *Native Collector 367, 1693, Bur. Sci.* from the vicinity of Kuching, Sarawak. A species well characterized by its ferruginous indumentum; its conspicuously bracteolate flowers; and its compressed, comparatively narrow, transversely sulcate, sparingly ferruginous-pubescent pods, the keels along the upper suture being exactly marginal.

## OXALIDACEAE.

### *Sarcotheca* Blume.

#### *Sarcotheca pinnata* sp. nov.

Frutex scandens, inflorescentiis exceptis subglaber; ramis brunneis, glabris, striatis, 8 mm. diametro, ramulis junioribus puberulis; foliis circiter 50 cm. longis, foliolis 7, chartaceis, elliptico-ovatis vel oblongo-ellipticis, 14—27 cm. longis, acuminatis, basi late rotundatis vel obscure cordatis, nervis primariis utrinque 12—15, subtus perspicuis; inflorescentiis anguste paniculatis, axillaribus, 5—7 cm. longis, subcinereo-puberulis; floribus 4 mm. longis; sepalis oblongo-ovatis, acutis, puberulis.

A woody vine, the branchlets and inflorescences sparingly pubescent. Branches brown, striate, glabrous, about 1 cm. in diameter. Leaves pinnate, up to 50 cm. long; leaflets 7, elliptic-ovate to oblong-elliptic, chartaceous, 14 to 27 cm. long, 7 to 11 cm. wide, the base rounded or that of the lowermost leaflet sometimes obscurely cordate, apex shortly acuminate, the upper surface olivaceous, smooth, shining, the lower surface somewhat paler, the midrib and nerves brownish; lateral nerves 12 to 15 on each side of the midrib, curved-ascending, prominent on the lower surface, not anastomosing but directly joining the somewhat cartilaginous margins, the reticulations distinct; petiolules 5 to 7 mm. long. Inflorescences axillary, 5 to 7 cm. long, narrowly paniculate. Flowers about 4 mm. long, white, their pedicels 2 to 4 mm. in length, jointed. Sepals 5, oblong-ovate, acute or sometimes acuminate, brown when dry, pubescent. Petals elliptic to oblong-elliptic, obtuse, glabrous, 3.5 to 4 mm. long. Stamens 10, their filaments nearly free, the younger ones up to 2.5 mm. in length, the alternating shorter ones 1 to 1.5 mm. long. Ovary composed of 5 oblong carpels about 1.5 mm. long, somewhat pubescent, united below.

British North Borneo, Batu Lima, near Sandakan, *Ramos 1485*, October, 1920. On dry forested slopes at low altitudes. A species well characterized by its large pinnate leaves and its ample leaflets.

## RUTACEAE.

*Evodia* Forster.***Evodia punctata* sp. nov.**

Arbor parva, partibus junioribus cinereo-puberulis; ramis glabris, teretibus, 4—5 mm. diametro, ramulis plus minusve compressis; foliis 3-foliolatis, foliolis oblongo-ellipticis vel elliptico-ovatis, chartaceis, olivaceis, utrinque concoloribus, nitidis, 9—15 cm. longis, utrinque angustatis, basi acutis, apice acuminatis, subtus perspicue atro-punctato-glandulosis, nervis utrinque 12—15, distinctis: infructescentiis lateralibus, pedunculatis, pyramidato-paniculatis, 15 cm. longis, fructibus obovoideis, 8—10 mm. longis.

A nearly glabrous shrub or small tree about 5 m. high, the very young parts cinereous-puberulent. Branches pale-brownish, terete, smooth, about 5 mm. in diameter, the branchlets and petioles rather dark-brown. Leaves 3-foliolate, their petioles 3 to 6 cm. long; leaflets oblong-elliptic to elliptic-ovate, chartaceous, olivaceous, shining, of about the same color on both surfaces, 9 to 15 cm. long, 4 to 6 cm. wide, subequally narrowed to the acuminate apex and acute base, the lower surface conspicuously black-punctate-glandular; lateral nerves 12 to 15 on each side of the midrib, spreading, slightly curved, rather obscurely anastomosing, the reticulations lax, not prominent. Infructescences lateral, peduncled, about 15 cm. long, the branches few, spreading, the lower ones up to 7 cm. long. Fruits obovoid, the cocci 8 to 10 mm. long, slightly compressed and slightly inequilateral, verrucose when dry, the apex broadly rounded, base subacute. Seeds black shining, ellipsoid, 5 to 6 mm. long.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1289, October, 1920. In damp forests at low altitudes. A species in many respects closely resembling the Philippine *Evodia ternata* Merr., well characterized, however, by its unusually large fruits.

***Evodia bintoco*** Blanco Fl. Filip. ed. 2 (1845) 50, ed. 3, 1 (1877) 93; Merr. Sp. Blancoanae (1918) 197.

*Evodia mindanaensis* Merr. in Philip. Forestry Bur. Bull. 1 (1903) 25.

British North Borneo, Kudat, *Agama* 1077, November, 1920, near the seashore. Widely distributed in the central and southern Philippines, Mindoro, Sibuyan, Tablas, Panay, Leyte, Bohol, Mindanao, and Basilan, but not previously recorded from outside of that Archipelago.

## MELIACEAE.

*Chisochiton* Jussieu.***Chisochiton brachyanthum* sp. nov.**

Arbor parva, partibus junioribus plus minusve pubescentibus; foliis alternis, 25—60 cm. longis, foliolis 6—12, oblongis vel oblongo-ellipticis, subcoriaceis, olivaceis, utrinque nitidis, 8—16

cm. longis, abrupte subcaudato-acuminatis, nervis utrinque 10—13, supra leviter impressis, subtus valde perspicuis; inflorescentiis anguste paniculatis vel subspiciformibus, 40—50 cm. longis, ramis paucis, brevibus, supra obsoletis et floribus superioribus fasciculatim dispositis; floribus circiter 13 mm. longis, 4-meris; calyce truncato; petalis glabris, 4, in dimidio inferiore cum tubo coalitis; tubo in partibus superioribus extus adpresse hirsuto-ciliato, intus glabro, crenato; antheris 4 vel 5, 1 mm. longis; fructibus junioribus dense ferrugineo-pubescentibus.

A small tree, the younger parts more or less pale ferruginous-pubescent, branches terete, dark-brown, glabrous, the ultimate branchlets about 5 mm. in diameter. Leaves alternate, 25 to 60 cm. long, the rachis brown, sparingly pubescent or ultimately glabrous; leaflets 6 to 12, oblong to oblong-elliptic, subcoriaceous, pale-olivaceous to somewhat brownish when dry, shining on both surfaces, 8 to 16 cm. long, 1 to 1½ cm. wide, rather abruptly caudate-acuminate, the acumen up to 2 cm. long, blunt, base usually rounded, glabrous on both surfaces or the midrib and nerves beneath sparingly appressed-pubescent; lateral nerves 10 to 13 on each side of the midrib, spreading, obscurely anastomosing, very prominent on the lower surface. Inflorescences narrowly paniculate or subspiciform, 40 to 50 cm. long, the branches few, distant, spreading, the lower ones up to 7 cm. long, usually much shorter, the upper ones obsolete and the flowers fascicled along the rachis. Flowers 4-merous, about 13 mm. long, sessile. Calyx cup-shaped, truncate, about 1.8 mm. in diameter. Petals 4, linear, about 12 mm. long, 1.8 mm. wide, glabrous, obtuse, united for the lower half with the staminal tube. Staminal tube cylindric, about 12 mm. long, 1.8 to 2 mm. in diameter, somewhat appressed-hirsute in the upper part, crenate at the apex, the anthers 4 or 5, 1 mm. in length, inserted just below the rim and with a few ciliate hairs on the back. Ovary ovoid, appressed-pubescent; style pubescent in the lower half; stigma subcapitate, 0.5 mm. in diameter. Disk O. Very young fruits densely ferruginous-pubescent, obovoid.

British North Borneo, Batu Lima and Sibuga, near Sandakan, *Ramos* 1252 (type), 1706, 1899, October, November, and December, 1920. In primary forests at low altitudes, with the local Malay name *bunga tauan*. A species allied to *Chisochiton amabilis* Miq., but differing, among other characters, in its shorter 4-merous flowers.

### ***Chisochiton kinabaluense* sp. nov.**

Arbor, inflorescentiis caulinis exceptis glabra vel subglabra; foliis alternis, 40—50 cm. longis, foliolis 8—10, oppositis, oblongis, chartaceis, subolivaceis, nitidis, 14—20 cm. longis, tenuiter acuminatis, basi inaequilateralibus, acutis, nervis utrinque circiter 12, subtus perspicuis; inflorescentiis caulinis, anguste paniculatis, circiter 40 cm. longis, ramis paucis, patulis, inferioribus circiter 7 cm. longis; floribus 4-meris, brevissime pedicellatis, racemose

dispositis, 2.7 cm. longis, extus leviter adpresse pubescentibus; calyce cupulato, truncato, 2 mm. diametro; petalis 4, liberis, tubo extus glabro, intus leviter pubescente; antheris 5 vel 6, anguste oblongis, 2 mm. longis, dorso leviter pubescente; ovario oblongo, adpresse pubescente.

A tree glabrous or subglabrous except the inflorescences, the ultimate branchlets dark-brown, terete, about 5 mm. in diameter. Leaves alternate, 40 to 50 cm. long; leaflets 8 or 10, opposite, oblong, chartaceous, subolivaceous when dry, shining, 14 to 20 cm. long, 5 to 8 cm. wide, rather slenderly but bluntly acuminate, base more or less inequilateral, acute; lateral nerves about 12 on each side of the midrib, prominent on the lower surface, scarcely anastomosing, the reticulations rather lax, distinct. Inflorescences fascicled on woody tubercles on the trunk, narrowly paniculate, about 40 cm. long, somewhat pubescent, the branches few, spreading, the lower ones about 7 cm. long. Flowers 4-merous, very shortly pedicelled and racemously arranged on the ultimate branchlets, about 2.7 cm. long. Calyx cup-shaped, truncate, 2 mm. in diameter, sparingly appressed-pubescent. Petals 4, free, sparingly appressed-pubescent outside, obtuse, the apical part 2 to 2.5 mm. wide. Staminal tube glabrous outside, sparingly pubescent inside, about as long as the petals, irregularly and shortly toothed at the apex; anthers 5 or 6, narrowly oblong, 2 mm. in length, slightly pubescent on the back. Ovary oblong, appressed-pubescent; style slightly pubescent. Disk 0.

British North Borneo, Kiau and Minitindok Gorge, Mount Kinabalu, up to an altitude of about 1,400 m., *Mrs. Clemens 10116* (type) *10219, 10490*, November, 1915. The inflorescences are detached, but the field label with No. 10490 indicates that they are borne near the base of the trunk. My specimen of this number shows three inflorescences attached to a woody tubercle 1.5 cm. in diameter.

#### *Aphanamixis* Blume.

***Aphanamixis sumatrana*** (Miq.) Harms in Engl. and Prantl Nat. Pflanzenfam. 3/4 (1896) 296.

*Amoora sumatrana* Miq. Ann. Mus. Bot. Lugd.-Bot. 4 (1868) 35; C. DC. in DC. Monog. Phan. 1 (1818) 581.

British North Borneo, near Sandakan, *Villamil 266, Agama 413, Clemens 11775, Ramos 1128*; Sarawak, *Foxworthy 123*. In forests at low altitudes. Malay Peninsula, Sumatra.

#### *Aglala* Loureiro.

***Aglala baramensis*** sp. nov. § *Hearnia*.

Arbor, partibus junioribus inflorescentiisque dense ferrugineo-pubescentibus, indumento stellato; foliis alternis, 20—28 cm. longis, foliolis 9—13, lanceolatis, subcoriaceis, 7—14 cm. longis, acuminatis, basi cuneatis, nervis utrinque 15—17, vetustioribus

utrinque glabris: paniculis 20—25 cm. longis, dense ferrugineo-pubescentibus, multifloris, floribus 5-meris, brevissime pedicellatis, subracemose dispositis; calyce circiter 1.5 mm. diametro, lobis orbiculari-ovatis; petalis liberis; tubo stamineo 5-fido.

A tree, the younger parts, young leaves, and inflorescences densely ferruginous-pubescent, the indumentum short, more or less stellate. Leaves alternate, 20 to 28 cm. long, the petiole and rachis more or less ferruginous-pubescent, in age glabrous or nearly so; leaflets subcoriaceous, lanceolate, 9 to 13, opposite or the lower ones subalternate, 7 to 14 cm. long, 1 to 1.8 cm. wide, narrowed upward to the acuminate apex and below to the usually cuneate base, the upper surface grayish or brownish, glabrous, the lower surface rather dark-brown, when young stellate-tomentose, ultimately glabrous; lateral nerves 15 to 17 on each side of the midrib, prominent on the lower surface, curved-anastomosing, the reticulations obscure; petiolules 2 to 3 mm. long. Panicles terminal and in the uppermost axils, 20 to 25 cm. long, densely ferruginous-pubescent, the branches more or less spreading, the lower ones up to 10 cm. long. Flowers numerous, shortly pedicelled, subracemously arranged on the ultimate branchlets. Calyx about 1.5 mm. in diameter when spread, the lobes orbicular-ovate, 0.7 mm. long, usually obtuse, densely pubescent. Petals obovate, free, about 2 mm. long. Staminal tube 5-cleft; anthers 5, very short, at the tips of the lobes.

Sarawak, Baram, Lio-Matu, *Major J. C. Moulton 19* (= 2768 *Native Collector Bur. Sci.*), October 30, 1914, and at the same locality, *Moulton 6712*, October 15, 1920. A species strongly characterized by its subcoriaceous, narrow, lanceolate leaflets, in its vegetative characters radically differing from all previously described species of this section. The staminal tube is divided nearly to the base into 5, free, obovate segments.

## BURSERACEAE.

### *Santiria* Blume.

***Santiria samarensis*** Merr. in *Philip. Jour. Sci.* **10** (1915) Bot. 31.

British North Borneo, Sebuga, near Sandakan, *Ramos 1807*, December, 1920. In damp forests at low altitudes. Previously known only from the Philippines, where it occurs in southern Luzon, Palawan, Leyte, Samar and Mindanao. *Canarium caudatifolium* Merr. and *C. crassifolium* Merr. are both synonyms.

### *Canarium* Linnaeus.

***Canarium pseudocommune*** Hochr. *Pl. Bogor. Excicc.* (1904) 60.

British North Borneo, Batu Lima, near Sandakan, *Ramos 1698*, November, 1920. In damp forests at low altitudes. The original description was based on specimens cultivated in the



botanic garden at Buitenzorg, Java; it seems probable that it was introduced there from Borneo.

## DICHAPETALACEAE.

### *Dichapetalum* Thouars.

**Dichapetalum holopetalum** Merr. in Philip. Jour. Sci. 17 (1920) 271.

British North Borneo, Batu Lima near Sandakan, *Ramos* 1290, 1750, October and November, 1920. In forests at low altitudes. The specimen conform closely with the Philippine (Mindanao) type.

## EUPHORBIACEAE.

### *Glochidion* Forster.

**Glochidion lancisepalum** sp. nov. § *Hemiglochidion*.

Frutex glaber, ramulis tenuibus, plus minusve angulatis; foliis chartaceis vel subcoriaceis, lanceolatis vel oblongo-lanceolatis, 11—20 cm. longis, apice tenuiter acuminatis, interdum falcatis, basi cuneatis, subtus minutissime verruculosus, nervis utrinque circiter 5, adscendentibus; floribus fasciculatis: ♀ paucis, sepalis 6, lanceolatis, 2 mm. longis; ovario globoso, 3-locellato; stylis cylindraceis, 2.5 mm. longis, basi haud constrictis; ♂ antheris 3, connatis, 2 mm. longis, sepalis lanceolatis, 2.5 mm. longis, exterioribus accrescentibus.

A glabrous, apparently dioecious shrub, the ultimate branches slender, about 1 mm. in diameter, somewhat angled. Leaves chartaceous to subcoriaceous, lanceolate to oblong-lanceolate, 11 to 20 cm. long, 2.3 to 5 cm. wide, narrowed upward to the slenderly acuminate apex, the acumen frequently falcate and rather abruptly narrowed below to the cuneate base, the upper surface olivaceous, smooth, the lower surface paler and very minutely verruculose when dry; lateral nerves about 5 on each side of the midrib, rather sharply ascending, distinct, obscurely anastomosing, the primary reticulations slender, rather lax; petioles 2 to 3 mm. long; stipules acicular, about 4 mm. long. Flowers axillary, fascicled, the pistillate ones few, their pedicels up to 6 mm. long. Sepals 6, lanceolate, about 2 mm. long, acute or somewhat acuminate, the alternating ones slightly narrower than the others. Ovary globose, glabrous, 3-celled, about 0.8 mm. in diameter. Style cylindric, 2.5 mm. long, about as thick as the ovary, not contracted at the base, very shortly 3-lobed at the tip. Staminate flowers apparently somewhat abnormal, their pedicels up to 1 cm. in length, frequently supplied with one or two lanceolate bracteoles, the outer three sepals lanceolate, acuminate, about 2.5 mm. long, accrescent and attaining a length of 4.5 mm., the inner three lanceolate, not exceeding 3 mm. in length. Stamens 3, united, the anthers about 2 mm. long, the connectives slightly produced.

Sarawak, Upper Baram, Lio-Matu, *Major J. C. Moulton 6714* (type), 6071-4, October 12 and 15, 1920. Altitude about 160 m. A species strongly characterized by its lanceolate, slenderly acuminate, few-nerved leaves, and its lanceolate sepals. The type presents pistillate flowers only, the other numbers cited staminate flowers only, the latter for the most part being abnormal in their accrescent outer sepals.

*Galearia Zollinger and Moritzi.*

*Galearia stenophylla* sp. nov. § *Eugalearia*.

Frutex, ramulis inflorescentiisque pubescentibus; foliis lineari-lanceolatis vel lanceolatis, 10—25 cm. longis, 1—2.5 cm. latis, basi acutis, apice obscure acuminatis, nervis utrinque 10—15, distantibus, arcuato-anastomosantibus, perspicuis; racemis terminalibus, 3—5 cm. longis, fructibus 1-locellatis, leviter adpresse pubescentibus, 6—7 mm. longis, 8—10 mm. latis.

A shrub, the branchlets rather densely pubescent with short, brownish hairs, the branches terete, glabrous, grayish or brownish. Leaves linear-lanceolate to lanceolate, subcoriaceous, 10 to 25 cm. long, 1 to 2.5 cm. wide, greenish-olivaceous, slightly shining, glabrous on both surfaces, the base acute, gradually narrowed upward to the somewhat acuminate apex; lateral nerves 10 to 15 on each side of the midrib, curved, arched-anastomosing, prominent on the lower surface, the reticulations lax, distinct; petioles 2 to 4 mm. long. Fruiting racemes terminal, 3 to 5 cm. long, rather densely pubescent. Fruits dark-brown when dry, sparingly appressed-pubescent, 6 to 7 mm. long, 8 to 10 mm. wide, 1-celled, their pedicels ferruginous-pubescent, about 5 mm. long.

British North Borneo, Batu Lima, near Sandakan, *Ramos 1542*, November, 1920. In forests at low altitudes. A very strongly marked species, readily distinguishable from all previously described forms by its very narrow, elongated, lanceolate leaves.

*Galearia sessiliflora* sp. nov. § *Eugalearia*.

Frutex, ramuli- inflorescentiisque exceptis glaber; foliis chartaceis, oblongo-ellipticis, 18—25 cm. longis, perspicue acuminatis, basi plerumque leviter asymmetricis, rotundatis vel subacutis, nervis utrinque 5—8, subtus valde perspicuis; inflorescentiis ♀ folia subaequantibus, floribus sessilibus, fasciculatis; calycis lobis ovatis, 1 mm. longis, pubescentibus; petalis glabris, spatulatis vel oblongo-obovatis, 2.5—3 mm. longis, rotundatis, leviter cucullatis; ovario dense pubescente.

A shrub about 2 m. high, glabrous except the somewhat pubescent branchlets and inflorescences, the branches terete, grayish or brownish, 2 to 2.5 mm. in diameter. Leaves chartaceous, oblong-elliptic, 18 to 25 cm. long, 4 to 9 cm. wide, greenish-olivaceous, slightly shining, the base rounded or subacute, usually somewhat

inequilateral, the apex rather prominently acuminate; lateral nerves 5 to 8 on each side of the midrib, somewhat impressed on the upper surface, very prominent on the lower surface, the reticulations lax, very prominent; petioles 5 to 12 mm. long, pubescent when young, ultimately glabrous. Pistillate inflorescences terminal, about as long as the leaves, the flowers sessile, fascicled. Calyx appressed-pubescent, 5-lobed, the lobes ovate, acute, about 1 mm. long. Petals glabrous, oblong-obovate to spatulate, 2.5 to 3 mm. long, the limb rounded and cucullate, the narrower basal part 1 mm. in length. Ovary densely pubescent, 2-celled; styles very short.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1312, October, 1920. In damp forests at low altitudes. A species apparently most closely allied to *Galearia phlebocarpa* Miq., well characterized by its spatulate to oblong-obovate, slightly cucullate petals, and its sessile flowers.

***Homonoia* Loureiro.**

***Homonoia javensis*** (Blume) Muell.-Arg. in *Linnaea* **34** (1865) 200, DC. Prodr. **15/2** (1866) 1022; Pax and Hoffm. in Engl. Pflanzenreich **68** (1917) 112, f. 27.

British North Borneo, Labuk District, *Agama* 1115. In forests at low altitudes. New to Borneo. Malay Peninsula and Java to the central and southern Philippines southward to Timor and New Guinea.

***Mallotus* Loureiro.**

***Mallotus blumeanus*** Muell.-Arg. in *Linnaea* **34** (1865) 195, DC. Prodr. **15/2** (1866) 978; Pax in Engl. Pflanzenreich **63** (1914) 157.

British North Borneo, Kudat, *Agama* 1068, in dry forests at low altitudes. Sumatra, Java.

***Mallotus moritzianus*** Muell.-Arg. in DC. Prodr. **15/2** (1866) 971; Pax op. cit. 152.

British North Borneo, Tawao, *Wood* 906, September, 1920. In level places along the Kumpang River. Java.

***Actephila* Blume.**

***Actephila dispersa*** (Elm.) Merr. in Philip. Jour. Sci. **4** (1909) Bot. 276.

*Pimeleodendron dispersum* Elm. Leaf. Philip. Bot. **1** (1908) 308.

British North Borneo, Sandakan, *Ramos* 1451, *Wood* 930, October, 1920. In damp forests at low altitudes. This species is widely distributed in the Philippines (Luzon, Palawan, Leyte,

Siargao, Dinagat, Mindanao), but should be critically compared with *Actephila gigantifolia* Koord. of Celebes. The genus is new to Borneo.

***Cleistanthus* Hooker f.**

***Cleistanthus megacarpus*** C. B. Rob. in Philip. Jour. Sci. **6** (1911) Bot. 323.

British North Borneo, Bettotan River, *J. Agama* 716, June 9, 1919. In forests at low altitudes. Previously known only from the Philippines, where it is widely distributed from Mindoro to Negros, Samar, and Mindanao.

***Omphalea* Linnaeus.**

***Omphalea bracteata*** (Blanco) Merr. Sp. Blancoanae (1918) 230.

*Tragia bracteata* Blanco Fl. Filip. ed. 2 (1845) 480.

*Omphalea philippinensis* Merr. in Philip. Jour. Sci. **3** (1908) Bot. 236.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1453. In forests at low altitudes. Previously known only from Luzon, the third species found in Borneo, all three also occurring in the Philippines.

**ANACARDIACEAE.**

***Melanochyla* Hooker f.**

***Melanochyla ferruginea*** sp. nov.

Arbor parva, ramulis et petiolis et inflorescentiis et subtus foliis dense ferrugineo-pubescentibus; foliis coriaceis, ellipticis vel oblongo-ellipticis, 18—42 cm. longis, apice plerumque late rotundatis, basi acutis, supra olivaceis, glabris, minute puncticulatis, subtus pallidioribus, molliter pubescentibus, nervis utrinque circiter 22, patulis, valde perspicuis; paniculis angustatis, circiter 30 cm. longis; floribus 5—6 mm. longis, dense ferrugineo-pubescentibus; calycis tubo 3 mm. longo, lobis subacutis, 1.5 mm. longis; petalis oblongis, 4—5 mm. longis, crassis, dense ferrugineo-pubescentibus, partibus apicalibus reflexis intus glabris.

A small tree the branchlets, petioles, inflorescences, and the lower surface of the leaves on the midribs and nerves densely ferruginous-pubescent. Branches terete, sparingly lenticellate, brownish, glabrous, 5 to 6 mm. in diameter. Leaves coriaceous, elliptic to oblong-elliptic, 18 to 42 cm. long, 7 to 17 cm. wide, the apex broadly rounded or somewhat retuse, base acute, the upper surface olivaceous, glabrous except for the more or less hirsute midrib, supplied with numerous, scattered, minute pits, the lower surface paler than the upper, conspicuously and softly pubescent, the indumentum dense only on the midrib; petioles 1.5 to 2.5 cm. long, densely ferruginous-pubescent; lateral nerves about 22 on each

side of the midrib, spreading, very prominent on the lower surface. Panicles narrow, about 30 cm. long. Flowers 5 to 6 mm. long, densely ferruginous-pubescent, the calyx tube about 3 mm. in length, the lobes oblong-ovate, subacute, coriaceous, 1.5 mm. long. Petals oblong, 4 to 5 mm. long, thickened, densely ferruginous-pubescent on both surfaces except on the inner surface of the reflexed apical part. Filaments 2 mm. long, densely ferruginous-pubescent. Anthers narrowly oblong, 1 mm. long. Rudimentary ovary densely ferruginous-villous.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1594, November, 1920. In damp forests along small streams at low altitudes. A species manifestly allied to *Melanochyla beccariana* Oliv., but with larger, more numerous nerved leaves and very much smaller, rather congested flowers. In Oliver's species the flowers exceed 1 cm. in length. It is possible that the present species may be the same as the form characterized by Oliver as var. *breviflora*, the flowers of this form being described as from  $\frac{1}{4}$  to  $\frac{1}{3}$  of an inch in length.

### *Semecarpus* Linnaeus f.

#### *Semecarpus borneensis* sp. nov.

Frutex vel arbor parva, ramis glabris, ramulis patule ciliatis; foliis subcoriaceis, in siccitate pallidis, nitidis, ellipticis vel oblongo-ellipticis vel obovato-ellipticis, 10—20 cm. longis, breviter obtuse acuminatis, basi acutis, supra glabris, subtus glaucescentibus, ad costam nervosae longe ciliatis, nervis primariis utrinque 10—14, perspicuis, curvatis, secundariis rectangularibus; inflorescentisque ♂ axillaribus, usque ad 20 cm. longis, subracemosis vel depauperato-paniculatis, perspicue ciliatis; floribus breviter pedicellatis, subglomeratis, bracteis anguste oblongis, 2—3 mm. longis, perspicue rufo-ciliatis.

A shrub or small tree, the branchlets, inflorescences, and leaves on the midrib and nerves conspicuously ciliate with spreading hairs. Branches glabrous, terete, grayish-brown. Leaves subcoriaceous, pale when dry, shining, elliptic to oblong-elliptic or obovate-elliptic, 10 to 20 cm. long, 5 to 8 cm. wide, apex shortly and obtusely acuminate, base acute, not decurrent, the upper surface glabrous, the lower somewhat glaucous, the ciliate spreading hairs scattered on the midrib and lateral nerves; lateral nerves 10 to 14 on each side of the midrib, prominent, rather spreading, curved, anastomosing, the primary reticulations leaving the nerves at right angles, prominent, the ultimate free ones rather distinct; petioles 1.3 to 2 cm. long. Staminate inflorescences axillary, solitary, subracemose or depauperate-paniculate, 6 to 20 cm. long, conspicuously ciliate, the hairs spreading, those on the younger parts rufous. Flowers crowded at the nodes in small glomerules, their pedicels 1 mm. long or less. Bracts narrowly oblong, 2 to 3 mm. long, conspicuously rufous-ciliate, the bracteoles similar, smaller. Calyx about

2 mm. in diameter, the lobes ovate, acute or acuminate, 0.8 mm. long, ciliate. Petals oblong-elliptic, 2 mm. long.

British North Borneo, Rosop, near Kudat, *Agama* 1061, November 15, 1920. On dry slopes, altitude about 20 m. A species allied to *Semecarpus glauca* Engl., from which it is distinguished by its much shorter, axillary not terminal, usually racemose rather than paniculate inflorescences, larger leaves, and other characters.

***Semecarpus oblanceolata* sp. nov.**

Frutex erectus, simplex, circiter 1 m. altus, inflorescentiis puberulis: exceptis glaber; foliis oblanceolatis, subcoriaceis, circiter 75 cm. longis, 13 cm. latis, supra olivaceis, nitidis, glabris, subtus pallidioribus, minute scaberulis, apice breviter acuminatis, deorsum gradatim angustatis, basi obtusis, 1—1.5 cm. latis; nervis primariis lateralibus utrinque circiter 30, utrinque valde perspicuis, nervis secundariis inter primarios transversis, angulo recto abeuntibus, ultimis obscuris, liberis; paniculis ♂ terminalibus 20 cm. longis, puberulis; floribus 5-meris; sepalis petalisque extus puberulis, petalis elliptico-ovatis, 2.5 mm. longis.

An erect, apparently unbranched shrub about 1 m. high, glabrous except the puberulent inflorescences, the stems pale-brown when dry, about 1 cm. in diameter, sparingly lenticellate. Leaves crowded at the apices of the stems, coriaceous or subcoriaceous, oblanceolate, about 75 cm. long, 13 cm. wide, the upper surface olivaceous, shining, glabrous, the lower surface paler but scarcely glaucous, minutely scabrid, the apex shortly and sharply acuminate, gradually narrowed in the lower three quarters to the abruptly rounded base which is but from 1 to 1.5 cm. in width, the midrib, lateral nerve, and reticulations very prominent on both surfaces, the nerves about 30 on each side of the midrib, the reticulations lax, the primary ones leaving the nerves at right angles, the ultimate veinlets obscure, free; petioles stout, angular, about 1 cm. long. Staminate panicles terminal, erect, about 20 cm. long, all parts puberulent, the lower branches up to 12 cm. in length, their subtending bracts narrowly lanceolate, acuminate, about 5 mm. long. Buds obovoid, their pedicels about 1 mm. long. Calyx puberulent, 5-lobed, the lobes triangular-ovate, acute, 0.5 mm. long. Petals 5, elliptic-ovate, somewhat acuminate, 2.5 mm. long, puberulent externally, rather distinctly nerved and reticulate.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1517, November, 1920. On steep forested slopes near streams at low altitudes. A species very closely allied to the Philippine *Semecarpus subsessilifolia* Merr.: in habit, size and appearance of its leaves closely approximating the latter species, differing in its much more lax reticulations, the nerves and midribs prominently raised on both surfaces, the lower surface of the leaves minutely but distinctly scabrid.

## HIPPOCRATEACEAE.

*Salacia* Linnaeus.***Salacia nitidissima* sp. nov.**

Frutex scandens, glaberrimus; ramis ramulisque minute lenticellatis; foliis coriaceis, elliptico-ovatis vel oblongo-ellipticis, utrinque nitidis, 8—15 cm. longis, basi acutis, apice obtuse acuminatis, nervis utrinque 8—10, perspicuis; floribus paucis, axillaribus, 9—11 mm. diametro, sepalis orbiculari-ovatis, rotundatis, 2 mm. diametro, petalis ellipticis vel elliptico-ovatis, 5—5.5 mm. longis, disco crasso, 3 mm. diametro, filamentis latis, circiter 1 mm. longis.

A glabrous scandent vine, the branches reddish-brown to somewhat grayish with numerous small lenticels, the ultimate branchlets about 1.5 mm. in diameter. Leaves opposite, coriaceous, elliptic-ovate to oblong-elliptic, rather pale when dry and prominently shining on both surfaces, 8 to 15 cm. long, 3 to 5.5 cm. wide, entire, the margins somewhat recurved, subequally narrowed to the acute base and the bluntly acuminate apex, the acumen up to 1 cm. long; lateral nerves 8 to 10 on each side of the midrib, rather prominent on the lower surface, distinct; petioles 8 to 10 mm. long. Flowers few, in axillary fascicles, 9 to 11 mm. in diameter, their pedicels 3 to 4 mm. long, subtended by few broadly ovate bracteoles about 1 mm. in length. Sepals 5, orbicular-ovate, rounded, about 2 mm. in diameter, glabrous. Petals elliptic to elliptic-ovate, rounded, 5 to 5.5 mm. long. Disk about 3 mm. in diameter, thick. Stamens 3, their filaments flattened, about 1 mm. long, scarcely exceeding the disk, the anthers transversely oblong.

British North Borneo, Sibuga, near Sandakan, *Ramos* 1860, December, 1920. In open forests at low altitudes. A species apparently most closely allied to *Salacia maingayi* Laws., but with more numerous nerved, blunt-acuminate leaves and longer petioles. The flowers, as in Lawson's species, are fascicled, few in number, but not borne on tubercles.

***Salacia oblongifolia* Blume Bijdr. (1825) 220.**

British North Borneo, Batu Lima near Sandakan, *Ramos* 1561, 1690. In secondary forests at low altitudes. Previously known only from Java, the specimens agreeing very closely both with Blume's description and with Javan material.

## ICACINACEAE.

*Phytocrene* Wallich.***Phytocrene anomala* sp. nov.**

Frutex scandens hirsutus; foliis chartaceis, oblongis vel oblongo-oblanccolatis, integris, acuminatis, basi rotundatis cordatisque, nervis utrinque 8—10, subtus valde perspicuis; inflorescentiis

♂ et ♀ globosis, axillaribus, solitariis, pedunculatis. ♂ 8 mm. diametro, floribus 4-meris, bibracteolatis, bracteolis linearis, hirsutis; fructibus junioribus oblongo-ellipsoideis, 2 cm. longis, densissime adpresse reflexeque hirsutis.

A scandent woody vine, the branchlets and leaves on the lower surface rather prominently hirsute. Branches up to 5 mm. in diameter, grayish, ultimately glabrous, the younger branchlets about 1.5 mm. in diameter, with two types of indumentum: pale, short, numerous, spreading hairs; and scattered, longer, purplish ones. Leaves chartaceous, oblong to broadly oblong-ob lanceolate, entire, the upper surface olivaceous, glabrous or nearly so or the midrib somewhat hirsute, the lower surface paler and conspicuously hirsute on the midrib, nerves, and reticulations, the margins entire, or obscurely denticulate in younger leaves, narrowed upward to the somewhat acuminate apex and below to the rather abruptly rounded and distinctly cordate base: lateral nerves 8 to 10 on each side of the midrib, very prominent on the lower surface as are the reticulations; petioles hirsute, 10 to 13 mm. long. Staminate inflorescences axillary, peduncled, solitary, globose, the heads about 8 mm. in diameter, their peduncles hirsute, about 10 mm. long, the staminate flowers numerous, crowded, 2-bracteolate, the bracteoles linear, 3 to 4 mm. long, densely hirsute. Flowers funnel-shaped, about 3 mm. long, somewhat hirsute, 4-lobed, the lobes ovate to elliptic-ovate, acute, about 1.3 mm. long. Stamens 4, their filaments about 2 mm. in length; anthers elliptic-oblong, 1 mm. long. Pistillate inflorescences axillary, solitary, glabrous, the young fruits ovoid to oblong-ellipsoid, narrowed at both ends, about 2 cm. long, densely hirsute with reflexed, appressed, brown, stiff hairs, the calyces similar to those of the staminate flowers, somewhat accrescent and 5 to 6 mm. in length.

British North Borneo, Batu Lima and Sibuga, near Sandakan, *Ramos* 1848, 1508, 1534 (type), October, November, and December, 1920. In secondary forests at low altitudes. Sarawak, Upper Baram, Lio-Matu, *Moulton* 6703-25, October, 1920. A remarkable species, not only on account of its vegetative characters, but also on account of its solitary, globose, axillary, peduncled staminate heads, in this last character differing radically from all previously known representatives of the genus.

### *Iodes Blume.*

***Iodes philippinensis* Merr.** in Philip. Jour. Sci. **3** (1908) Bot. 241.

British North Borneo, Sapang and Batu Lima, near Sandakan, *Yates* 20, *Ramos* 1410. In thickets and secondary forests at low altitudes. The material exactly matches *Iodes philippinensis* Merr. which is common in the central and southern Philippines, southern Luzon to Palawan and Mindanao, in all or most islands.



## ELAEOCARPACEAE.

*Elaeocarpus* Linnaeus.***Elaeocarpus brevipes* sp. nov.**

Arbor circiter 8 m. alta, pubescens; foliis breviter petiolatis, oblongis, chartaceis vel subcoriaceis, usque ad 17 cm. longis, acuminatis, basi obtusis vel subacutis, margine perspicue distanter serratis, nervis utrinque circiter 12, subtus perspicuis; stipulis 6—7 mm. longis, palmatis laciniatis; racemis usque ad 12 cm. longis, multifloris, floribus 4—5 mm. longis, sepalis extus adpresse pubescentibus; petalis obovatis, glabris, laciniis numerosis.

A tree about 8 m. high, more or less softly pubescent. Branches terete, smooth, ultimately glabrous, brown, the branchlets softly pubescent with short hairs. Leaves oblong, chartaceous to subcoriaceous, olivaceous, somewhat shining, 11 to 17 cm. long, 5 to 7 cm. wide, the apex acuminate, base obtuse to subacute, margins rather conspicuously serrate in the upper one-half to two-thirds, entire below, the upper surface glabrous or slightly pubescent on the midrib, the lower surface rather uniformly pubescent with short hairs; stipules pubescent, deciduous, orbicular to obovate in outline, 6 to 7 mm. long, palmately lacinate, the lobes 7 to 9, usually extending to about the middle; petioles pubescent, 7 to 10 mm. long. Racemes axillary, more or less fascicled, 6 to 12 cm. long, pubescent. Flowers numerous, white, 4 to 5 mm. long, their pedicels 5 to 8 mm. long. Sepals 5, oblong-ovate, acute, sparingly appressed-pubescent, 4 to 5 mm. long. Petals equalling the sepals; glabrous, obovate, the fimbriae about 25, extending to about the middle. Stamens about 30, the anthers blunt, 1.8 mm. long. Ovary pubescent; style 2 mm. long, pubescent below.

British North Borneo, Batu Lima, near Sandakan, Wood 952. October 15, 1920. In damp forests at low altitudes. A species manifestly allied to *Elaeocarpus gambir* Becc., differing especially in its rather conspicuously toothed not entire leaves.

## TILIACEAE.

*Grewia* Linnaeus.***Grewia pyriformis* sp. nov.**

Arbor parva, inflorescentiis exceptis glabra; foliis coriaceis, nitidis, oblongo-ellipticis vel elliptico-ovatis, 20—35 cm. longis, basi late acutis vel rotundatis, leviter asymmetricis, obscure 3-nerviis, apice obtuse acuminatis, nervis utrinque 6—10, valde perspicuis; paniculis axillaribus terminalibusque, pubescentibus, 8—12 cm. longis; fructibus pyriformibus, glabris, 3 cm. longis, endocarpio osseo, mesocarpio fibroso.

A small tree, glabrous except the inflorescences, the branches reddish-brown or grayish, somewhat rugose when dry. Leaves

coriaceous, oblong-elliptic to elliptic-ovate, 20 to 35 cm. long, 9 to 14 cm. wide, entire, brownish-olivaceous to greenish-olivaceous when dry, shining on both surfaces, the base broadly acute to rounded, somewhat 3-nerved, the axillary glands when present not bearded, the apex broadly acuminate; lateral nerves, including the basal pair, 6 to 10 on each side of the midrib, somewhat ascending, curved-anastomosing close to the margin, prominent on both surfaces, the primary reticulations rather lax, distinct, subparallel; petioles 1.5 to 2.5 cm. long. Panicles axillary and terminal, in fruit 8 to 12 cm. long, somewhat pubescent. Fruits obovoid or pyriform, smooth, brown when dry, glabrous, about 3 cm. long, the endocarp hard, bony, the mesocarp fibrous.

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1704 (type), 1438, 1622, October and November, 1920. In damp forests at low altitudes. A species manifestly in close alliance with the Philippine *Grewia stylocarpa* Warb., from which it is easily distinguished by its much larger fruits.

### *Neesia* Blume.

***Neesia synandra*** Mast. in Hook. f. Fl. Brit. Ind. **1** (1874) 352, Jour. Linn. Soc. Bot. **14** (1875) 504; King in Jour. As. Soc. **60** (1891) 56 [Mat. Fl. Malay Penin. **1** (1891) 165].

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1540, November, 1920. The specimen is in fruit and so is not directly comparable with my material of *N. synandra* Mast. from the Malay Peninsula and Penang. The vegetative characters, however, seem to be an exact match for Penang material, coll. *For.* The fruits are described as from 6 to 9 inches long and 4 to 5 inches in diameter and further as ovoid-conic, much as in the Javan *Neesia altissima* Blume. The fruits of the present species, not quite mature, are ellipsoid, when fresh 30 cm. long and 18 cm. in diameter, when dry about 20 cm. long and 10 to 12 cm. in diameter. The leaves attain a length of 50 cm. and a breadth of 25 cm. It may represent a distinct species, but more and complete material of both *Neesia synandra* Mast., and *N. altissima* Blume will be necessary to determine this point.

### *Boschia* Korthals.

***Boschia griffithii*** Mast. in Jour. Linn. Soc. Bot. **14** (1875) 503, t. 15, f. 29-39, t. 16, f. 40-42; King in Jour. As. Soc. Bengal **60** (1891) 55 [Mat. Fl. Malay. Pen. **1** (1891) 164].

British North Borneo, Batu Lima, near Sandakan, *Ramos* 1794. In forests at low altitudes. All the known species of this genus are represented in the herbarium of the Bureau of Science. The present species was previously known from the Malay Peninsula and Sumatra.

## STERCULIACEAE.

*Sterculia* Linnaeus.***Sterculia trichopetiolata* sp. nov.**

Frutex circiter 2 m. altus, petiolis densissime ferrugineo-hirsutis exceptis glaber vel subglaber; ramulis circiter 5 mm. diametro; foliis oblanceolatis vel oblongo-oblanceolatis, chartaceis, utrinque glabris nitidisque, 27—42 cm. longis, tenuiter caudato-acuminatis, deorsum gradatim angustatis, basi acutis, nervis utrinque 18—20, subtus valde perspicuis; stipulis membranaceis, anguste oblongo-lanceolatis, 1.5—2 cm. longis, margine ciliatis; paniculis glabris, circiter 25 cm. longis, ramis patulis, inferioribus 5 cm. longis, bracteis caduceis, 6—10 mm. longis; floribus ♂ circiter 11 mm. longis, extus glabris, lobis triangulari-ovatis, acutis, erectis vel patulis, haud coherentibus, 4 mm. longis, intus hirsutis; antheris 10; folliculis oblongis, 5—8 cm. longis, rostrato-acuminatis, extus densissime ferrugineo-pubescentibus, intus glabris.

A shrub about 2 m. high, glabrous or nearly so except the very densely ferruginous-hirsute, somewhat thickened petioles, the ultimate branches brownish, terete, glabrous, sparingly lenticellate, about 5 mm. in diameter. Leaves crowded at the apices of the branchlets, oblanceolate to oblong-oblanceolate, chartaceous, olivaceous, glabrous and shining on both surfaces, 27 to 42 cm. long, 6 to 12 cm. wide, the apex slenderly caudate-acuminate, gradually narrowed below to the acute base; lateral nerves 18 to 20 on each side of the midrib, somewhat curved, arched-anastomosing, very prominent on the lower surface as are the lax primary reticulations; petioles about 1 cm. long, very densely hirsute with stiff spreading ferruginous hairs 2 to 3 mm. in length; stipules membranaceous, narrowly oblong-lanceolate, obtuse or acuminate, 1.5 to 2 cm. long, about 4 mm. wide, their margins ciliate, otherwise glabrous or nearly so. Panicles glabrous, in the uppermost axils, in anthesis about 25 cm. long, the branches spreading, the lower ones about 5 cm. in length, when young the primary branches subtended by membranaceous, oblong-ovate to lanceolate, caducous bracts, 6 to 10 mm. in length. Staminate flowers about 11 mm. long, glabrous outside, the tube somewhat cup-shaped, about 6 mm. long, rounded or obtuse at the base, the lobes 5, triangular-ovate, acute, erect or spreading, not at all cohering, hirsute inside, about 4 mm. long. Anthers about 10, 1.2 mm. long, the globose head about 2.5 mm. in diameter, the glabrous androphore 2 mm. in length. Follicles oblong, 5 to 8 cm. long, about 2 cm. wide, very densely ferruginous-pubescent externally, glabrous internally, rostrate-acuminate, base narrow, the pericarp subcoriaceous. Seeds 2 to 5, dark-brown, ellipsoid, about 12 mm. long.

British North Borneo, Batu lima, near Sandakan, *Ramos*, 1702 (type), *Agama* 1030, November, 1920. On steep forested slopes at low altitudes. A species belong in the group with *Sterculia*

*spatulata* Warb., in general appearance very similar to *S. yatesii* Merr., differing from the latter in its very densely ferruginous-hirsute petioles, in its flowers being glabrous, and in its shorter perianth lobes which do not at all cohere and are not at all arched.

## DILLENiaceae.

### *Actinidia* Lindley.

***Actinidia latifolia*** (Gard. & Champ.) comb. nov.

*Heptuca latifolia* Gard. & Champ. in Hook. Jour. Bot. Kew Miscel. 1 (1849) 243.

*Actinidia Championi* Benth. Fl. Hongk. (1861) 26; Dunn in Jour. Linn. Soc. Bot. 39 (1911) 407.

*Kadsura pubescens* Miq. Fl. Ind. Bat. Suppl. (1861) 620.

*Actinidia miquelii* King in Jour. As. Soc. Bengal 59-2 (1890) 126, Ann. Bot. Gard. Calcutta 5 (1896) t. 176.

British North Borneo, Mount Kalawat, Mrs. Clemens 11166, December 11, 1915.

The specimen, in fruit, matches *Teysmann 4229* from Lampongs, Sumatra, a cotype of Miquel's *Kadsura pubescens*, and King's collector 5437 from Perak, which were kindly loaned to me by Col. A. Gage, Director of the Botanic Garden, Calcutta, for examination. Dunn,\* in his revision of the genus *Actinidia*, states that there does not appear to be any distinction to be drawn between *A. championi* and *A. miquelii*; I agree with Mr. Dunn after comparing Chinese and Malayan Material. The oldest valid specific name is that supplied by *Heptuca latifolia* Gard. & Champ. Fukien and Kwangtung Provinces, China, Hongkong, Formosa, Indo-China, Malay Peninsula, Sumatra. The genus is new to Borneo.

### *Saurauia* Willdenow.

***Saurauia amplifolia*** sp. nov.

Frutex vel arbor parva, pedicellis floribusque leviter pubescentibus exceptis glabra, ramulis ultimis 6—8 mm. diametro, paleis paucis crassis lanceolatis adpressis instructis; foliis chartaceis, oblongo-ellipticis vel oblongo-oblancoatis, 45—55 cm. longis, usque ad 21 cm. latis, supra laevibus, subolivaceis, nitidis, subtus pallidioribus, apice acutis vel breviter acuminatis, basi acutis, margine distanter denticulatis, nervis utrinque 15—19, subtus perspicuis; floribus plerisque fasciculatis, fasciculis caulinis vel in ramis vetustioribus, pedicellis tenuibus, leviter pubescentibus, usque ad 1.5 cm. longis; floribus 5-meris, 1.4 cm. diametro, sepalis ellipticis, 4.5 mm. longis, extus leviter pubescentibus; staminibus circiter 20; ovario ovoideo, leviter pubescente, stylis 3 liberis.

A shrub or small tree glabrous except the sparingly pubescent pedicels and flowers, the ultimate branchlets 6 to 8 mm. in diameter, gray or dark-brown and with few appressed, lanceolate, acuminate scales 1.5 to 2 mm. in length. Leaves chartaceous oblong-elliptic to oblong-oblancoate, 45 to 55 cm. long, 15 to 20 cm. wide, the upper surface greenish-olivaceous, somewhat shining, the lower paler, apex acute or shortly acuminate, narrowed below to the acute base, the margins distantly but rather conspicuously denticulate or sometimes crenate, the slightly projecting teeth being formed by the excurrent nervules; lateral nerves 15 to 19 on each side of the midrib, prominent on both surfaces, especially so beneath, and on the lower surface with occasional, widely scattered, appressed, linear-lanceolate scales, arched-anastomosing close to the margin, the primary reticulations lax; petioles often rather stout, about 3 cm. long. Flowers chiefly in large, very dense fascicles on the trunk and larger branches below the leaves, the pedicels often very numerous, up to 100 or more in a fascicle, sometimes few and but 8 or 10 or even fewer in a fascicle, the pedicels slender, sparingly pubescent, up to 1.5 cm. long. Flowers about 1.4 cm. in diameter, the sepals elliptic, obtuse or rounded, about 4.5 mm. long, sparingly pubescent externally. Corolla lobes 5 to 6 mm. long, 2.5 to 4 mm. wide, the apex somewhat inequilateral. Stamens about 20, the filaments and anthers 2 mm. in length. Ovary ovoid, slightly pubescent; styles 3, free, 3.5 mm. long. Fruit globose, glabrous about 8 mm. in diameter.

British North Borneo, Batu Lima and Sibuga, near Sandakan, *Ramos* 1245 (type), 1829, *Agama* 1045, November and December, 1920. On damp forested slopes at low altitudes. A species well characterized by being nearly glabrous throughout; by its very large, smooth, glabrous leaves; and by its densely fascicled flowers, the flowers being for the most part borne on the trunk and larger branches, many fascicles being from 3 to 5 cm. in diameter and often presenting 100 or more pedicels.

## THEACEAE.

### *Gordonia* Ellis.

#### *Gordonia grandiflora* sp. nov.

Arbor circiter 12 m. alta; foliis brevipetiolatis, coriaceis, oblongo-ellipticis, usque ad 18 cm. longis, breviter obtuseque acuminatis, basi rotundatis vel leviter cordatis, margine crenulatis; floribus permagnis, 10 ad 11 cm. diametro; capsulis junioribus 5 ad 6 cm. longis, apiculato-acuminatis.

A tree about 12 m. high, the stout branchlets and the lower surfaces of the leaves somewhat pubescent. Leaves subsessile, coriaceous, oblong-elliptic, 14 to 18 cm. long, 6 to 8 cm. wide, shining, margins crenulate, apex very broadly and obtusely acuminate, base somewhat narrowed and abruptly rounded or slightly

cordate, the midrib very prominent beneath, the lateral nerves slender, about 15 on each side of the midrib. Flowers white, axillary, solitary, 10 to 11 cm. in diameter. Sepals coriaceous, broadly ovate to orbicular-ovate, rounded, glabrous or slightly pubescent, 1.5 to 2 cm. long and somewhat accrescent in anthesis. Petals obovate to oblong-obovate, 4 to 5 cm. long, somewhat pubescent externally. Stamens very numerous, free, the filaments glabrous, up to 3 cm. long; anthers 3 to 3.5 mm. long. Ovary pubescent. Style slender, glabrous, up to 2.5 cm. long. Immature capsules 5 to 6 cm. long, apiculate-acuminate, sulcate. Seeds winged.

British North Borneo, Rosab, near Kudat, *Castro* 972, November 14, 1920. On dry slopes, altitude about 50 m. A species well characterized by its unusually large subsessile leaves and by its very large flowers.

In this connection the species described by me from Amboina as *Gordonia rumphii* Merr. Inter. Herb. Amb. (1917) 368 is manifestly identical with the form described by Miquel as *Laplacea amboinensis*. The synonymy should be as follows:

***Gordonia amboinensis* (Miq.) comb. nov.**

*Laplacea amboinensis* Miq. Ann. Mus. Bot. Lugd. Bat. 4 (1868) 114.

*Haemocharis amboinensis* Burkill in Jour. Str. Branch Roy. As. Soc. 76 (1917) 141, 158.

*Gordonia rumphii* Merr. Interpret. Herb. Amb. (1917) 368.

I agree with Burkill's expressed opinion\* that the Malayan species of *Haemocharis* (*Laplacea*) should be placed in *Gordonia*. In discussing this particular species Mr. Burkill treated it as *Haemocharis* rather than *Laplacea*. I can find no reference to its previous treatment under *Haemocharis*.

## FLACOURTIACEAE.

### *Taraktogenos* Kurz.

***Taraktogenos grandiflora* sp. nov.**

Arbor circiter 10 m. alta, ramulis et subtus foliis ad costam nervosque pubescentibus; foliis oblongis, coriaceis, 25—35 cm. longis, abrupte acuminatis, basi subrotundatis, leviter inaequilateralibus, nervis utrinque 10—12, subtus valde perspicuis, petiolo 6—8 mm. longo, floribus ♂ 3—4 cm. diametro, cymis axillaribus, paucifloris; sepalis 8, orbicularibus vel obovatis, 1.5—2 cm. longis; petalis 9—12, usque ad 10 mm. longis, leviter fimbriatis; staminibus numerosis.

\*Burkill, I. H., *Gordonia*, Journ. Str. Branch, Roy. As. Soc. 76. (1917) 138-159, fig. 15.

A tree about 10 m. high, the young branches and the leaves beneath on the midrib and nerves more or less ferruginous-pubescent, otherwise glabrous or nearly so. Branches terete, grayish or brownish. Leaves oblong, coriaceous, brown or brownish olivaceous when dry, somewhat shining, 25 to 35 cm. long, 8 to 11 cm. wide, apex abruptly acuminate, the acumen about 1 cm. long, base subrounded, slightly inequilateral; lateral nerves 10 to 12 on each side of the midrib, very prominent on the lower surface, curved-anastomosing, the primary reticulations prominent, subparallel; petioles 6 to 8 mm. long, stout, somewhat pubescent; stipules oblong-lanceolate, coriaceous, about 1 cm. long, 3 mm. wide. Male flowers white, 3 to 4 cm. in diameter, in axillary few-flowered cymes, the peduncles stout, about 1 cm. long, the pedicels about 1.5 cm. long. Sepals 8, orbicular to obovate, rounded, glabrous, 1.5 to 2 cm. long, the outer smaller than the inner ones. Petals 9 to 12, orbicular to obovate, unequal, 7 to 10 mm. long, 5 to 8 mm. wide, more or less fimbriate, the thick basal scale somewhat pubescent, sulcate, 3 to 4 mm. long, 2 to 3.5 mm. wide. Stamens very numerous, the filaments 1 cm. long; anthers elliptic, 4 mm. long, 3 mm. wide.

British North Borneo, Batu Lima, near Sandakan, *Wood 960*, October 10, 1920. In damp forests at low altitudes. A remarkable species not only in its very large flowers, but also in its numerous sepals and petals. In spite of the fact that the pistillate flowers and fruits are unknown it is clearly a *Taraktogenos*.

*Casearia* Jacquin.

*Casearia borneensis* sp. nov.

Arbor parva, glaberrima; foliis integris, oblongo-ovatis, utrinque nitidis concoloribus, 12—20 cm. longis, 6—9 cm. latis, subcoriaceis, acute acuminatis, basi acutis, epunctatis, nervis utrinque circiter 8, perspicuis, reticulis confertis, utrinque distinctis; petiolo 1—1.5 cm. longo; fructibus axillaribus, plerisque fasciculatis, ovoideis, 1.8—2.5 cm. longis, pedicellatis.

A small, entirely glabrous tree, the branches terete, smooth. Leaves entire, oblong-ovate, subcoriaceous, brownish-olivaceous and conspicuously shining on both surfaces when dry, subcoriaceous, 12 to 20 cm. long, 6 to 9 cm. wide, apex acutely acuminate, base acute, not punctate; lateral nerves about 8 on each side of the midrib, rather prominent, the reticulations close and distinct on both surfaces; petioles 1 to 1.5 cm. long. Fruits axillary, mostly fascicled, ovoid to oblong-ovoid, dark red when mature, 1.8 to 2.5 cm. long, dark brown and shining when dry, the pedicels about 5 mm. long. Persistent sepals glabrous, 2 mm. long.

British North Borneo, near Sandakan, *Ramos 1167*, *Wood 961* (type), October 20, 1920, *Mrs. Clemens 9499*, December 21, 1915. In damp forests at low altitudes. A species well characterized by being entirely glabrous and in its very entire, strongly shining, densely reticulate leaves.

## BEGONIACEAE.

*Begonia* Linnaeus.***Begonia angustilimba* sp. nov. § *Petermannia*.**

Herba erecta, suffruticosa, 40—90 cm. alta, partibus junioribus perspicue ciliatis: foliis numerosis, chartaceis, anguste lanceolatis, 10—16 cm. longis, 1—3 cm. latis, acuminatis, basi abrupte rotundatis, leviter cordatis, symmetricis vel leviter inaequilateralibus, margine irregulariter serrato-dentatis spinulosisque; stipulis perspicuis, subpersistentibus, 1.5—2 cm. longis, oblongo-lanceolatis, tenuiter acuminatis; floribus axillaribus, plerumque solitariis, ♂ sepalis 2, obovoideis, 8—10 mm. longis; petalis 0, pedicellis 1.5—2 cm. longis; ♀ breviter pedicellatis; capsulis aequaliter 3-alatis, circiter 8 mm. longis, 11 mm. latis, basi rotundatis, apice subacutis, omnibus partibus perspicue longe ciliatis vel ciliato-setosis.

An erect, simple or sparingly branched, suffrutescent plant, 40 to 90 cm. high, the younger parts rather prominently ciliate with elongated, spreading, brownish hairs, the older stems and branches glabrous, brown, rugose, about 3 mm. in diameter. Leaves numerous, chartaceous, narrowly lanceolate, greenish-olivaceous when dry, shining, the lower surface paler than the upper one, both surfaces sparingly ciliate on the midrib and nerves, or the upper surface glabrous, straight or somewhat falcate, slightly inequilateral, 10 to 16 cm. long, 1 to 2 cm. wide, the apex rather slenderly acuminate, base rather abruptly rounded, slightly cordate, equilateral or somewhat inequilateral, the margin irregularly toothed and spinulose in the upper part, the teeth obscure or wanting in the lower part; lateral nerves sharply ascending, about 5 on each side of the midrib, slender, distinct; petioles ciliate, 2 to 4 mm. long; stipules rather thin, 1.5 to 2 cm. long, oblong-lanceolate, slenderly acuminate, somewhat ciliate, subpersistent. Flowers axillary, solitary or in pairs, white. Staminate flowers: sepals 2, obovate, rounded, sparingly ciliate 8 to 10 mm. long, 6 to 8 mm. wide. Petals none. Stamens about 35, the anthers obovoid to oblong-obovoid, 1 mm. long, equal-about 35, the anthers ovoid to oblong-obovoid, 1 mm. long, equalling the filaments in length. Pedicels slender 10 to 12 mm. long, glabrous or very slightly ciliate. Pistillate flowers axillary, solitary, their pedicels about 2 mm. long. Sepals 3, elliptic-ovate, subacute, 6 to 7 mm. long, sparingly ciliate. Capsules equally 3-winged, about 8 mm. long, 11 mm. wide, rounded at the base, the apex subacute, the outer upper angles of the wings subacute or rounded, all parts of the capsule, including the wings, prominently ciliate with elongated, spreading, purplish or brownish setae 2 to 3 mm. in length.

British North Borneo, near Sandakan, *Ramos 1388*, October, 1920. On cliffs and boulders along streams at low altitudes. A species strongly characterized by its narrow, elongated, often somewhat falcate leaves, its persistent large sepals, its axillary solitary flowers, and its conspicuously setose-ciliate capsules.



## THYMELAEACEAE.

*Linostoma* Wallich.

***Linostoma pauciflorum*** Griff. in Calcutta Jour. Nat. Hist. **4** (1844) 234 in nota; Gamble in Jour. As. Soc. Bengal **75** (1912) 261.

*Psilaea dalbergioides* Miq. Fl. Ind. Bot. Suppl. (1861) 355.

British North Borneo, Sandakan, *Ramos* 1799. In secondary forests at low altitudes. Burma, Malay Peninsula, Sumatra. The genus is new to Borneo.

## MYRTACEAE.

*Eugenia* Linnaeus.

***Eugenia sandakanensis*** sp. nov. § *Jambosa*.

Arbor parva, glabra, ramis ramulisque teretibus pallide griseis, ramulis 2.5 mm. diametro; foliis coriaceis, rigidis, oblongo-ellipticis, 14—17 cm. longis, apice obtuse acuminatis, basi acutis vel decurrento-acuminatis, supra olivaceis, nitidissimis, minute puncticulatis, ad costam perspicue glanduloso-punctatis, subtus pallidioribus, atropunctatis, nervis utrinque 12—15, subtus perspicuis, rectis, marginalibus perspicuis, leviter arcuatis; inflorescentiis in ramis sub folia, axillaribus, depauperato-cymosis, fasciculatis, vix 1 cm. longis; floribus 4-meris, sessilibus, sub anthesin 1.5 cm. diametro, alabastro obovoideo, 3 mm. diametro.

A small, glabrous tree, the branches and branchlets terete, pale-gray, the ultimate branchlets 2.5 mm. in diameter. Leaves coriaceous, rigid, oblong-elliptic, 14 to 17 cm. long, 6 to 7 cm. wide, subequally narrowed to the acute or somewhat decurrent-acuminate base, and the blunt-acuminate apex, the upper surface olivaceous, strongly shining, minutely pitted, smooth, the midrib, conspicuously glandular-punctate, the nerves slightly impressed, distinct, the lower surface paler, conspicuously black-punctate; lateral nerves 12 to 15 on each side of the midrib, straight, prominent, anastomosing directly with the slightly arched, equally distinct marginal nerves 4 to 6 mm. from the edge of the leaf, the reticulations slender, indistinct; petioles stout, 5 to 7 mm. long. Inflorescences from the branches below the leaves, axillary, composed of very short, few-flowered, fascicled, depauperate-cymose axes 7 mm. long or less. Flowers white, in anthesis about 15 mm. in diameter, the buds obovoid, 3 mm. in diameter, narrowed below into the 1 to 2 mm. long pseudostalk, sessile, subtended by a pair of minute bracteoles. Calyx throat in anthesis about 7 mm. in diameter, the lobes 4, broadly rounded, 2 mm. long, about 4 mm. wide. Petals free, orbicular, punctate-glandular, 4.5 mm. in diameter. Stamens indefinite, their filaments 4 to 5 mm. long.

British North Borneo, Sandakan, *Ramos 1466*, October, 1920. In damp forests at low altitudes. A species closely allied to the Philippine *Eugenia rubronervia* C. B. Rob., differing in its terete branchlets, its longer-petioled leaves, the upper surfaces of which are strongly shining, not dull when dry. The flowers appear to be distinctly larger than in the Philippine species.

***Eugenia woodii* sp. nov. § *Jambosa*.**

Arbor parva, glabra, ramulis teretibus; foliis magnis, coriaceis, oblongo-lanceolatis, 40—60 cm. longis, brevissime petiolatis, apice perspicue acuminatis, basi rotundatis et leviter cordatis, nervis utrinque 40—50, valde perspicuis; inflorescentiis axillaribus terminalibusque brevibus, dichotome ramosis, ramulis brevibus, ultimis circiter 5 mm. longis; calyce infundibuliformi, tereti, circiter 2 cm. longo, et 1 cm. diametro, deorsum valde angustato, perspicue 4-lobato, stylis circiter 3.5 cm. longis.

A glabrous tree about 7 m. high, the branches terete, the ultimate ones 5 to 8 mm. in diameter. Leaves opposite and coriaceous oblong-lanceolate, 50 to 60 cm. long, 9 to 18 cm. wide, the base rounded and slightly cordate, the apex prominently acuminate, the acumen about 3 cm. long, the upper surface grayish or olivaceous when dry, the lower pale; lateral nerves 40 to 50 on each side of the midrib, very prominent, spreading, slightly curved and astomosing with the distinct, slightly arched, marginal nerves, 3 to 5 mm. from the edge of the leaf; petioles very stout, 5 mm. long or less. Inflorescences axillary and terminal, the short peduncle and axis about 2 cm. long, dichotomously branched, the branches short, the ultimate branchlets about 5 mm. long each bearing a single flower which is subtended by 2 small bracteoles. Calyx funnel-shaped, about 2 cm. long, the throat about 1 cm. in diameter, the lower 1 cm. forming a rather narrow pseudostalk, then abruptly widening, the lobes 4, conspicuous; style slender about 3.5 cm. long.

British North Borneo, Bettotan Watershed, *D. D. Wood 688* (type), June 5, 1919, in flat forests, altitude about 20 meters; Batu Lima and Sebuga near Sandakan, *Ramos 1262, 1803, 1804*, October and December, 1920, in forests at low altitudes. A remarkable species strongly characterized by its elongated, numerous and conspicuously nerved leaves which are slenderly acuminate at their apices and narrowed below to the rounded and slightly cordate bases, as well as by its short inflorescences and its calyx characters.

***Eugenia palawanensis* C. B. Rob. in Philip. Jour. Sci. 4 (1909) Bot. 377.**

British North Borneo, Labuk Bay *D. D. Wood 677*, March 30, 1919, in flat forests at low altitudes. Previously known only from Palawan.

*Myrtus* Linnaeus.***Myrtus moultonii* sp. nov.**

Frutex, ramulis floribusque exceptis glaber; ramulis minute glanduloso-verruculosis; foliis numerosis, alternis, oppositis vel quaternis, crassissime coriaceis, ellipticis, utrinque rotundatis, 4—6 mm. longis, margine revolutis, nervis obsoletis, subtus glanduloso-punctatis; floribus axillaribus terminalibusque, solitariis vel confertis; calycibus cinereo-pubescentibus, lobis 4, ovatis, 1.5 mm. longis, acutis; petalis orbiculari-ovatis, stipitatis; staminibus circiter 30, 5—6 mm. longis.

A shrub, the branchlets, pedicels, and calyces somewhat cinereous-pubescent, the branches stiff, elongated, covered with somewhat shaggy, brownish or grayish bark, the younger ones somewhat glandular-verruculose. Leaves very numerous, alternate, opposite, or sometimes in verticils of 4, thickly coriaceous, elliptic, 4 to 6 mm. long, 2.5 to 4 mm. wide, rounded at both ends, the margins revolute, the upper surface dark-olivaceous, smooth, shining, the lower surface paler, prominently glandular-punctate, the midrib impressed on the upper surface, usually prominent on the lower surface, the lateral nerves and reticulations obsolete; petioles about 1 mm. long. Flowers in the upper axils and crowded at the tips of the branchlets, their pedicels 1 to 2 mm. long; bracteoles 2, subtending the calyx, narrowly oblong, glandular-punctate, slightly pubescent, up to 1.5 mm. long. Calyx tube about 2 mm. long, pubescent, rugose when dry, narrowed below, the lobes 4, ovate, subcoriaceous, glandular-punctate, subacute, about 1.5 mm. long. Petals suborbicular-ovate, membranaceous, reticulate and glandular-punctate, the limb about 2.5 mm. long, the claw 1 mm. in length. Stamens about 30 in one row, the filaments slender, 5 to 6 mm. long, bent inward in bud. Ovary 3-celled; ovules numerous.

Sarawak, Upper Baram, Gunong Temabok, *Major J. C. Moulton* 6747, November 2, 1920, altitude about 2100 m. The third species of the genus to be found in Borneo; among the species familiar to me most closely allied to *Myrtus rufopunctata* Panch. of New Caledonia.

**MELASTOMATACEAE.***Melastoma* Linnaeus.***Melastoma laevifolium* sp. nov.**

Frutex erectus, circiter 2 m. altus, obscure et parcissime strigillosus; ramis ramulisque tenuibus, teretibus, ramis glabris, ramulis rubro-brunneis, paleis adpressis minutis sparsis obscuris instructis vel sublacvibus; foliis lanceolatis, coriaceis, rigidis, 4—9 cm. longis, acuminatis, basi acutis, 3-nerviis, supra olivaceis, laevibus, parcissime strigillosis, subtus viridibus, sublacvibus, paleis minutis paucis instructis; floribus terminalibus, solitariis, 5-meris, calyci obscure parceque paleaceo, paleis ovatis acutis adpressis vix 0.5 mm. longis instructo, lobis latis, brevibus, circiter 2 mm. longis; antherarum majorum connectivo basi longe producto.

An erect shrub about 2 m. high nearly glabrous throughout, the branches and branchlets terete, smooth, the ultimate branchlets reddish-brown, 1.5 mm. in diameter or less, supplied with very few widely scattered, appressed, ovate scales about 0.2 mm. long. Leaves lanceolate, coriaceous, rigid, 4 to 9 cm. long, 1 to 1.5 cm. wide, narrowed upward to the acuminate apex, the base acute, 3-nerved, the upper surface olivaceous, somewhat shining, smooth, obscurely and very sparsely strigulose, the lower surface paler and with few widely scattered, minute, appressed scales similar to those on the branchlets, the midrib, nerves and reticulations reddish in contrast with the greenish surface; petioles slender, 7 to 10 mm. long, with very few minute, appressed scales. Flowers terminal, solitary, 5-merous, their pedicels about 1 cm. long. Calyx about 1 cm. long, subcylindric, acute at the base, about 8 mm. in diameter, the lobes short, broad, subobtusate, about 2 mm. in length, the pedicels, tube, and lobes supplied with minute, appressed, widely scattered, triangular-ovate scales 0.5 mm. long or less. Petals oblong-obovate, about 3 cm. long, 1.5 cm. wide, narrowed below to the subacute base, the apex acute or somewhat obtuse. Stamens unequal, the filaments of the shorter ones 9 mm. long, their anthers curved and about as long as the filaments, the longer filaments 12 mm. in length, their anthers linear-lanceolate, curved, about 1.5 cm. long, the connectives produced about 14 cm., 2 appendiculate, the appendages stout, 2 mm. long. Top of the ovary produced, about 2 mm. long around the base of the style and conspicuously ciliate.

British North Borneo, Sandakan, *Ramos 1132*, September, 1920. In thickets near the seashore. A species perhaps most closely allied to *Melastoma nitidum* Zoll.; differing, however, in numerous characters. In the genus it is well characterized by being nearly smooth and glabrous, the scales on the branchlets, petioles, pedicels, calyces, and leaves being inconspicuous, minute, and widely scattered, the upper surface of the leaves being entirely glabrous.

### *Dalenia* Korthals.

#### *Dalenia pubescens* sp. nov.

Frutex scandens, ramulis et inflorescentiis et subtus foliis perspicue ferrugineo- vel cupreo-stellato-pubescentibus; foliis orbiculari-ellipticis vel ellipticis, 20—27 cm. longis, coriaceis, basi late rotundatis, 7-nerviis, apice truncato-rotundatis vel acutis, perspicue abrupteque apiculato-acuminatis, supra glabris, nitidis, subtus ferrugineo-pubescentibus; paniculis usque ad 1 m. longis; floribus numerosis; alabastro cylindrico, 1.5 cm. longo; calyce calyptraco, calyptra acuta, 5 mm. longa; petalis 4, ovatis, acuminatis, 5 mm. longis; staminibus fertilibus 4, antheris oblongo-lanceolatis, obtusis, appendicibus ovatis, membranaceis, 0.5 mm. longis, sterilibus 4, minoribus, appendicibus anterioribus lineari-lanceolatis, lateralibus 2—3 mm. longis, interioribus 5—6 mm. longis.

A scandent shrub, the branches frequently emitting rootlets, the younger parts, inflorescences, and the lower surface of the leaves conspicuously ferruginous- to cupreous-stellate-pubescent. Branches terete, 5 to 7 mm. in diameter, the ultimate branchlets sometimes compressed or somewhat angular. Leaves opposite, orbicular-elliptic to elliptic, coriaceous, 20 to 27 cm. long, 15 to 18 cm. wide, base broadly rounded and sometimes shallowly cordate, apex truncate-rounded to acute and conspicuously and abruptly apiculate-acuminate, the acumen narrow, up to 7 mm. long, the upper surface greenish-olivaceous, shining, glabrous, the lower surface ferruginous, minutely and densely stellate-pubescent; basal nerves 7, the inner two pairs reaching the apex of the leaf, somewhat impressed on the upper surface, very prominent on the lower surface, the transverse nerves subparallel, conspicuous; petioles stout, densely stellate-pubescent, 2.5 to 3 cm. long. Panicles terminal, peduncled, up to 1 m. long, the branches opposite, spreading, the lower ones up to 10 cm. in length, all parts ferruginous- to cupreous-stellate-pubescent. Flowers numerous, their pedicels about 1 cm. long. Calyx, in bud, cylindric, about 1.5 cm. long, 5 mm. in diameter, glabrous or very slightly pubescent, the sepals entirely united into a deciduous cone, the cone acute, about 5 mm. long. Petals 4, glabrous, ovate, acuminate, about 5 mm. long. Stamens 8, 4 fertile, the filaments flattened, 2.5 to 3 mm. long; fertile anthers oblong-lanceolate, obtuse, 6 to 7 mm. long, the connectives not produced, the appendages ovate, membranaceous, 0.5 mm. long, 1 dorsal and 2 anterior; sterile anthers oblong-lanceolate, 2 mm. long, the dorsal appendage oblong-ovate, acute, membranaceous, 1 mm. long, the anterior one linear-lanceolate, 2 to 3 mm. long. Ovary 4-celled, style 4.5 mm. long. Fruits somewhat urceolate, truncate, glabrous or slightly pubescent, about 1 cm. long.

British North Borneo, Kiau, Mount Kinabalu, *Mrs. Clemens 10301* (type), December 4, 1915; Batu Lima, near Sandakan, *Ramos 1585*, November 5, 1920, in damp forests along small streams. *Dalénia*, up to the present, has been represented by a single known species, *D. pulchra* Korth., of Borneo. The present species differs from the type of the genus, not only in its pubescence, the type being almost glabrous, but also in its floral characters. In fact, the staminal characters are so different in the present species from those of the type of the genus that *D. pubescens* might, with considerable propriety, be made the type of a distinct genus. In *D. speciosa* the stamens, while dissimilar, are all fertile, the larger ones bisetose anteriorly and calcarate posteriorly, the connectives of the smaller anthers bituberculate anteriorly and very shortly calcarate exteriorly. In the present species, the fertile stamens are merely supplied with 2 membranaceous, ovate scales anteriorly, and a single similar one exteriorly, while the sterile anthers are supplied dorsally with a very short scale, and ventrally by two lateral and one central thin, elongated appendages. In the size and shape of its leaves, in its habit, that is, the stems producing

roots along the internodes, and in its calyprate calyx, it is very similar to Korthals's species. The floral characters of the present have been worked out from nearly mature buds; they may be subject to slight modifications when open flowers are available.

*Dissochaeta Blume.*

*Dissochaeta ramosii* sp. nov. § *Diplostemonces*.

Frutex scandens, partibus junioribus et inflorescentiis et subtus foliis ferrugineo-stellato-pubescentibus; foliis oppositis, ellipticis vel elliptico-ovatis, chartaceis, 9—12 cm. longis, supra glabris, nitidis, basi rotundatis, 5-nerviis, nervis marginalibus tenuibus, apice acuminatis; inflorescentiis axillaribus terminalibusque, cymosis, bracteis lineari-lanceolatis, 3 mm. longis; calyce 1.5 cm. longo, 1 cm. diametro, basi cuneato, lobis 4, brevibus, latissimis, rotundatis; petalis circiter 2 cm. longis; staminibus 8, filamentis 1.6 cm. longis, antheris majoribus 2.5 cm. longis, utrinque longe angustatis, setiformibus, 9 mm. longis, antheris appendiculatis minoribus sigmoideis.

A scandent shrub, the branchlets, petioles, inflorescences, and the lower surface of the leaves rather densely ferruginous-stellate-pubescent. Leaves opposite, elliptic to elliptic-ovate, chartaceous, 9 to 12 cm. long, 4.5 to 6 cm. wide, the upper surface greenish, shining, glabrous or nearly so except the somewhat pubescent midrib, the lower surface ferruginous or brownish and conspicuously pubescent with scattered stellate hairs, base usually rounded, not at all cordate, 5-nerved, the marginal nerves more slender than the inner pair, the apex distinctly acuminate; transverse nervules prominent on the lower surface; petioles densely stellate-pubescent, 1 to 2 cm. long. Inflorescences axillary and terminal, peduncled, cymose, the axillary ones up to 7 cm. long, the terminal ones 10 cm. long, sometimes supplied with greatly reduced leaves, the bracts linear-lanceolate, about 3 mm. long, the peduncles, pedicels, and calyces very densely stellate-pubescent with ferruginous or brownish hairs. Calyx about 1.5 cm. long, base cuneate, the throat about 1 cm. in diameter and with 4, very short, broad, rounded lobes. Petals white, glabrous, elliptic-obovate, rounded, about 2 cm. long, 1.2 cm. wide, more or less narrowed to the subacute base. Stamens 8, their filaments about 1.6 cm. long, the 4 longer anthers 2.5 cm. long, rostrate, much narrowed at both ends, the connectives not produced, the anterior appendages setiform, about 9 mm. long; shorter anthers sigmoid, the apical rostrate part recurved, the anterior appendages similar to those of the longer stamens.

British North Borneo, Sebuga, near Sandakan, *Ramos* 1758, December, 1920. In open forests at low altitudes. A species most closely allied to *Dissochaeta punctulata* Hook. f., from which it differs especially in its much larger flowers and longer petioles and anthers.

*Kibessia* DeCandolle.***Kibessia verrucosa*** sp. nov. § *Eukibessia*.

Arbor glabra, 4—7 m. alta, ramis ramulisque teretibus; foliis chartaceis vel subcoriaceis, ellipticis vel oblongo-ellipticis, subolivaceis, nitidis, 15—22 cm. longis, utrinque subaequaliter angustatis, basi acutis, 3-nerviis, apice obtuse acuminatis; inflorescentiis axillaribus terminalibusque, subcymosis, 1—2 cm. longis; calycis tubo truncato, 6—7 cm. longo, 5 mm. diametro, perspicue verruculoso, haud setoso, calyptra 5—6 mm. longa, acuta; petalis 4, obovatis, acutis, 6—7 mm. longis; fructibus obovoideis, truncatis, 1 cm. longis, leviter verruculosis, verruculis subplanis, pentagonis, 1.5 mm. diametro.

An entirely glabrous tree 4 to 7 m. high, the branches and branchlets terete, smooth, usually brown, the ultimate branchlets about 2 mm. in diameter. Leaves chartaceous to subcoriaceous, elliptic to oblong-elliptic, subolivaceous, shining on both surfaces, the lower surface somewhat paler than the upper, 15 to 22 cm. long, 6 to 11 cm. wide, subequally narrowed to the acute and prominently 3-nerved base and to the blunt-acuminate apex; midrib and basal nerves somewhat impressed on the upper surface, very prominent on the lower surface, the longitudinal nerves reaching the apex of the leaf, a very faint pair of marginal nerves usually present, situated 1 to 2 mm. from the edge of the leaf, these not more prominent than are the primary reticulations; petioles rather stout, 5 to 8 mm. long. Inflorescences axillary and terminal, solitary or fascicled, subcymose, 1 to 2 cm. long, few-flowered. Calyx tube cup-shaped, truncate, 6 to 7 mm. long, about 5 mm. in diameter, rather conspicuously verrucose but not at all setose, the conical apical portion formed by the wholly united sepals 5 to 6 mm. long, acute, deciduous. Petals apparently pale-blue, obovate, acute, inequilateral, 6 to 7 mm. long. Stamens 8, the anthers about 2.5 mm. long, inappendiculate. Fruits somewhat obovoid, truncate, about 1 cm. long, slightly verruculose, the verruculae plane, scarcely or not at all elevated, pentagonal, about 1.5 mm. in diameter.

British North Borneo, Batu Lima and in the vicinity of Sandakan, *Ramos* 1722 (type), 1191, *Villamil* 147, *Agama* 463; flowering in November, fruiting in August, October, and February. In forests at low altitudes. A species in its calyx characters apparently approximating *Kibessia teysmanniana* Cogn., but with entirely different vegetative characters. It is easily recognizable by its elliptic to oblong-elliptic leaves which are subequally narrowed at both ends and by its verruculose calyx tube which is not at all setose, the verruculae being plane or nearly so, sometimes slightly elevated in their central portions.

*Clidemia* D. Don.

***Clidemia hirta*** (Linn.) D. Don in Mem. Wern. Soc. 4 (1823) 309; Cogn. in DC. Monog. Phan. 7 (1891) 986.

*Melastoma hirta* Linn. Sp. Pl. (1753) 390.

British North Borneo, Sandakan and vicinity, *Clemens* 9464, October, 1915; *Yates* 3, October, 1917; *Castillo* 590, January, 1918, on slopes near the sea; *Foxworthy* 604, January, 1916, at the base of sandstone cliffs; *Wood* 766, 848, May, 1920, on ridges; *Ramos* 1134, in thickets and along small streams. This American species is, thoroughly naturalized in the vicinity of Sandakan as it is in Singapore and in Java.

***Pachycentria* Blume.**

***Pachycentria constricta*** Blume in *Flora* 14 (1831) 520; Cogn. in DC. Monog. Phan. 7 (1891) 608.

British North Borneo, Batu Lima near Sandakan, *Ramos* 1163. On trees in forests at low altitudes. Java.

**ALANGIACEAE.**

***Alangium* Lamarck.**

***Alangium borneense*** sp. nov. § *Marlea*.

Arbor circiter 15 m. alta, ferrugineo-pubescent; foliis subcoriaceis, oblongis, acuminatis, 15—23 cm. longis, basi rotundatis, supra glabris, subtus ad costam nervosque pubescentibus, nervis utrinque 10—14, perspicuis; cymis axillaribus 3—7-floris; calyce 10-sulcato, truncato; stylis sursum inerassatis, apice perspicue 3-lobatis, lobis papillatis, 2.5 mm. longis.

A tree about 15 m. high, the branches, branchlets, and inflorescences densely ferruginous-pubescent. Leaves subcoriaceous, oblong, 15 to 23 cm. long, 6 to 9 cm. wide, pale brown when dry, sharply acuminate, base rounded, the upper surface glabrous, the lower pubescent on the midrib and lateral nerves; nervis 10 to 14 on each side of the midrib, prominent, curved, the reticulations subparallel; petioles pubescent, 1 to 1.5 cm. long. Cymes axillary, pubescent, 3- to 7-flowered, including the flowers 4 to 5 cm. long. Calyx pubescent, about 6 mm. long, prominently 10-sulcate, the limb somewhat spreading, about 4 mm. in diameter, truncate, or very shallowly and obscurely toothed. Petals 5 or 6, linear-lanceolate, coriaceous, densely pubescent, 2 cm. long, 2.5 mm. wide. Stamens 5 or 6, about 1.6 cm. long, the filaments somewhat flattened. Style about 1.5 cm. long, thickened upward, narrowly club-shaped, appressed-pubescent; stygma distinctly 3-lobed, the lobes ovate-lanceolate, papillate, 2.5 mm. long.

British North Borneo, Batu Lima, near Sandakan, *Agama* 1022 (type) *Ramos* 1451, November 1920, on steep damp forested slopes, altitude about 70 m. A species allied to *Alangium vitiense* (A. Gray) Harms var. *tomentosum* Benth., differing notably in its very much larger leaves, much larger flowers, prominently sulcate calyces, and 3-lobed styles.



# A Murut Vocabulary.

BY THE LATE N. B. BABONEAU.

WITH AN INTRODUCTORY NOTE

BY G. C. WOOLLEY.

The following Murut Vocabulary was compiled by the late Mr. N. B. Baboneau, an Officer in the British North Borneo Service from February 1910 to December 1921, and was found amongst his papers after his death. The original is carefully typewritten, and has been revised, as there are numerous pencil additions and corrections in the text. I do not know, however, whether Mr. Baboneau considered that it was now as complete as he intended it to be. Probably not, for further research would doubtless reveal many native terms in place of the Malay or semi-Malay forms here given.

The only 'introduction' is a pencil note on the fly-leaf "A Murut Vocabulary compiled with the help of various Keningau Muruts, intelligent and otherwise, between the years 1911 and 1914. N. B. B. Rundum 1914."

The name 'Murut' though now generally adopted and understood, was not originally used by the people themselves, but was given by Brunei Malay and other Coast people to the inhabitants of the hills and Interior of this part of the country. The 'Murut' districts are Keningau, Tenom and the greater part of Pensiangan or Rundum Districts of the Interior, the lower Padas and Bukau rivers in Beaufort District, and the greater part of Province Clarke, which includes the Lakutan and Mengabong rivers and head waters of the Padas.

So far as I am aware, no ethnologist has yet classified the various tribes in this area, but we can perhaps distinguish four main tribes, though the number of petty subdivisions, with small variations of dialect, is very large. A Murut, if asked his race, would probably not state to which main tribe he belonged, but would give his local subdivision, generally a geographical description, according to the river on which he or his people lived, *e.g.* that he was a Tomani or Siliu man, *i.e.* that he lived on the Tomani or Siliu river or that he was a 'Keningau Murut.'

As the country has got more peaceful under European Government, raiding has died out and intercourse has become more free, tribal boundaries have tended to become obscured, and probably dialectical variations of language have become less accentuated, but a general distribution of tribes can still be given.

In the Western hills of Keningau District are the Kwijaus, a semi-Dusun, semi-Murut tribe. On Keningau plain are the 'Dabai': in the East, in the upper Sook, are the Bokan tribes (probably closely related to Peluan).

Peluan tribes are found in the Dalit and Mesopo and Karamatoi districts and the head-waters of the Telankai and Penawan rivers i.e. the S. E. part of Keningau and the N. of Pensiangan, with a sub-tribe called Belarun ("Blarlun country" on small maps) and from there across Tenom district to the Mengalong and Lakutan rivers of Province Clarke and the River Bukau of Beaufort. Timugun tribes are found in the northern part of Tenom plain, on the Pegalan river, and there are also few in Beaufort.

The Semambus are a more important branch, and stretch from the S. E. part of Pensiangan, (when they meet with the 'Sakaïs' of Dutch Borneo, related to the Tidongs of Bulongan) through the Tagul, Siliu, Rundum, Selalir, Telecosan and Tomani rivers, across the Padas to Bole; and perhaps to Lawas in Sarawak. At Bole, the people call themselves 'Tagals' and when I was District Officer Province Clarke I do not recollect hearing them use the name Semambu of themselves: their dialect however is similar, and a Policeman who has learnt 'Murut' at Bole is soon quite at home amongst Pensiangan people.

Besides these, in Province Clarke, there were some settlements of people who called themselves 'Kolor' 'Okolor' 'Unkolor' and said they came from Dutch rivers south of the Selalir, and, in the extreme ulu Padas the 'Undaio' or 'Lundaio' (? = Ulu Daio, 'Dyak men') who were closely related to the 'Muruts' of the upper Limbang and Trusan rivers of Sarawak, and appeared to be very distinct in type and language, from either the 'Tagals' or 'Kolor.'

For practical purposes therefore, I omit Kuijaus, as not being a pure race and the Lundaio, as being of Dyak kin, and classify our 'Muruts' as Dabai and Timugun on the plains, with Peluan and Semambu as Hill tribes.

In conclusion, it may be of interest to give a few illustrations of dialect variations. Several letters appear to be commonly interchanged, and these differences in pronunciation and spelling offer a considerable obstacle to any attempt to make a satisfactory or concise Murut-English Vocabulary. A Native, if questioned whether e.g. 'baguh' or 'waguh' is correct, will often say 'either will do.' though whether he means that each form is in use in one or other of the dialects or that your hearer would catch your meaning and excuse your ignorance of his language, is open to doubt.

The Keningau dialect, as given in this vocabulary, seems very fond of initial 'm' which is often absent in the ulu Padas (Semambu).

(K = Keningau. T = Timugan. S = Semambu).

*e.g.* cold K. 'mesimoh': S. asimoh.

afraid K. 'malâh': S. alâ.

before K. 'garing': T. galing. (S. understands 'galing' but generally says 'nagulu' and 'naling' in Semambu is 'behind'.)

brother K. harih T. and S. halih

between K. dolut T. and S. lolut

sharp K. malais S. apaïs

sharp K. meladum T. melarum S. alarum

woman K. doando T. roando S. roando

rain K. domassam T. & P. rasam S. unguluh

right (not left) K. pemidis S. pamiris

good K. mainseu S. unsoi or âtar

small K. mebodok T. beloroh S. brook

wicked K. merâht S. alaât

many K. mamok S. aramak or asuang

night K. mundum S. lundum

sleep K. molong S. olong

sun K. odoh S. ôro or tolok

hot K. melassu S. alasu

swim K. padusoh T. naliso S. nariso

your K. maguap T. maguab

The Semambu dialect varies slightly on different rivers, but whereas Dabai, Peluan and Timugan are fairly closely related to each other, Semambu is much more distinct: though an untravelled Semambu man placed in Keningau could still gather roughly what was being said. Some common words are quite different, *e.g.* 'quickly' K. keribok, S. kapasian: angry K. mangit, S. ambok: cloud K. dutoh or gaun, S. laput or gaun: Indian corn K. budit, S. sangun or dalai: long ago K. nakalaid, S. alair or awhoi: pig K. bawih, S. biag: skin K. kulit, S. kongkong.

The final 'K' in this vocabulary is nearly mute.

(sd.) G. C. WOOLLEY.

*Numerals.*

<b>1</b> sa, dundoh.	<b>500</b> limongatus.
<b>2</b> duoh.	<b>600</b> onom'ngatus.
<b>3</b> taloh.	<b>678</b> onom'ngatus torongopod om baloh.
<b>4</b> apat.	<b>700</b> turongatus.
<b>5</b> limoh.	<b>729</b> turongatus duongopod om siam.
<b>6</b> enom.	<b>800</b> balongatus.
<b>7</b> turok.	<b>900</b> siam'ngatus.
<b>8</b> baloh.	<b>930</b> siam'ngatus talongopod.
<b>9</b> siam.	<b>1,000</b> saliong.
<b>10</b> mopod.	<b>5,000</b> limongaliong.
<b>11</b> mopod om dundoh.	<b>10,000</b> mopod naliong.
<b>12</b> mopod om duoh.	<b>once</b> igundoh.
<b>20</b> duongopod.	<b>twice</b> induoh.
<b>21</b> duongopod om dundoh.	<b>3 times</b> intaloh.
<b>25</b> duongopod om limoh.	<b>4 times</b> inggapat.
<b>30</b> talongopod.	<b>5 times</b> indimoh.
<b>35</b> talongopod om limoh.	<b>6 times</b> inggonom.
<b>40</b> apatnopod.	<b>7 times</b> inturok.
<b>50</b> limongopod.	<b>8 times</b> imbaloh.
<b>60</b> onom'ngopod.	<b>9 times</b> insiam.
<b>70</b> turongopod.	<b>10 times</b> inggopod.
<b>80</b> balongopod.	<b>20 times</b> induongopod.
<b>90</b> siam'ngopod.	<b>30 times</b> intalongopod, &c.
<b>100</b> matus.	<b>100 times</b> inggatus.
<b>125</b> matus duongopod om limoh.	<b>how many times?</b> inkurra?
<b>200</b> duongatus.	"inkurra ioh saboi?" (how many times did he come?)
<b>300</b> talongatus.	
<b>350</b> matus limongopod.	
<b>400</b> apatngatus.	

**A.**

**a** (*of small, round things*), dundoh: (*of animals*) sang-inan: (*of trees*) sampohun: (*of sheets of paper, cloth, &c.*) sampilah.

**abandon to**, pauantan binantan, pinoantah: "magigidoh iroh, pauantan noh pagun nanoh": they ran away and abandoned their village.

**able**, pandei, mapandei, maka-dapat.

**about**, korah korah.

**above**, disawat, tumampak.

**abscond to**, magidoh.

**absent**, kandok, kaiioh.

**abundant**, mamok.

**abuse**, magarias.

**accept**, makiupah.

**accustomed**, mairidaram, nobas.

**acknowledge**, (*M*) menakun.

**across**, sendipag, senihkuad: senihkuad susungoi, across the river: senihkuad tidong, beyond the hill.

**active**, mepinit.

**add**, doangih.

**admit** (confess), (*M*) kenakun: (to let in) makasubul, (*imper.*) pasubuloh: "sukabi urubun pasubuloh assuh ih," open the door and let in that dog.

**adopted child**, tinangkanak.

**adorn oneself**, membuas.

**adultery to commit**, memalaphoh: lapauluok, to have intercourse with a person immediately after the death of one's husband, or wife.

**afraid**, malâh: mataloh, a coward.

**afternoon**, merundom.

**after, afterwards**, taurih.

**age**, tuh.

**agent**, (*M*) wakil.

**agile**, mepinit.

**ago, long**, nakalaid noioh.

**agree, make an agreement with**, (*M*) janji.

**ahead** (*in front*), magagulu.

**aim at**, turok, menurok.

**alike**, nagundoh.

**alive**, tinambiag: biag.

**all**, ugai ngai.

**allow**, gamah: 'gamah doginu,' = (*M*) 'Biar-lah bagitu.'

**almost**, memad.

**alone**, dundoh dundoh.

**also**, tupoh.

**always**, masarok.

**ambush, lie in**, magawang.

**amok to**, temobok.

**ancestors**, pengadu.

**and**, am, om.

**angry**, mangit: inangitan, to incur anger.

**animal**, (*M*) binatang.

**ankle**, buningal: bulingkus, an anklet.

**annoy**, anjahan.

**annoyed**, medual goang.

**another**, bokun: Atoiennuh bokun-ih, where are the others?

**answer to**, magagual, manja-jawab.

**ant**, kilau: red ant, 'labus burong': lit. 'let go one's parang' (on account of the pain): white ant, (*M*) anai: the soldier ant, kalipodus bawang: (because bears eat their nests).

**ant-hill**, punchu.

**antidote**, dawar.

**apart**, nataiad.

**appearance**, bansa.

**approach to**, datong, datong memad.

**are (is)**, makondoh.

**arm the**, langan.

**arm** (*weapon*), aniban.

**armed**, mokondoh aniban.

**armadillo** balukun: -hide, -si-sih.

**armpit**, kapilok.

**around**, domipud.

**arrange**, mongusai.

**arrest**, memerakab.

**arrive**, somaboi, makasaboi.

**ascend**, tomakad: tomakad ti-dong, to climb a hill: tumun om tomakad, up and down hill.

**ashamed**, moiuh.

**ashes**, kauh.

**ask** (*inquire*), mengimuat, imuaton.

**ask for**, mikianih.

**assemble**, menimpong.

**assist**, indangan.

**astonished**, metambungoh: 'metambungoh aku mongining doginu': I am surprised to hear that.

**at, du, tio du.**

**atap** (*of a house*), tap: menarut, to sew ataps.

**attack**, memalambah, nakatuntuloi: (*of animals, with the teeth*) sinâm, menâm: (*with the horns, as a buffalo*) menangau.

**attempt**, iri, mengiri.

**authority**, (*M*) kuasa: ulun maiioh, a chief.

**avenge to**, sumulih.

**awake** (*trans.*), mengadat, kadatoh: (*intrans.*), kumalat.

**axe**, (*M*) kapak: Panah, a small hatchet, a 'beliong.'

## B.

**baby a**, daragang.

**back the**, bakorong.

**bad**, meraht.

**bad-tempered**, marigogut, masarok mangit.

**bait**, upan.

**balance** (*the remainder*), noantai.

**bale to** (*a boat*), mengias: (*imper.*) iasih.

**bamboo**, tembalang, paring, sumbiling: tembalang, the small-leaf bamboo, used in making hedges, &c.: sagoh, a piece of bamboo, for carrying water, also to take water from a stream.

**banana**, punti.

**bank of river**, king susungoi.

**bargain to**, (*M*) tawar.

**bark to**, menyusig.

**bark of tree**, kulit tetaun.

**barrel of a gun**, berongon.

**barren** (*of females*), mawaluih.

**barter to**, magalid.

**basket**, paiauan: bongun, a receptacle made of bark, used for carrying goods on the back.

**bastard a**, anak pungoh.

**bat**, pongit.

**bathe to**, madioh.

**beads**, sesigut: bungkas, long, oval-shaped beads: bebungal, round, white beads: manudirau, (lit. 'bright') tinsel, yellow or red: Agoh agoh, small white beads: Agih, long, octagonal.

**beak a**, tinduk.

**beam a**, tetaun: sumuloi, the beam under the floor of a

house, a girder: pakang, the beam under the roof, a rafter.

**bean a**, blatong.

**bear a**, bawang.

**bear** (*to endure*), tomahan.

**bear** (*give birth*), maganak.

**beard**, jarub.

**beast**, (*M*) binatang.

**beat to**, memalambah: (*v. to hit*): (*of the pulse, &c.*) kibun kibun.

**beautiful**, mainseu: (*of persons*) mapasau, mainseu.

**because**, kosoi, (*M*) sebab.

**become**, mawâl, (*M*) makajadi.

**beckon to**, kapoiun.

**bee**, meningot.

**beetle**, tapih: limunod, the large boring beetle.

**before** (*in front of*), gintuong, gintuungan: cf. 'mentudong nuh talikudan, kai mentudong du gintuungan ku': stand behind me, not in front of me: (*of time*) garing. "akiah kai koh nomarah du garing ih?" (why did you not tell me before?)

**beg to**, mikianih.

**begin to**, menimpun: impun, at first.

**behind**, talikud, talikudan.

**belch to**, magilub.

**believe**, mintopud, malansan: kai kalansan disoh magambut, do not trust him, he is lying.

**bell**, karing: kinaringan, a pang or belt adorned with bells.

**belly**, tinai.

**belt**, (*M*) tali pinggan.

**bend**, bent, mapikul.

**beside**, tabibikan.

**bet to**, mentatahan.

**betel-nut**, kusob: magintat, to chew betel-nut.

**betrothed**, manunang: moipanudang, to ask in marriage.

**between**, dolut, (*M*) tengah:  
cf. 'tengah tengah nuh Ken-  
ningau Tenom om Tambun-  
an.

**beyond**, senihkuad.

**bewitched**, punan.

**big**, maiioh, makaluh.

**bind** (*e.g. a wound*), bawodun.

**bird**, sesirak.

**bird lime**, pulut.

**birds' nest**, tambunan.

**birth** (*give birth to*), maganak.

**bite to**, kinokut, manokut: (*of  
a snake*) menindok, tindokun.

**bitter**, mosum.

**black**, mahitam.

**blade** (*of a weapon*), ladam:  
pagong, the blunt edge: la-  
dam, the sharp edge, or the  
whole blade: utin, the part  
of the blade that goes into the  
handle.

**blaze to**, (*of a fire*), malang:  
*to blaze a tree*, mebatin: me-  
batin dalam, to mark a path by  
blazing trees.

**blear-eyed**, mankudarudab.

**bleed to**, makadâh.

**blind**, mumbulau: nohlusuan,  
blind in one eye.

**blister**, mampulalak: palakak,  
a blister on the sole of the  
foot, the 'puru.'

**blood**, dah.

**blossom**, a busak.

**blossom to**, menyakah, memu-  
kakah.

**blow to**, simpui, menimpul:  
the nose, magingasingor.

**blowpipe**, sapok: menyapok,  
to shoot with a blowpipe:  
sinapok, to be shot with a  
blowpipe.

**blue**, tumau.

**blunt** (*of an edge*), ka malais:  
(*of a point*) ka maladum.

**board a**, pinapapan, (*M*) papan.

**boast to**, makiumpod: cf.  
'Makiumpod ioh di nakalap  
du ulu': he boasted that he  
had taken a head.

**boat**, padau.

**body**, inan.

**boil to**, (*trans.*), mangsak:  
(*intrans.*), dumidih, menim-  
bual.

**boil a**, tupas.

**bone**, (*M*) tulang.

**bore the ears to**, mentobok.

**borrow**, midah, ideh.

**both**, duoh duoh.

**boundary**, dolud, paboboitan.

**bow to**, kumong.

**bow the**, (*of a boat*), julong.

**bowl**, sarogong.

**box**, (*M*) kaban: tiduan, a  
small box, made of bamboo.

**bracelet**, dinoleh: bulingkus,  
an anklet.

**brains**, otok.

**branch** (*of a tree*), (*M*) dahan:  
(*of a river*) siang: (*of a  
path*) suriangan: (*of the  
horns of a deer*) mandân.

**brass**, sen-aring.

**brave**, banih.

**bread**, (*M*) roti.

**break**, mabak, mapandak, ma-  
potoh: (*to snap*) mokat:  
= (*M*) 'putus.'

**breast**, kubab, titih.

**breath**, peniaw: *out of breath*,  
ingus ingus.

**breathe to**, meminyawa.

**bribe**, (*M*) suap: Menakan  
suap, to take a bribe.

**bridge**, apad.

**bright**, manudirau.

**bring to**, naibit: (*imper. ibi-  
toh.*)

**bring up** (*to rear*), piarahan.

**broad**, mapilah.

**brother**, pabukat: Akak, elder brother: harih, younger: in-law, magawang.  
**bruise a**, rumutom.  
**brush to**, isasin.  
**brush a**, (M) bros.  
**buffalo**, (M) kerbau.  
**bullet**, (M) peluru.  
**build to**, memâl.  
**bunch** (*of fruit*), sampungoh, pungoh: (*of coconuts*), sam-papah.  
**burn to**, mesurob, moboh: one-self, melinseu: melinseu karindoh, to burn one's finger.  
**burnt** (*of wood &c.*), udu-  
**burst to**, lumapat.  
**bury to**, nalobong.  
**busy**, mainsoh-insoh, mamok kreja.  
**but** (*not used*).  
**butt to**, menangan.  
**butterfly**, kuliambang: kapuh. patatuding: different kinds of butterflies (unidentified).  
**buy**, memalih.

## C.

**cactus the**, dawar, *lit.* 'anti-dote,' (*against certain kinds of sickness.*)  
**calculate**, mengiap, iapun.  
**calf**, (M) anak sapi.  
**calf** (*of leg*), tonok: lukabab, the upper part of the calf. behind the knee.  
**call**, menimpag: (*imper.*) impagoh: mengorok, to call fowls: mempanad, to call dogs: memalangik, to call kijang, (with a leaf or bamboo).  
**call in at**, mapid.  
**calumniate**, mamitanah: cf. 'magambut kau, mamitanah kau daki': you are lying. you are slandering me.  
**camphor**, kuyong.  
**can**, (M) pandei, mapandei, makadapat.

**cannon**, (M) badil.  
**care to**, paduli.  
**care** (*take care of*), piara: ('take care!'), ilai!  
**carefully**, terandah: onggioik terandah, (hold it carefully).  
**carve**, senihkakalaing.  
**carry**, magibah: (*on the head*) patadungon: (*on the shoulder*) sahinin: (*in the arms*) bebilun.  
**cash**, dusin.  
**castrate**, intalinin.  
**cat**, kungau, ungau: ampu, a species of tree tiger, often found in Keningau district: munin, the civet, 'musang.'  
**catch to**, memerakob, narakob: mengot, to catch a buffalo &c. with a noose. (sarigut); to lasso: (*kena*) makonoh, ma-intupan.  
**caterpillar**, ulod.  
**cattle**, (M) sapi.  
**caught to get**, (*menyangkut*) mesalong.  
**cease**, tumuloh, tomangus.  
**centipede**, dipal: anak dipal, the luminous millipede.  
**centre**, (M) tengah.  
**certain**, topud, kepioh.  
**certainly**, (M) tentu, topud.  
**chaff** (*of grain*), apol.  
**chain**, (M) rantei.  
**chair**, (M) krosih.  
**change to**, magalid, pagalid: one's clothes dumalin.  
**channel** (*a passage*), otusan.  
**charm a**, dawar.  
**charred** (*of wood*), udu.  
**cheap**, memurah.  
**cheat to**, menipu, memusing.  
**cheek the**, bingal, ilan.  
**chest the**, kubah.  
**chew** (*betel-nut*), magintat.  
**chief a**, maiioh, ulun maiioh.  
**child**, dalaing: darangang, an infant.  
**chin**, saludah.



**chilly**, mesimoh: mesimuan, to shiver with cold.

**clipped** (*of a blade, &c.*), mapirang.

**choke to**, kadanang.

**choked up** (*as a blowpipe*), matitan: (*as a ditch or stream*) masukong.

**choose to**, (M) pileh.

**chop**, potul.

**cicada**, bintakar, sasing. gangarak.

**cinnamon**, keningau.

**circumcise**, pinapod.

**clap the hands to**, manapap.

**clean** (*adj.*), napapuan. nisa san: to clean pinupuan, isasih.

**clear**, tarang, matarang: (*of water*), menining.

**clever**, (M) paudei, mapandei: (*sensible*), makagoang.

**climb**, mengkeuah.

**close** (*to shut*), magangab: (*imper.*) angabih.

**close to** (*near*), memad.

**close together** (*crowded*), makodat.

**cloth**, lampei.

**clothes**, (M) pakaian: v. 'Dress.'

**cloud**, dutoh, gaun.

**cloudy** (*of the sky*), jinomûd.

**cluck to** (*of a hen*), menimpukak.

**clump of trees**, puru, sempuruan.

**cluster of fruit**, sampungoh, pungoh: of coconuts, sampapah.

**coal**, (M) arang.

**coarse**, (M) makasar: (*of texture, &c.*), makabulu.

**coat**, kawal: sampot, a coat made of deerskin, timbadau hide, &c.

**coax to**, kojur, dumojur.

**cobra**, mentakag: bantu, the hamadryad.

**cock**, tendah.

**cock-fight**, menturapih.

**cockroach**, lipus.

**coconut**, piasau.

**coconut-shell**, ranggut.

**coin**, dusin.

**cold** (*of weather*), mesimoh: mesimuan, to shiver with cold: (*of substances, water, &c.*) masaroi.

**cold in the head to have**, magosud.

**collect to**, semimpong.

**collide to**, makapantapak.

**comb**, sudai: (*of a cock*), tanggir.

**come**, domatong, datong: (*imper.*) kueh: 'kueh dog-itu,' come here.

**commence**, menimpun.

**companion**, dangan.

**compete**, lumawan.

**complete**, kaiiun, menukod: to complete, mokod.

**conceal**, semambunih.

**conceited**, makomoh, sumantuh.

**conduit**, tabarusoh.

**confess**, (M) menakun.

**connect**, natungul: (*imper.*) tungulok.

**connection** (*have connection with*), makinduh, magiut: mengkamatah, to make an assignment with a person.

**conquer to**, (M) menang.

**constipated**, tiabal: natiabalan, constipation.

**contented**, masenang goang.

**contents**, suang: kandok suang, empty.

**coo** (*of doves*), meningkurok.

**cook to**, mangsak, mengangsak: dapuan, a kitchen, the centre of a Murut house where the fire is made.

**cooking-pot**, (M) periok.

**corn Indian**, budit.

**corner a**, pantikuan.

**corpse**, (M) bangkei.

**correct**, topud, kepion.

**cotton**, gapas: sariban, the cotton tree.

**cough to**, mengkukol.

**count to**, maiiak, mengiapun.

**country**, pamagunan.

**cousin**, pabukat: pabukat igundoh, a first cousin: pabukat paginduoh, 2nd cousin: pabukat pangintaloh, 3rd cousin.

**cover to**, tetubin.

**coward**, cowardly, mataloh.

**crab**, karas, gagawoh.

**cracked**, lumatak.

**crocodile**, tambuaia.

**crooked**, talingkong.

**cross to**, memeripag, padipag, dumipag.

**crow a**, bengkak.

**crow to** (*of a cock*), meningkurok.

**crowded**, masarah, meramei.

**cry** (*to weep*), mentangih.

**cry out to**, lumakuih.

**cucumber**, sangup.

**curlew**, tagilok.

**curly** (*of hair*), kulanggot, menurionggok.

**current of a stream**, lintagup.

**curse to**, maguras.

**custom**, (*M*) adat.

**cut to**, mengorot, (*imper.*) korotoh: (*to chop, with a parang*) napidis, (*imper.*) padisoh.

**cut in 2 pieces** (*to split*), napotul, (*imper.*) potoloh.

**cut down** (*jungle, &c.*), mentagad: dumilik, to clear undergrowth.

## D.

**dam to**, mengalad.

**dam a**, aladan.

**damage to**, narunsai.

**damar**, salong.

**dance to**, mensaiau: lulungunan, a spring platform used for dancing: koilulunggun, one of the steps of this dance:

magititikas, to dance alone, holding and beating a gong: magodud, to dance alone, in the Dusun fashion, with arms outstretched.

**dangerous**, mabisa.

**daring**, banih.

**dark**, merundom.

**daughter**, anak doandok, dalaing doandok.

**day**, odoh: modoh, morning, when the sun is high, 9 or 10 o'clock: tumampak odoh, mid-day, 'the sun overhead': mapulid, manuul, early afternoon, 3 p.m.: topongsisid odoh, late afternoon, 5 or 6 p.m.

**day after tomorrow**, sangodoh sasuah.

**day before yesterday**, sanda daih, sangodoh daih: 'in 3 days' time' kataloh: every day sangodoh odoh.

**daybreak** (*dawn*), matawang.

**dazzling**, magasil.

**dead**, mopatoi.

**deaf**, mabungal.

**dear** (*expensive*), matang.

**debt**, (*M*) utang.

**deceive**, menipu, memusing.

**decide**, nokat.

**deep**, mendalum.

**deer**, (the sambur) payoh, tambang: (barking deer) tugau: (mouse-deer) kaduan.

**delirium, to talk in**, magampuang.

**demand to**, mikianih.

**dented** (*as a blade*), mapirang.

**deny to**, magalih.

**descend to**, tumun, indiwah.

**detest**, mararamuh.

**dew**, taridoh, balabau.

**diarrhoea to have**, mentaburus.

**die**, mopatoi.

**different**, bokun: (*of different kinds*) nakapinansuai.

**difficult**, masusah.

**dirt** (*refuse*), sakut.  
**dirty**, bejamut, sait, makasait:  
 (*of water*) malutut.  
**disease**, (*M*) penyakit: balik,  
 the skin disease, known as  
 (*M*) 'balang.'  
**dislike**, mararamuh.  
**distant**, malud.  
**distrust**, ka mintopud.  
**disturb**, (*M*) mengachau.  
**dive to**, mentolup, tumolub.  
**divide to**, taiad.  
**divorce**, mabintas: mikiintas,  
 to ask for divorce.  
**do**, anuan, pakuan.  
**do not, don't**, kai.  
**dog**, assuh: ukoh, a puppy.  
**door**, urupun.  
**dove**, kokorok.  
**down to go**, tumun, indiwah.  
**downstream**, dabugus: to go  
 downstream, mempiugus.  
**dowry**, purut: pibah, the mar-  
 riage gift from a father to his  
 daughter, formerly equal to  
 half the amount of the dowry,  
 now equal to the excess of the  
 dowry over \$60.  
**drag to**, dalatun.  
**dragon**, tembaka.  
**drain a**, (*M*) parit, susungoi.  
**draw** (*to pull*), logutun, dala-  
 tun: (*to engrave, d'c.*) me-  
 batik.  
**dream**, inopih: to dream, ma-  
 ginopih.  
**dress**, (*M*) pakaian: kawal, a  
 coat: tapih, a short skirt:  
 abag, a 'chawat': jiruk, lu-  
 luku, large wicker headdresses.  
**drift to**, makas.  
**drink**, menginum, inumok.  
**drive away**, pagiduun: me-  
 much, to drive away birds  
 from a padi-field.  
**drop to**, match, meratoh.  
**drop a**, tumoh.  
**drought** mongodoh.

**drown to**, losud, nalosud: cf.  
 'nopatai ioh losud timpok ioh  
 nadusoh susungoi': (he was  
 drowned while swimming the  
 river).  
**drunk**, magaup.  
**dry** (*adj.*), mapuah, natog:  
 to dry in the sun manog,  
 tugoh: to dry over a fire  
 -salagun.  
**duck**, utik.  
**dumb**, bungangang.  
**dun to**, sika, mensika.  
**dung**, tetai.  
**during**, timpok: cf. 'mamok  
 nopatoi nuh timpok penabuh  
 ih': (many people died dur-  
 ing the small-pox epidemic).  
**dusk**, mundom.  
**dust**, agis.  
**dwarf a**, kinumotog.  
**dysentery to have**, mentaburus  
 du dah.

## E.

**ear**, telingah.  
**earring**, sanggal.  
**early**, mensarap: matawang,  
 early morning, dawn.  
**earth**, (*M*) tanah.  
**eat to**, menekan.  
**echo**, tuniwau.  
**eclipse** (*of sun*), tinolum nia-  
 ru, (lit. "a spirit" is swal-  
 lowing).  
**eddy**, diruh: also used for the  
 circular markings on a buf-  
 falo's hair: (cf. Malay 'pu-  
 sar').  
**edge**, popud: on edge, (*of the*  
*teeth*) masiog.  
**effort to make an**, iri.  
**egg**, taloh: to lay, tumaloh:  
 memabak, to hatch eggs:  
 memamut, to sit on eggs:  
 bunsut, the nesting place, of  
 a hen.  
**elastic** (*adj.*), lumanat.  
**elbow**, (*M*) siku.  
**elephant**, gadingan.

**else, what else?** bagoh, atok bagoh?

**emaciated**, metukal.

**embers**, bah.

**embrace**, magorok.

**emigrate to**, mapindah, madingkat.

**empty**, kandok suang.

**end the**, upod, munjok.

**enemy**, sumangod.

**energetic**, merajin.

**enough**, samah, cukup.

**enquire to**, mengimuat, moipomarah.

**entangled**, nagaguliokud.

**enter**, mumpas, makasubul.

**entreat**, mikianih.

**envy to**, mesolun.

**equal**, nagagundoh.

**escape to**, magidoh.

**evening**, mundom, merundom.

**every**, ngai ngai.

**evil**, meraht.

**exceedingly**, kepioh. ka nara-ruoi.

**exchange**, magalid.

**expensive**, matang.

**explode to**, lumapot.

**extinguish**, lasaih, memalalah.

**eye**, mâtau matok: makudat, 'to make eyes.'

**eyebrow**, bulangkong, kudat.

**eyelash**, kuriap.

## F,

**fable**, tunud, susuih.

**face**, burus.

**faint to**, memukad.

**faint** (*not clear*), as a footprint, &c., napali, nalulu.

**fall to**, matoh, meratoh: (*of a tree*) naruat.

**fallow**, melanah.

**famine**, bitilih.

**far**, malud: as far as, disum, domisum, makasaboi: cf. 'mengekuah tetaun domisum umbus nanoh' (to climb a tree to its very top.)

**fast**, keribok, mahjag.

**fasten to**, mengkaput.

**fat**, melabong: (*noun*) lomok.

**fate**, saluad.

**father**, amak, bapa.

**father-in-law**, mangiwan.

**fathom**, (*M*) depa.

**fear**, mala, matalau.

**feast**, silad: to give a feast, mensilad.

**feather**, bulu.

**feeble**, 'ka ka aru.'

**feed**, menekan: (*at the breast*) tomitih.

**feel**, perasahan.

**fell to** (*jungle, &c.*), dumilik, mentagad.

**female**, doandok.

**fence**, ampuu, pagar.

**fern**, arusap: arusap maganak, a kind of fern, boiled and eaten by women when pregnant.

**fetch**, ibitali.

**feud**, sangud: to have a feud, meng-angud.

**fever**, sumarum.

**few**, makoreh.

**fibre**, bebuton.

**field**, alah: ranau, a wet padi-field.

**fierce**, mesangit.

**fight**, mengkeragan: magagabuh, to wrestle: of cocks menturapili.

**file**, (*M*) kikir: to file the teeth, magasah dipun: to walk in single file maususunoh, mansunoh.

**fill to**, masuang, mepanoh.

**fin** (*of fish*), kiwas.

**find**, mekalap, merampatan: cf. 'ium noh ioh makasaboi du merampatan': (look for it till you find it.)

**fine** (*adj.*), mainseu: (*of texture, &c.*) mahlus.

**finger**, karindoh: tatingkis, the little finger: 'kandok n'garan,' the third finger: lungkuh, the second finger: tuturoh, the first finger: tutumpoh, the thumb.

**finger-nail**, salindoh.

**finish**, nokud: cf. kapoioh nokud aku menakan (I have not yet finished eating): makaih, 'it is finished': (M. 'sudah habis').

**fire**, apui: to set on fire, memunsul.

**fire-fly**, aminipud.

**firewood**, siduan.

**firm**, matagap.

**first first of all**, pun noh garang, impun.

**fish a**, pait: to fish (with net) jala, meningjala: to fish (with line) mengapun: to fish (with tube) moipenoh.

**fish-trap** (of bamboo), saluid: sibur, a kind of 'kelong,' banked round with earth.

**fish-hook**, apon.

**fist**, angomun: tempokun, to strike with the fist.

**flag**, (M) bandera.

**flap the wings**, meninkabur.

**flat**, merantei.

**flatter to**, mangumpod: (imper.) impodoh.

**flea**, tuntulumoh: to search for flea in the head, mensisik: (meningkutu, to perform this office for another person.)

**flee to**, magidoh.

**flesh**, daging.

**float**, lumanitoh, lumapog.

**flood**, mempaliud: (Bokan, mantuh.)

**floor**, sulig: lulungunan, a spring dancing-floor.

**flour**, (M) tepung.

**flower**, busak.

**fly a**, bungkulut: pikud, the horse-fly.

**fly to**, mensiab.

**flying-fox**, bangkaut.

**foam**, putah.

**fold to**, lapotun: fold the arms, to stand with arms folded masongkipul.

**follow**, sumugut, maiah: cf. maiah du susungoi makasaboi du sulap ngitu, follow the river up to the hut: maiah daguh, to obey.

**food**, akanan, lutuh.

**fool**, palui.

**foot**, keraiam.

**footmark**, baiak.

**forbid**, mensawai.

**forehead**, dudoh.

**forget**, hmuian, malimuan.

**forgive**, makia ih.

**formerly**, garing.

**fort**, (M) kota.

**fortune**, saluad.

**foul**, bajamut, sait, makasait.

**founder** (of a boat), dumojob.

**fowl**, manok, piak: magorok, to call fowls.

**fox, flying**, bangkaut.

**freckle, freckled**, tetaih bungulut.

**free**, lumapas: to set free malabus: (imper.) labusih.

**fresh**, baguh: (of water) mapaloh.

**friend**, dangan, amod.

**frightened**, malâh, mataloh: pasatuntor, to shake with fright.

**frog**, bunong, beringkatak.

**from**, intod: atok intod moh? = where have you come from?

**front in**, gintuong, gintuongan.

**fruit**, (M) buah: punti, the banana: lampun, the durian: suah, kulapis, the lemon: mangga, the mango: manggi-, mangusteen: luun, the tembadak: kalam buku, the 'rambutan': tempasak, the 'kapaia': kian, the 'tarap': nangko, the jack-fruit, nangka.

**full**, panoh, mapanoh: (*containing something*) maka-suang: (*M. kenyang*) nasob.  
**full-moon**, mansarawang.

## G.

**gad about**, to mengambei: pagambei, a lover: (*of a woman*) mikiambei.

**gain** (*to win*), menang: (*profit*) untong.

**gall**, (*M*) ampadu.

**gambier**, (*M*) gambir.

**gamble**, mempapakau.

**game a**, magaiam.

**garden**, tetanun, kabun.

**gather** (*trans.*), menganam: (*imper.*) anamoh: (*intrans.*) timong, tumimong.

**gaze** (*stare at*), magiloi.

**genuine**, topud, kepioh.

**get**, makalap: (*imper.*) alapoh.

**get into**, makasubul: "lasaih apui iruh, makasubul lisun iruh matoh ku: (put out that fire, the smoke gets into my eyes).

**ghost**, kraganan, tentolong, ambiruoh, berioh. keragioh: kraganan, ghosts of the dead (invisible): tentolong, ghosts supposed to have the power of carrying people up trees: ambiruoh, supposed to follow people in the jungle and annoy them, not to cause death: berioh, ghosts that always cause death: keragioh, ghosts that haunt the jungle: (supposed to eat people).

**giddy**, magiruh iruh, manampéhroh: magananipad, "to see stars."

**girdle**, abut.

**girl**, doandok.

**give**, anih.

**go, go away**, mogad: (*imper.*) magidoh.

**go down**, tomakad.

**go in**, mumpas, makasubul.

**go home**, mulih, makolih.

**go out**, semerurak.

**goad to** (*e.g. a buffalo*), menobok.

**goat**, (*M*) kambing.

**goitre the**, anggok.

**gold**, (*M*) mas.

**gong**, (*M*) agong: taubun, a large gong: tawak tawak, chenang (*M*) chenang.

**good**, mainseu.

**good-bye** (*to a person going*), ugad kanah: (*to a person remaining*) tloh kanah.

**gourd**, mantisun.

**gradually**, ipipioh.

**grandfather**, akih, penakih.

**grandmother**, pengadu.

**grandson or -daughter**, kamaman.

**grass**, sakot: alap, the lalang grass.

**grasshopper**, kapoh.

**grave a**, lobong: sulap lobong.

**great**, maiioh.

**greedy**, madôht.

**green**, melinsih.

**ground**, tanah.

**grow**, tumoh.

**growl**, menongur.

**grunt**, (*of a pig*) menangkus.

**gums the**, sinsilun.

**gun**, (*M*) senapang.

**guide to**, mempaguloh.

**gutter**, (*M*) parit, susungoi.

## H.

**hack to**, mengkolog.

**hair**, abok: naöbas, a lock of hair.

**hair-pin** (*of bone, or ivory*), timbuk.

**half**, (*M*) s'tengah.

**halo** (*of the moon*), memangka.

**halt to**, tomangus.

**hammer**, (*of a gun*) kinudakuda: hammer to, papaki.

**hand**, longun.

**handful a**, sagongon: 'two handfuls' sangakop.

**handle**, (*of a parang or knife*) uluan: (*of a spear or blow pipe*) tanguran: utin, the part of the blade that goes in to the handle.

**hang to**, tehrikun.

**hard** (*of substances*) makutub: (*difficult*) masusah.

**harvest to**, menantab.

**hat**, (*M*) topi: salukup, a large wicker hat.

**hatch to**, memabak.

**hatchet**, (*belong*) panâh.

**hate to**, mararamuh.

**haul to**, sintakun, logut.

**have, has,\*** makondoh.

**hawk**, kanoihi.

**he**, disoh, ioh.

**head**, ulu: inggulih, nakalap ulu, to take a head.

**headman**, ulun maiioh.

**headland**, pulong.

**heap a**, pumpun.

**hear**, megining, mongining: "kapoh nokening aku du ban-sur": (I have not yet had news).

**heart**, ('*jantung*') pusuh: ('*hati*') goang.

**heavy**, magat.

**heel the**, tunob.

**heel to** (*of a boat*), luming-gang.

**heir**, (*M*) waris.

**help to**, indangan.

**hen**, punan, papunan.

**her**, (*v. him, his*).

**herd**, *of cattle* panun: sam-panun.

**here**, dogitu.

**hiccough to**, mensikok, mensadu.

**hide to**, semambuni: (*of animals*) kungkung, kulit.

**high**, mesawat.

**highwater**, mempaliud, liud.

**hill**, tidong.

**him**, ioh.

**hip the**, awak.

**his**, ioh tampoh: nanoh, after the noun = Malay -nya.

**hiss to**, (*as a snake*) memangong.

**hit to**, memalambah: (*with the open hand*) tepapun, lapisun: (*with the fist*) tembukon.

**hold**, onggoiok.

**hold** (*contain*), masuang.

**hole**, berongoh.

**hollow**, ka masuang.

**home to go**, mulih, makolih.

**honey**, lating meningot.

**hook**, apun: mengapuu, to fish with a line.

**hook onto to**, nakait: (*im-per.*) kaitoh.

**hope to**, mengarap.

**horn**, sangau: menangau, to attack with the horns, to butt.

**hornbill**, the tuntudun.

**hornet**, surun.

**horse**, (*M*) kuda: igioh, a mare: to ride a horse, masak kuda.

**horse-fly**, pikud.

**horse-leech**, limbata.

**hot**, melassu, (*pungent*) mapodos.

**house**, balui.

**how?** atok kosun na:

**how many times?** kain kurra.

**how much?** kurra.

**how long?** kurra boi.

**howl to** (*as a dog*), mogaum.

**huge**, maiioh.

**humpbacked**, mabunkor.

**hungry**, maitilan.

**hunt to** (*with dogs*), membugah: pamajaling, majaling, to hunt with dogs, using noo-es of rotan (*jaling*): (*stalk*) mengkakab.

\*Mokondoh, used in sense of Malay "ada" either is, are or have, has, or used with a verb to express past tense, as Mokondoh bilin noh daki,—he sent me a message: mokondoh domatong,—he is coming.

**hurry**, keribok, mainsoh, di-baki.

**hurt**, kinadual: (*imper.*) kadualoh: cf. 'kai kadualoh ulun inuh': (don't hurt that man.)

**husband**, dalaki.

**hush!** tuloh!

**husk** (*of grain*), apol.

**hut**, (*M*) sulap.

# I.

**I**, aku, kuih: (daki = me).

**idiot**, paloi.

**idle**, matiad.

**it** (*not used*), cf. "nambat noh poioh berai domatong dogitu" (if you meet him tell him to come): "makapandei aku poh tentu du ka indangan ku" (if I had known I would not have helped him).

**ignorant**, paloi, ka maindalam.

**iguana**, taraioh: kambok, the tree iguana.

**ill**, somakit, mesakit, medul: masanadan, very ill, the last stages.

**ill-tempered**, marigogut, masarok mangit.

**illegitimate**, anak pungoh.

**imitate to**, baiak baiak.

**immediately**, daiitu, tarus.

**impede to**, mensawai.

**impropriety to behave with**, mengkamatah.

**impudent** (*M*) korang ajar.

**in**, **inside**, dilalam.

**increase to**, tumpok.

**incur to**, makonoh, maintain.

**India-rubber**, pulut malamili.

**Indian corn**, budit.

**indolent**, matiad.

**industrious**, merajin.

**inexperienced**, kapoioh maindalam.

**infant**, daragang.

**infectious**, (*M*) jangkit.

**inform to**, berai.

**information**, bansur.

**inhabit**, memagun: pagun, a dwelling place, a village.

**injure**, mabinasa.

**inlaid**, peropok, fastened in, like a nail in a wall.

**inland**, (*M*) darat.

**inquire**, mengimuat, imuaton.

**insane**, makolus.

**insect**, (*M*) binatang.

**insipid**, mapaloh.

**inspect**, (*M*) memeriksa.

**insult to**, uiuh, monguiuh.

**intend**, me-agah.

**intercourse to have-with**, magiut, makinduh.

**inter to**, lobong.

**interest** (*on money*), anak.

**interpreter**, (*M*) jurubhasa.

**interrupt**, sumoh daguh.

**intoxicated**, megauk.

**invite to**, menimpag.

**iron**, (*M*) besi.

**is**, makondoh.

**island**, puru.

**itch itchy**, matol: kagal, the itch, ('*kudis*'): kurap, ring-worm.

**ivory**, gading.

# J.

**jacket**, kawal.

**jagged** (*as a knife edge*), mapirang.

**jail**, telungkoh, (*lit. stocks*).

**jar a**, paungan: kakanan, a 'tajau': kibut, berina, a 'kabok.'

**jaw**, ajai.

**jealous**, maiingot.

**jeer to**, makakudit.

**join**, sumpat.

**joint of bamboo**, (*M*) buku.

**jolt**, tegogun.

**journey**, mogad, mugad.

**juice**, makaduh.

**jump to**, timingkurok, temindak.

**jungle**, kasarawan: gimbahan, virgin jungle: nohmok, secondary growth, 'blukar.'



**just**, topud, kepioh.

**just now**, daïtoh bagoh: bagoh ioh domatong, he is just coming.

## K.

**keen** (*sharp*), malais.

**keep**, memponan: (*imper.*) pemponoh.

**kick to**, tunub, menunub.

**kidneys the**, angkawa.

**kill**, nomatoi: (*imper.*) potoi-oh.

**kind** (sort). (*M*) bangsa.

**kind-hearted**, mainseu, mainseu goang.

**kindle**, (*e.g. a fire*), pamiag. memiad.

**kingfisher**, tawakir: mantis. a small species.

**kiss to**, magarok.

**kitchen**, dapuan.

**knee**, atud.

**kneel**, magaratud.

**knife**, pais: burong, a 'parang'.

**knot**, timpagas: to tie a knot menimpagas.

**know**, mapandei, pandei: endaiih, "I don't know": (*be acquainted with*) makolig moligan.

**knuckle**, (*M*) buku.

## L.

**labour**, (*M*) kreja.

**laden heavily laden**, mapanoh.

**laden to**, pasuangun.

**lalang-grass**, alap.

**ladder**, turkad.

**lame**, mangkuda.

**lament to**, matangih.

**land** (*as opposed to sea*), (*M*) darat: katanan.

**land to**, (*from a boat*), mang-ingtanan.

**language**, daguh.

**lap to**, (*as a dog drinking*): dumilai.

**large**, maiioh, makuluh.

**lasso**, a sarigut: to lasso, menigot: (*imper.*) sigotoh.

**last** (*to endure*), metahan.

**last** (*of time, &c.*), taurih.

**last night**, dundom daih.

**late**, lambei, melambeï.

**lately**, daïtoh.

**laugh to**, makakudit.

**lay** (*to place*), bulai, polioh.

**lay eggs**, tamaloh.

**lead** (*to guide*), mempaguluh: (*as a buffalo, &c., with a rope*) dalatun.

**leaf**, (*M*) daun.

**leak leaky**, lauasan.

**lean** (*thin*), matukal.

**lean to**, mempiras, pasandigun.

**leap**, timgkurok, temindak.

**learn**, maganad.

**leave** (*trans.*), pauantan: (*intrans.*) mugad.

**leech**, limpudu, limbutang: limbata, a horse-leech.

**left**, kait.

**left-handed** (*of a person*), natongkait.

**leg**, (*foot*) keraiam: (*whole leg*) sempanan, sakukur.

**legend**, tunud, susuih.

**lemon**, suah, kulapis.

**lend to**, midah.

**leprosy**, gamuh, losok.

**let** (*to allow*), gamah.

**let go**, malabusan.

**level**, merantei, nagagundoh.

**lick**, tilah.

**lie** (*to tell a lie*), magambut.

**lie down**, mikikolong: (*on the back*) lumangkid: (*on the face*) lumog: (*on the side*) tumehging.

**life**, peniaw.

**lift**, matarih: cf. magat kepioh ka matarih ku, it is exceedingly heavy, I cannot lift it.

**light to** (*e.g. a fire*), pamiag, memiad, madoki.

**lightning**, ganit, tungkilap, kilap: meninisih, to be struck by lightning.

**like to**, mesagah.

**like**, (*similar*) nagundoh.

**lime a**, kulapis.

**lime**, (*eaten with sirih*) apog.

**limpid**, menining.

**line**, kumiting: (*of the palm of the hand*) bamburut karindoh: cf. mogilai du bamburut karindoh memad ioh matawang: it is early morning, one can distinguish the lines of one's hand.

**lip**, munong.

**listen to**, mengining, megining.

**little** (*of size*), mosat, mebodok: (*of quantity*) kosat.

**live to**, biag: (*to inhabit*) memagun: pagun, a village: sampagun, to live in the same village as another.

**liver**, angkaian.

**living** (*alive*), tinambiag.

**lizard**, house-ambiruoh baloi: grass-lizard garang.

**load a**, magibah: to load pasu-angun.

**lock of hair**, (unbound) naobas: tininbuku, a lock of hair bound and kept together with a hairpin: ("timbuk.")

**locust**, kapoh, kakaiak.

**log**, tetaun.

**loin-cloth**, abag.

**lonely**, masiruk.

**long**, mawad: (*of time*) maboi: kurra maboi, kurra boi? = how long?

**long ago**, nakalaind noioh.

**long for to**, me-agah.

**look at to**, mogiloi.

**look for**, ium, megium, makium.

**'look out'** ilai.

**loose** (*adj.*) maluag: loose to, malabusan.

**lose**, metatag: (*get the worst of*) mala.

**lose one's way**, makaraiau.

**loss**, (*M*) rugi.

**louse**, kutu, kuad.

**love to make**, dumojur.

**lovely**, mainseu: (*of persons*) mapasau, mainseu.

**lover a**, pagambeil.

**low**, mediwah.

**low tide**, mosat, timog mosat.

**luck**, saluad.

**lucky**, saluad mainseu.

**lunatic**, makolus.

## M,

**mad**, makolus.

**maiden a**, darâh.

**maize**, budit.

**male**, kusoi.

**make**, anuan, pakuan.

**man**, ulun, kusoi.

**mane** (*of a horse*), tetabir.

**manggo the**, (*M*) mangga.

**mangrove**, (*M*) bakau.

**many**, mamok: (*numerous*) mawas: domassam mawas, heavy rain: how many? kain korah.

**mare**, igioh, kuda igioh.

**mark**, (*M*) tanda: baiak, a footmark: pinututan, mark of an animal by cutting its tail: to mark (*e.g. a tree by blazing*) mebatin.

**marry** (*of a man*), magagalus: (*of a woman*) magaguat, mempapurut: (purut, a dowry): moipanudong, to ask in marriage.

**marsh a**, losok.

**mat**, iam.

**match**, pendidip.

**matter** (*pus*), (*M*) nanah.

**matter, what's the?** stok makoran?

**mattress**, (*M*) tilam.

**me**, daki.

**mean**, (*stingy*) makalit

**measure** ~~to~~, tukoh.

**meat**, (*M*) daging.

**medicine**, (*M*) ubat: tetapis, native medicine.

**meet**, nambat, matuka, makam-but.

**melt**, tumanoh, mapusoh.

**mercy**, makiasih.

**message to send a**, mamilin, balinin.

**mew** (*of a cat*), daguh.

**middle**, (*M*) tengah.

**midwife**, mangungoi.

**milk**, gatas: to milk memagah: tomitih, to feed at the breast.

**mimic to**, baiak baiak.

**mina** (*the bird*), tioh.

**mind**, ('never mind') gamah noioh.

**mine**, aku tampoh: aku (ki) kuu, used after noun they govern, as in Malay:

**mingle to**, pagamonguh.

**mist**, dandaman, gaun.

**mistake to make a** malimuan.

**mistrust**, ka mintopud.

**mix**, pagamonguh.

**moist**, masah.

**moment**, sangkinurad: cf "sangkinurad da moiun, ka maboi aku": (wait a moment, I won't be long.)

**money**, dusin.

**monkey**, jibulau, the 'kerah': gabok, the berok: kalawat. the 'wah wah': dungoih, the long nosed monkey: kagoioh, the 'mawas' (orang utan).

**month**, (*M*) bulan.

**moon**, (*M*) bulan: mansara-wang, full moon: kasisilah. new moon.

**more**, makalabih bagoh.

**mortar**, (*for pounding rice*) tutuan.

**mosquito**, namok.

**mosquito-net**, kabunan.

**mother**, inah, panginah: cf. 'atar inah moh': = (*M*) 'puki mak': (a term of abuse).

**mother-in-law**, mangiwan.

**mountain**, tidong.

**moustache**, jarub.

**mouse**, (*M*) tikus.

**mouth the**, kabang: mouth of a river nagalongan, alongan.

**move** (*intrans.*), madangkat: (*trans.*) baluih.

**much**, mamok.

**mud muddy**, losok: (*muddy, of water*) malutut.

**mule**, (*M*) kladi.

**murder to**, mematoi: (*imper.*) potoioh.

**muscle**, uat.

**music**, daguh: kulintang, a kind of violin, made of bamboo, with rotan strings: sempotun, a kind of bamboo flute.

**my**, aku tampoh, kuu tampoh.

## N.

**nail**, (*M*) paku: finger-nail salindoh.

**naked**, lumabas.

**name**, ngaran: 'atok ngaran susungoi dogitu?' (what is the name of this river?)

**nape of neck**, impus.

**narrate to**, nomarah, pauaran.

**narrow**, mapisok.

**nasty**, meraht, ka mainseu.

**nationality**, (*M*) bangsa.

**navel**, pusut.

**near**, memad: nakodat, to go near, to approach.

**nearly**, memad: memad ioh mopatoi, he nearly died.

**neck**, liog.

**need to**, mesagah.

**need**, (noun) pasagan: cf. "atok pasagan moh": what do you want.

**needle**, sabul.

**nephew**, akun.

**nest**, tambunan.

**net** (*for fishing*), jala, penakat.

**nettle a**, (with large stinging leaves) arupui.

**never**, kai gunduh.

- new**, bagus: bagus is used also in the sense of 'then only' (as Malay 'baru'): cf. "uasih busak inuh, bagus ioh tumuh," (water those flowers and then they will grow): mainseu molong": (set the "pamiag du apui, bagus om fire going and then we can sleep in comfort).
- news**, bansur.
- nice**, mainseu.
- niece**, akun.
- night**, dundom, mundom. dundom daih, last night.
- nightjar the**, labok.
- nimble**, mepinit.
- nip to**, kadut.
- nipple** (*of breast*), titih.
- no, not**, ka, salah.
- noise**, mohtah, magutah, mindaguh.
- nonsense**, paloi.
- noose**, sarigut: sigotun, to catch with a noose, to lasso.
- nose**, adong: maginsingor, to blow the nose.
- not any, none**, kandok: kaiioh.
- not at all**, ka gundoh.
- not enough**, ka sukup, ka samah.
- notch a tree to**, mebatin.
- notched** (*of a blade*), mapi-rang.
- now**, dalitu.
- numb**, orodun.
- numerous**, mawas: domassam mawas, heavy rain.
- nurse to**, bebilun: tomitih, to feed at the breast.
- O,**
- oath**, mopatod: take an oath mopatod, magibut.
- obey**, maiiah du daguh.
- oblong**, taigagawad.
- obstinate**, kumaras.
- obstruct to**, lumawan.
- obtain**, mekalap.
- ocean**, dat.
- odd**, (*M*) heran.
- odour**, mowoh.
- of** (*possessive*), tampoh.
- offence**, (*M*) salah.
- offended**, medul goang.
- often**, masarok.
- oil**, piad: Piad tanah, kerosine oil: Piad tetaun, the sap of a tree.
- old**, matua.
- omen**, angai.
- on**, disawat.
- once**, igundoh.
- one**, dundoh.
- onion**, babawang: (Dalit i.e. Peluan dialect bintudu).
- only**, iak.
- open**, sukab: to open, sukabun: (*imper.*) sukabih.
- opium**, (*M*) piun.
- oppose**, mengkeragan.
- opposite**, magintuang.
- orange**, suah.
- \*or, kia**: 'talai-kia ginu-kia?', this or that?
- orchid an**, sarongih.
- order to**, menusb. moipo-marah: (*imper.*) sukubuh.
- order to put in**, nakiting: (*imper.*) tingoh.
- ornament to**, mematik.
- ornamentation** (*e.g. on a shield*) batik.
- other**, bokun: cf. 'atok aien (atoien) ulun du bokun-ih?' (where are the other men?)
- ought**, (*M*) patut, mapatut.
- our**, akai tampoh, monoh, (used after the noun it governs, as Malay -nya.)
- out outside**, liwad.
- oval**, taigagawad.
- over**, disawat, tumampak.

\*Also used in interrogation in the sense of the Malay "kah": "kah ralong ioh kia ka-kia. Cf. Makaratong ioh kia ka-kia?—has he arrived or not?"

**overcast** (*of the sky*), jinomûd, jímôht.  
**overgrown**, masakut.  
**overladen**, mapamoh.  
**overturn to**, mesasad.  
**owe**, magutang.  
**owl**, puak.  
**ox**, (*M*) kerbau.

## P.

**pack up to**, mengkaput: (*im-per.*) kaputi.  
**package a**, magibah.  
**paddle a**, kabir: to paddle, mengkabir.  
**padi**, bilod.  
**padi-field** (hill), tindal: menindal, domilik, to prepare hill padi-field: (wet) ranau: menaras, to prepare a wet padi-field: linawang, the lines between (wet) padi when planted out: bokok, the ridges dividing wet padi-fields: rampud, large receptacle of bark, for storing padi.  
**pain painful**, somakit, medul.  
**pale**, mapasih: (*of colours*) mebuloh.  
**palm of hand**, palad: bamburut karindoh, the lines of the palm.  
**pant to**, meingus: ingus ingus, out of breath.  
**paper**, (*M*) kertas.  
**parang**, burong: kinamulan. a long sword-shaped parang: paiirang, a 'parang hilang.'  
**pass**, mensail, pantaliban.  
**path**, baian, baian lalas, dalan.  
**pay for**, membalai gatang, menganih gatang.  
**pebble**, (*M*) batu.  
**peck**, menindok.  
**peel**, (*M*) kulit: to peel mengkulit: (*imper.*) mengkulitih.  
**pelt to**, memohas, bosoh.  
**penalty**, sagit.  
**pendulous**, (*of breasts*) lumoiud.

**people**, ulun.  
**pepper**, ladoh.  
**perch to** (*of birds*), modup.  
**perhaps**, (*M*) barangkali.  
**permit**, gamah.  
**person**, ulun.  
**perspire to**, umasan.  
**persuade**, pajaloh.  
**phlegm**, usod.  
**pick up**, alap, menganam.  
**pick out**, (as a thorn from the foot) surah, memurah: (to choose) (*M*) pileh.  
**picture**, (*M*) gambar: batik, engraving, ornamentation.  
**piece a**, taiadan.  
**pierce to**, tebokun.  
**pig** (*wild*), basing: (domestic) bawih.  
**pigeon** (*the punai*'), tawan: (*the 'punai tanah'*) limbukun: (*the 'pergan'*) balud.  
**pile a**, pumpun.  
**pillow**, lulunan.  
**pimp**, (*M*) beruah.  
**pinang**, kusoh: magintat, to chew betel-nut.  
**pinch to**, kadut.  
**pineapple**, sarabak.  
**pipe** (*large, of bamboo*), sût: tabaga, a small wooden pipe with thin bamboo stem: (*a conduit*) tagurusoh.  
**pitch** (*resin*), salong.  
**pitcher-plant the**, tutuyod.  
**pitted**, (with small-pox) pilat, burus pilat.  
**pity**, makasih, marobat: it is a pity marobat: cf. "marobat patidin moh piad ih": (it is a pity to waste the oil).  
**place a**, aianan, pemulian: to place bulihin, nakôliuh: (*im-per.*) polioh.  
**plain**, matarang, matawang.  
**plain a**, alap.  
**plait to**, manolampit.  
**plan to**, (*M*) pakat, mempakat.  
**plant to**, tinanom, menanam: a plant, busak.

**plantation**, tetanun.  
**plate**, lalaian.  
**play to**, magaganja.  
**pleasant**, mainseu.  
**plenty plentiful**, mamok.  
**plot to**, (*M*) pakat, mempakat.  
**plough to**, meradu.  
**pluck to** (*e.g. a flower*), moi-upuh: (*a fowl*) memubol, mabulun.  
**plunder to**, madamas, domasun.  
**pock-marked**, pilat.  
**point to**, turuok.  
**point** (*the tip*), munjok: (*a headland*) pulong.  
**poison**, umpadan: tuoh, the tuba poison: palig, poisonous sap (used for blowpipe darts): binah a poisonous root, mixed with "palig": limuan, or limbuanan, poisonous leaves: (name probably derived from limuan, "oblivion"): tam-ban, a poisonous root.  
**poisonous**, mabisa.  
**pole a**, lugh: (*for punting*) tukol.  
**poke to**, susok, sinusok.  
**pool a**, luluiun.  
**poor**, (*M*) miskin.  
**populous**, masarah, meramei.  
**porcupine**, tautong, lisis.  
**post a**, lugh.  
**pound to**, manutu: tutu, a pounding-stick: tutuan, a mortar, for pounding padi.  
**pour to**, lingingun, dalinun.  
**powerful**, maikang.  
**praise**, umpod.  
**praise to**, impodoh: maki-umpod, to boast.  
**pregnant**, menantian, mapang.  
**prepare**, samadia, makasedia.  
**present to**, anih.  
**present at**, daiitu.  
**press to**, sendotun.  
**pretend**, magakal.  
**pretty**, mainseu: of persons, mapasau, mainseu.  
**prevent**, sawaiun.

**price**, gatang.  
**prick to**, matobok, tebokun.  
**prisoner**, binduan, (*M*) orang salah.  
**probably**, (*M*) barangkali.  
**prop a**, tetokud, tetansok: to prop, natokud, natansak.  
**property**, dapu: mamok dapu, rich.  
**prostitute**, (*M*) sundal.  
**proud**, makomoh, sumantuh.  
**prow of boat**, julong, diulong.  
**pull**, logotun, dalatun: (logotun, to pull gently, dalatun, to pull hard).  
**pull out** (*as a parang from its sheath*), butus: (*as a root from the ground*) menubul.  
**pulse the**, peniaw uat: kibut kibut, to beat (*of the pulse*).  
**pumpkin**, mantisun.  
**pungent**, mapodos.  
**punt to**, mentukol.  
**punting-pole**, tukol.  
**puppy**, ukoh.  
**purpose on**, inintopud.  
**pursue**, maindakup.  
**push**, sungkangun.  
**put**, balihiu, nakoluih: (*imper.*) polioh.  
**put out** (*to extinguish*), lasaih.  
**putrid**, mootong.  
**python the**, mendolun.

## Q.

**quail the**, pipitau.  
**quarrel to**, mengkeragan.  
**quarter**, (*M*) sasuku.  
**queer**, matabungoh, (*M*) heran.  
**question to**, mengimuat, imuat-ton.  
**quick**, meribok, keribok, mah-jag: (*agile*) mepinit.  
**quiet, be quiet!** tuloh! kai pagusoh.  
**quill** (*of porcupine*), garit, kadamok.

**quiver to**, menuntor: with fear pasatuntor.  
**quiver of darts** (*made of bamboo*), kobun.

## R.

**race a**, (M) bangsa: to race. semimbul.  
**raft a**, gakit.  
**rafter** (*main*), pakang: small. M. 'kasau') timpudokong, dolus.  
**raid to**, mengaiau.  
**rail hand-**, kakapitun.  
**rain**, domassam: domassam mawas, heavy rain: (cf. M. 'hujan lebat').  
**rainbow**, bunsirak.  
**raise to**, kakaton.  
**ramrod**, lulugup.  
**rape**, ginabuh.  
**rapid**, madaras a rapid, rikus.  
**rare -ly**, melambat.  
**raspberry**, surinid.  
**rat**, (M) tikus.  
**rations**, lutuh.  
**ravish to**, ginabuh.  
**raw**, matah, bebata.  
**reach** (*arrive at*), somaboi, makasaboi.  
**read**, (M) memacha.  
**ready**, makasedia.  
**real**, topud, kepioh.  
**reap**, mengatab, mengomud.  
**rear** (*to bring up*), piara.  
**rear** (*as a horse*), menterodong.  
**receive**, makiupah, tarima.  
**recline**, lumangkod: (*v. to lie*).  
**recognize**, makolig.  
**red**, meriah.  
**refuse to**, ka mesagah, matiad.  
**refuse** (*dirt*), sakut.  
**regret to**, mengkada.  
**regular** (*in order*), ketingun.  
**relate to**, pawaran, nomarah.  
**relation**, pabukat: magamud, to swear relationship.  
**rely on**, mintopud, malansan.  
**remain**, bantar, minenta.

**remainder the**, noantai.  
**remember**, maganib, jimagah, (M) meningat, tomorandah.  
**repair to**, patarandain.  
**repeatedly**, masarok.  
**replace**, magalid.  
**replete**, nasob.  
**reply**, magagual, majawab.  
**request to**, mikianih: a request, pakianian.  
**reside**, memagun.  
**resist**, lumawan.  
**retire**, dumulih, lumogut.  
**return** (*go back*), mulih: (*give back*) paluliu.  
**revenge**, suhan: to take revenge, sumulih.  
**revile**, maguras.  
**revolve**, domiruh, madiruh.  
**rhinoceros**, tembaiungan.  
**rice** (*uncooked*), bagas: (*cooked*) nasi: mumok, unripe rice, cooked, (M. 'emping'): (*fermented*) tapei.  
**rice-bird**, (the 'pipit') pirit.  
**rich**, langkaia, mamok dapu.  
**ride to**, masak, masak kerbau, kuda, &c.  
**ridge** (*of a hill*), nolug, holud: (*between padi fields*) bokok.  
**right** (*correct*), topud, kepioh: (*opposed to left*) pemidis.  
**rigid**, matân.  
**ring**, (M) chin-chin: (*through a buffalo's nose*) anting.  
**ringworm**, (M) kurap.  
**rinse** (*in water*), polangdongan.  
**ripe**, mangsak.  
**rise** (*get up*), somukal: (*of the sun*) sumilah, makasoroh.  
**river**, timog, susungoi: darai-  
 ioh, upriver: sumulok, to go  
 upriver: dabugus, downriver:  
 mempiugus, to go downriver:  
 memeripag, padipag, to cross  
 a river.  
**road**, sinangkul, dalan.  
**rob**, madamas, domasun.  
**rock a**, (M) batu.

**roll up** (*e.g. a mat*), padunun, balunun.

**roof**, tap.

**room**, pisok: dapuan, the centre of a Murut house, where the fire is made: bantul, the raised flooring round this 'dapuan.'

**root**, bakat.

**rotten** (*decayed*), mapasah: (*putrid*) motong.

**rotan**, owoi: owoi sogoh, the 'rotan sega': owoi rimut, the small, thin rotan: semambu (Malacca cane) lasun: tomatas owoi, to collect rotan. to collect rotan.

**round**, (*adj.*) mohrud, (*M*) bulat.

**round around**, (*prep.*) domipud.

**rouse** (*to waken*), mengadat, kadatoh.

**route a**, dalan.

**row** (*a line*), kumiting.

**row** (*a noise*), mohtah, magutah, pagusoh.

**rub to**, puiaun.

**rubber india-**, pulut malamih: (*hard*) liganian.

**rubbish**, sakut: (*nonsense*) paloi.

**rude**, (*M*) korang ajar.

**rumour a**, bansur.

**rump the**, tabing.

**run to**, magidoh, semimbul.

**run against** (*collide*), makapantapak.

**rust -ty**, togur.

## S.

**sad**, merobatan: (= *M. sayang*).

**saddle**, (*M*) sela.

**sago**, inatok.

**sago-palm**, rembia.

**saliva**, idis, usod = engus, (phlegm.)

**sallow**, mapasih.

**salt**, usih.

**salt water**, timog mapadih.

**salt-lick a**, mesupon.

**sand**, agis.

**sandfly**, rangit.

**sap** (*of tree*), pulut. piad tetaun.

**satisfied**, masenang goang: mainseu goang: (*sated*) nasob.

**say to**, berai, daguh.

**scabbard** (*of parang*), angkap.

**scald to**, mauassan.

**scales** (*of a fish*) sisik.

**scar a**, pilat.

**scare to**, ilalanoh.

**scared to be**, malâh.

**scarecrow**, senihkakalaing:

(derived from dalaing, a child; "child's work"): tetandok, dead leaves hung on a line to scare birds: lelakup, pieces of bamboo, used for this purpose: lungkating, the rotan on which these are hung.

**scatter**, *e.g.* padi, in feeding fowls: mapatias, patiasoh (*imper.*)

**scorpion**, lingangait.

**scratch to**, kikutok.

**scream to**, lumakuih, gumagang.

**scum**, putah.

**sea**, dat.

**sea-shore**, king dat.

**search to**, ium, megium.

**see**, mokitoh, mogiloi.

**seed**, umih.

**seek**, ium, megium.

**seize**, ongoiok, memerakap.

**seldom**, melambat.

**self**, (*M*) sendiri: cf. 'domatang ioh sendiri, balinin ioh ak?' (did he come himself or did he send a message?)

**sell**, mentaran, taranan.

**send**, natadan, (*imper.*) atadih.

**send for**, menimpag.

**sense**, goang.

**senseless** (*stupid*), paloi: (*unconscious*) ka makahiman.



**sensible**, makagoang.

**sensual of a man**, madôht mengambeî.

**sensual of a woman**, madôht mikiambeî.

**separate to**, taiad: (adj.) nataiad.

**serve**, 'serve you right': majarah kan doginuh.

**set** (*to place*), nakoluih, balin-in: (*of the sun*) melasah lumasah.

**settle** (*to decide*), nokat.

**settle** (*to inhabit*), mēmpagun.

**severe**, makotog.

**sew to**, memikit: menarut, to sew ataps.

**shabby**, gansing, mapasah.

**shadow**, baiang baiang.

**shaft** (*of spear, &c.*), tanguran.

**shake to**, mosoh: pasatuntor to shake with fright.

**shake hands**, menganggai kariindoh.

**shallow**, matingkah.

**sham to**, magakal.

**shame**, muiuh.

**shape**, bansa.

**share a**, taiadan: to share, taiad.

**sharp** (*of a point*), malais: (*of an edge*) maladum.

**sharpen to**, magasah.

**she**, ioh, gisah.

**sheath**, *of parang*, angkap.

**shed**, the skin, as a snake, memalus: tambulalas, a hard wood that sheds its bark.

**shell coconut**-, ranggut.

**shew**, turuih.

**shield a**, kalid.

**shift to**, (*trans.*) baluih: (*in-trans.*) madangkāt, mapindah.

**shiver** (*with cold*), mesimuan.

**shoal a**, kumukot: of fish, sampanun: menauh, the swarming of fish at the breeding season.

**shoot**, memadil: *imper.* badi-loh (*with blowpipe*) menyapok.

**shooting star**, timbunus.

**shop**, (*M*) kedai.

**short**, majunok: (*wanting*) ka samah.

**short cut a**, magatas.

**shoulder**, limbahu: sahnin, to carry a load on the shoulder.

**shut to**, angabih.

**shut up!**, tuloh!, kai pagusoh.

**shy**, muiuh.

**sick**, medul, somakit, mesakit: to be, (*to vomit*) mēmpalûah.

**sick of**, (*M.* 'puas') masintoh.

**sickle a**, titantab: menantab, to reap.

**side**, tehgingan, tabibikan.

**sieve to pass through a**, mēniri.

**sight a** (*of a gun or blowpipe*), tentaran.

**sign a**, tetandok, pulanau: mengapoih, to make signs, as a dumb person.

**silly**, palui.

**silver**, (*M*) perak.

**similar**, nagundoh.

**since long since**, nakalaid noioh.

**sing to**, medimbai, melimbai.

**single**, dundoh: (*unmarried of a man*), buiaiyoi: (*unmarried of a woman*), darâh.

**sink to**, lumunut, dumojoh.

**sister**, pabukat: kakak, elder sister: harih, younger sister.

**sister-in-law**, along.

**sit to**, mentudong: magin-suroh, to squat, on the haunches: magalaliad, to sit on the ground with the feet to the right and bent back, the left hand resting on the ground, (*Malay* 'timpoh'): magibaboiad, to sit on the ground with feet outstretched, side by side, in front of one: pagulabidan, to sit crossleg-

- ged, 'tailor fashion': men-tukang, to sit on the ground, with hands folded across the knees, fingers interlocked.
- sit**, (of a hen) mimamut.
- skilful**, (*M*) pandei, mapandei.
- skin the**, kulit: to skin, neh-duan: (*imper.*) iduoh.
- skirt** (*short*), tapih.
- skull**, ranggut, ranggut ulu.
- skunk the**, tuduh.
- sky**, koanan.
- slack** (*not taut*), lumaungkong: (*lazy*) matiad.
- slander to**, mamitanah: (probably derived from Malay 'fitenah').
- slap to**, tepapun, lapisun.
- slave a**, ulun ulun: cf. 'pun noh garing ih ulun dogitu ulun ulun, to begin with, formerly this man was a slave.
- sleep to**, molong: to talk in one's, magampuang: (Malay *igau*).
- sleepy**, kolong olong, tikikolong.
- slip to**, nakatuntuas: malabusan, = Malay 'lepas': cf. "malabusan burong makonoh keraiam nanoh": the parang slipped and cut his foot).
- slippery**, lamog, melamog.
- slow slowly**, ipipiioh, kapiainih: liwar<sup>2</sup>.
- small**, mosat, mebodok.
- small-pox**, penabuh.
- smash**, mahak, meroput.
- smell to**, mengarok, magarok: a smell, mowoh: mohtong, a foul smell.
- smoke**, lisun: to smoke, men-sigup, menigup.
- snake**, dipu: dipu mainsisiab, the flying snake.
- snap to**, mapitoh, mapandak.
- snare a**, sarigut, antob, jaling: (a 'trap'): to snare, sigotun, pamajaling.
- sneeze**, tadisu.
- sniff**, mainsingut.
- snipe**, taduid.
- snore to**, gumarus, meningarus.
- snout** (*of a pig*), sesungal: menungal, to grub about (as a pig).
- so**, koiuh doginuh.
- so-and-so**, ianu.
- soak in water to**, polandongau.
- soft**, malamih.
- some**, paraphrased: cf. mokondoh domatong ka domatong, some came, some did not: mokondoh du dipu mabisa, mokondoh kandok, some snakes are poisonous, some not.
- son**, anak kusoi: son-in-law: son step- kamanakun.
- song**, dimbai.
- sorry to be**, mengkada.
- sort**, (*M*) bangsa.
- sound a**, mohtah, mindaguh.
- sour**, masum.
- source** (*of a river*), udan.
- sow to**, tinanom, menanam.
- span a**, sandangau: sandangau mawad, a span in length.
- spark a**, memurarau.
- speak to**, daguh, mindaguh berai.
- spear a**, dongkot: Andus, a barbed spear: to spear, men-udah.
- speckled**, taporintek intek.
- spider**, lawa, angkalawa.
- spider-web**, tambunan lawa.
- spill to**, pasasadoh.
- spin** (*to weave*), tinalud.
- spirit a**, berioh, ambiruoh, kraganan (*v. ghost*): (made from rice fermented) tapai.
- spit**, magiwog.
- split to**, lapakun, melapak.
- spoil**, narunsai.
- spoon**, (*M*) sendok, sudu.
- sprain**, nakakandur uat, mesalah uat.

**spring to**, timingkurok, temindak.

**spring a** (*of water*), taud.

**sprinkle**, uasih.

**sprout to**, puput.

**spur** (*of a cock*), atad.

**squander to**, patidih.

**square**, pinasagi.

**squat to**, maginsuroh.

**squeeze**, memagah.

**squirm**, as a snake: mengkilus kilus.

**squirrel**, khaitan: apuiut, the flying squirrel.

**squint-eyed**, sulimpat.

**stab to**, menudah.

**tagger**, ugad magoag goag, mensiling siling.

**stake of pointed bamboo** (*caltrop*), udang.

**stalk to**, mengkakap.

**stalk** (*of a flower*), taunan.

**stammer**, kudalit.

**stand to**, menterudong: (*imper.*) patudong: (*to endure*) tomahan.

**stand up**, somukal, kumakal.

**star**, butiting: butiting mentatakoh, the evening star: timbunus, a shooting star.

**start** (*to set out for*), tumuad, tumuad mogad.

**startled**, mokoporog.

**stay**, bantar, minenta.

**steady**, maikang, matân.

**steal**, takoh, mentakoh.

**steel**, (*M*) besi.

**steep**, mapusok.

**stem** (*of a flower*), taunan.

**step to**, kamidau, kidawi.

**steps** (*of a house*), tokad.

**stern**, makotog.

**stern the**, tabing: (*of a boat*) ulin.

**stick a**, sasukud: to stick, dumokut.

**sting a** (*of a wasp, &c.*), tuli: to sting, meningot, manokot.

**stingy**, makalit.

**stink**, mohtong.

**stir**, sasau.

**stocks**, telungkoh.

**stomach**, tinaih.

**stone**, (*M*) batu.

**stoop to**, kamoöh.

**stop**, (*intrans.*) tomangus: (*trans.*) menikog: (*imper.*) sikagih.

**storm**, magangin, angin mapod.

**story a**, tunud.

**stout**, melabong.

**straight**, matulid, makiting.

**stranded** (*of a boat*), makasangut.

**strangle to**, memontol, memontol du liog, bantoloh.

**stream**, susungoi, timog: upstream, darayoh; to go upstream, sumulok, makasulok: downstream, dabugus; to go downstream, mempiugus.

**stretch to**, humanat, membirud.

**strike**, lambah, memalambah, linambah.

**stripped**, lumabas.

**strong**, maikang: (*of wind*) mapod: (*of taste, &c., pungent*) mapodos.

**struggle** (*to wrestle*), magagabuh.

**stubble**, nanantaban.

**studded** (*inlaid*), peropok.

**stumble**, makasadoh.

**stump** (*of tree*), tuod.

**stunned**, ka makaliman.

**stupid**, palui, kandok goang.

**subsequently**, taurih.

**substitute**, magalid.

**succeed** (*be successful*) mopud, makajadi: (*take the place of*) magalid, ginumanti: cf. "asai ginumanti disoh du maiioh" (who took his place as headman?)

**suckle to**, tomitih.

**sufficient**, samah, cukup.

**sugar**, (*M*) gula.

**sugar-cane**, tabu.

**suicide to commit**, nantuoh.

**summit** (*of a hill*), bolud, no-lug.

**sun**, odoh, matanodoh (v. day.)

**sunrise**, sumilah.

**sunset**, melasah, lumasah.

**support** (*to prop up*), tetokud, tetansok.

**sure surely**, (M) tentu, topud.

**suffeited**, nasob.

**surplus the**, noantai.

**surprised**, metambungoh.

**swallow to**, tinolun, melanun, talun.

**swallow** (*the bird*), pandai-angan.

**swamp a**, ranau.

**swarm a**, sampanun.

**swear to** (*take an oath*), mopa-tod.

**sweat**, umos: to sweat, uma-san, magumos.

**sweep to**, isasih.

**swell to**, menimbalud, menimbatal.

**swelling in the neck**, (goitre) anggok.

**swift**, menibok, (of water) mapuun.

**swim to**, domusok, nadusuh.

**swollen**, menimbalud.

**swoon to**, memukad: ka makaliman, to be in a swoon, unconscious.

## T.

**table**, (M) meja: babaloi, a bench.

**tadpole**, tebulu.

**tail**, iku.

**take**, nakalap: (*imper*) alapoh: (*accept*) makiupah.

**take away**, ibitoh: ibitoh mogad ulun nginguh: 'take that man away.'

**take care**, ilai.

**take care of**, (M) piara.

**tale**, tunud, susuih.

**talk to**, daguh, mindaguh: (in one's sleep) magampuang.

**talkative**, mawad gilah.

**tall**, mesawat, of persons, malampas, melangoh.

**tame**, makaup.

**tapioca**, mundok.

**taste to**, iri, mengiri: a taste, iri.

**tasteless**, (*insipid*) mapaloh.

**tattoo to**, papak, mempakak.

**teach**, memumau.

**tear**, mauriak, mohriak: cf. 'ilai duih inuh, tentu mohriak kawal monoh': (mind the thorns, our clothes will be torn.)

**tease**, anjahan.

**teat**, titih.

**tell** (*inform*), berai, nomarah: (*order*) menusup.

**temper**, goang.

**temple the**, piping.

**\*than**, ku.

**that**, talah, ginuh, nuh.

**their**, iroh tampoh, nanoh. (nanoh used after the noun, as M. -nya.)

**them**, iroh.

**then**, timpok inuh.

**there**, tio, tio nalah.

**these**, gitu, talah.

**they**, iroh.

**thick**, makapal.

**thick-headed**, palui, ka maka-goang: kandok goang.

**thief**, mentatakoh.

**thieve to**, takoh, mentakoh.

**thigh**, paha.

**thin**, menipis: (of persons) metukal.

**things**, ('perkakas') kuliamas: (barang) M. barang.

\* The comparative is formed as in Malay, either with or without the word 'makalabih' (more) qualifying the adjective. cf. "Talah maiioh ku nallah."; or "Makalabih maiioh talah ku nallah."—This is larger than that.

- think**, memikirkan: generally paraphrased, as "atok goang da moiun."
- thirsty**, kandok: goang ku nampas.
- this**, gitu, talah.
- thorn**, duih.
- thousand**, saliong.
- thread**, gapas.
- threaten to**, ilalânun.
- throat**, membalangan.
- throb to**, kibut kibut.
- through**, sumunsor.
- throw to**, memuas: mapatias, to scatter.
- throw away**, patidih: noati-dan.
- thunder**, tumparak.
- thus**, koioh, koioh doginuh.
- tick a**, sudib.
- tickle to**, taligogonan.
- ticklish**, taligogonan.
- tide** (*current*) lintagup: high tide, lumuab: low tide, merasak, timog merasak, t. mosat.
- tidy to make**, nakiting: (*imper.*) itingoh.
- tie to**, mengkaput, (*imper.*) kaputi.
- tie up to** (*e.g. a horse*), dakugi: (to bind *e.g. a wound*) bawodun.
- tiger**, mondoh.
- tight**, lanating, maikang: (*drunk*) magaup.
- till**, makasaboi, saboi: saboi inu, till now.
- timbangau**, membaras.
- timber**, tetaun: mentagad, to fell timber.
- time**, timpok: how many times? kain kora? at that time, timpoh doginuh.
- timid**, malâh.
- tinse** (*beads*), manudirau, (*lit. 'bright'*).
- tip the**, munjok.
- tipsy**, magaup.
- tiptoe to walk on**, kamuda.
- tired**, numpai, gumpai.
- to towards**, du: (*as far as*) disum, domisum, makasaboi.
- toad**, pantong.
- tobacco**, (*M*) sigup.
- today**, odoh n'gitu.
- toe**, karindoh keraiam.
- together**, nagagundoh, maba-baia.
- tomorrow**, sasua.
- tongue**, gilah: mawad gilah, talkative.
- too**, tupoh.
- tooth**, dipun: mengasah, to file the teeth: bunganaliu, the canine teeth: bagang, the molars.
- toothless**, narangaban.
- top** (*e.g. of a tree*), umbus: (*of a hill*) bolud, nolug.
- torch**, titiu.
- tortoise**, buh.
- totter to** (*as a drunken man*), mensiling siling.
- touch**, anggai, menanggapi: menanggapi karindoh, to shake hands.
- tough**, maikang.
- tow to**, dalatun.
- towards**, du.
- track to**, mengkakab.
- track** (*a narrow path*), atang.
- track** (*a footmark*), baiak.
- trade to**, (*M*) berdagang.
- trample to**, mongujok.
- transparent** (*as water*), mengining.
- trap**, sarigut, sesigut, jaling, nooses of rotan, used in deer drives: antob, traps for small animals, pelandok, etc.
- travel to**, mogad.
- tread to**, kedawih.
- tree**, tetaun.
- tribe**, (*M*) bangsa.
- trigger of a gun**, dalatun.
- trip to**, makasadoh.
- troublesome**, masusah.
- true**, topud, kepioh.
- trunk**, of a tree, tetaun.

**trust to**, mintopud, malansan.  
**try to**, iri, mengiri.  
**tuba**, tuoh: moipenoh, to fish with tuba.  
**turbid** (*of water*), malutut.  
**turn to**, (*intrans.*) lumikuad.  
**turn into**, (*to become*) mawâl.  
 cf. "butiting timbunus mawâl du pait" (a shooting star becomes a fish.)  
**turn round to**, lumikuad.  
**turn over to**, (*trans.*) timpudokoh.  
**tusk** (*of a boar*), lalangiu.  
**twilight**, mundom.  
**twins**, mongkobun, magabid.  
**twist to**, mepilus, napuak:  
 natoh ioh, mepilus keraiam noh (he fell and twisted his foot).

## U.

**udder**, titih.  
**ugly**, meraht, ka mapasau.  
**ulcer an**, tupas: palakak, an ulcer on the foot, the 'puru.'  
**unable**, ka makadapat.  
**uncertain**, kapo napandaian.  
**uncommon**, melambat.  
**uncooked**, memata, bebata.  
**under**, dariwah.  
**undergrowth**, nomok: dumi-lik, to clear undergrowth, (as opposed to 'memtagad,' to clear big jungle.)  
**understand**, makarerti.  
**unequal**, ka nagagunduh.  
**unfasten to**, sukabun.  
**unfrequented** (*lonely*), masiruk.  
**uninhabited**, nalasun.  
**unmarried** (*of a man*), buai-yoi: (*of a woman*) darâh.  
**unripe**, memata, bebata.  
**unsteady**, menuntor.

**until**, saboi, makasaboi.  
**unwilling**, matiad, ka mesagah.  
**up, to go**, tomakad.  
**up, to climb**, mengkeuah.  
**up, to pull** (*as a weed, &c.*), menubul: (*imper.*) bebuloh.  
**up, to stand**, somukal, kumakal.  
**up, to wake**, (*trans.*) mengadat, (*imper.*) kadatoh: (*intrans.*) kumalat.  
**up and down**, tunun om tomakad.  
**upon**, disawat.  
**upset to**, mesasad.  
**upside down**, nalikuat.  
**upstream**, daraiioh: to go upstream, sumulok, makasulok.  
**use to**, (*M*) pakai, memakai.  
**use**, (noun), (*M*) guna.  
**used to** (*accustomed*), maindaram: (in sense of 'formerly') garing, pun noh garing. cf. "pun noh garing ih mamok keningau du Keningau gitu, daitu poioh kandok bagoh": (there used to be a quantity of cinnamon at Keningau, now there is none.)  
**uselessly**, palaloh.

## V.

**vain**, makomoh, sumantuh.  
**vain in**, palaloh.  
**valuable**, matang, maiioh gatang.  
**value**, gatang.  
**various**, nakapinansusuai: cf. nakapinansusuai, makondoh ioh meriah makondoh mapurak: "of different sorts, some red some white."  
**vast**, maiioh.  
**vegetable**, inapah: punuh, the 'umbut,' (the palm-cabbage.)  
**vein a**, uat, uat mosat.

**venomous**, mabisa.  
**venture, venture-some**, banih.  
**very**, kepioh: ka korah, not so very, (*M.* 'tidak brapa.')

**vex to**, anjahan.  
**vexatious**, masusah.  
**vicious**, meraht.  
**victuals**, lutuh.  
**vigorous**, maikang.  
**village**, pagun: memagun, to inhabit: sampagun, to live in the same village as another.  
**violate**, ginabuh.  
**virgin**, darâh.  
**visit to**, mapid.  
**voice**, daguh.  
**vomit to**, mempaluah.

## W.

**wad**, (of gun barrel) unal.  
**wade to**, (breast deep) tongkorun.  
**waddle to**, mengkilus kilus.  
**wag the tail**, magusoh iku.  
**wages**, (*M*) gaji.  
**waist**, ansang.  
**waist-cloth**, ('*chawat*') abag.  
**wait**, makinah, danih: 'danih aku poh,' wait for me.  
**'wait a moment,'** kapoioh.  
**wall**, bumbong.  
**wallow a**, luluiun: to wallow, magaluluoi.  
**walk to**, mogad, makogad: to go for a walk, mabinsaloi.  
**wake to**, (*trans.*) mengadat: (*imper.*) kadatoh: (*intrans.*) komalat.  
**want**, mesagah.  
**warm**, melassu.  
**\*was**, noioh.

**wash to**, pupuiun: madioh, to bathe.  
**wasp**, meningot.  
**waste to**, patidih.  
**water**, timog: sagoh, to take water from a stream in a piece of bamboo: semûk, menûk, to take water by means of a tin or bamboo tied at the end of a stick, or rope: cf. the Suk river, so called because water had to be taken in this way on account of crocodiles.  
**water to** (*flowers, &c.*), uasih: to pass water, sumabuh: fresh water, timog mapaloh: salt water, timog mapadih.  
**waterfall**, bosoioh.  
**wave a**, lakun.  
**way a**, baian, dalan: 'atok dalan moi du....?' (which is the way to....?)  
**way get out of the**, lumisang.  
**waylay to**, magawang.  
**we**, akai: takau.  
**wealth**, dapu.  
**weapon**, aniban.  
**wear to**, (*M*) pakai, memakai.  
**weary**, numpai.  
**weave to**, tinalud.  
**web of spider**, tambunan.  
**well a**, tagarusoh.  
**well**, (*adv.*) mainseu.  
**wet**, masah.  
**what?** atok?  
**what's his name**, ianu.  
**when?** sangira?  
**where?** atok aien, atoien?  
**where to?** atolian?  
**where from, whence?** atok intod?

\* Noioh is used to express the past tense, as Malay "sudah" e.g. Mopatoi noioh daih, he died yesterday. Noadil noioh ioh timpok ioh sagoh, she was shot while taking water. Nomatoi noioh taloh ulun, he killed three men.

**wherever**, atok atok.

**whet to**, magasah.

**whetstone**, pagagasah.

**which**, (*interrog.*) atok? 'atok knih tampoh, gitu kia talah kia?' (which is mine, this or that?): (relative) (not used).

**while**, timpok: cf. 'he was drowned while crossing the river': nopatai ioh losud timpok ioh memeripag sungoi.

**whine to** (*of a dog*), mogaum.

**whirlpool**, diruh.

**whisper to**, mogokonus.

**whistle to**, magisisrup.

**white**, mapurak: -haired uan.

**who?** asai?

**whore**, mamalapau.

**whorl** (*of finger print*), diruh du karindoh.

**whose?** asai tampoh?

**why?** akiah? atok kosun? atok kosoi?

**wicked**, meraht.

**wide**, mapilah, dumopoh.

**widow**, mapod.

**widower**, magalang.

**wife**, andu.

**wild**, mesioh: (*of fruit, &c.*) kasarawan: used in sense of Malay 'utan,' as buah kasarawan, a jungle fruit.

\***will** (*future tense*), daka (*seldom used*).

**win to**, (*M*) menang.

**wind**, (*M*) angin: angin mapod, a strong wind.

**wind to**, padunun, balunun, ginolong.

**winding** (*of a river*), talingkong.

**wing**, kawoh.

**wink to**, mangaritub.

**winnow to**, meniri.

**wipe to**, arus, magarius, mengkaiah.

**wire**, (*M*) dawai.

**wise**, makagoang.

**wish to**, mesagah.

**with**, du: "ioh memalambah daki du burung": (he struck me with a parang).

**withdraw to**, lumisang, lisang.

**witness a**, (*M*) saksi: (*to see*) mokitoh.

**woman**, doandok.

**wonder to**, metambungoh.

**wood**, tetaun: tagas, bilian: panopok, 'selangan batu': opil, ipil, mirabau: banati, temasu: jahalan, camphor wood: tambulalas, a hard wood that sheds its bark.

**woodpecker**, pempalit.

**work**, (*M*) kreja.

**worm**, ulod: lingguong, the tape-worm.

**worn out**, gansing, mapasah.

§**would that**, dan.

**wound a**, ramat.

**wounded to be**, maramatan, mepidis, matimpasok.

**wound one's foot**, (*with a thorn, suda. &c.*) makasumpak.

\* e.g. "Makajadi poioh, daka aku domatong sangodoh susuab." or Makajadi poioh, aku domatong... (If possible I will come tomorrow).

§ Used at the end of the sentence, e.g. 'Domatong ioh dan, baguh om mainseu goang ku.' (Would that he would come, then I shall be content 'Domassam iak dan ..' (Would that it would rain...)



**wrap up to**, mengkaput, lapotun: (*imper.*) kaputih.

**wrestle to**, magagabuh.

**wriggle** (*as a snake*), mengkilus kilus.

**wrist**, tantod.

**wrong**, (*M*) salah, ka mapatut.

## Y.

**yawn to**, maguap.

**year**, bilod, sambiladan: reckoned by the padi harvest, ('bilod,' padi) from the time the jungle is cleared, to the end of the 'panawongun',<sup>2</sup> roughly 13 months.

**yearly, every year**, bilod bilod: cf. "membalai takau bilod<sup>2</sup> wang kepala": we pay poll-tax yearly.

**yell to**, lumakuih, gumagang.

**yelp** (*of a dog*), mantangak.

**yes**, iau.

**yesterday**, daih: the day before yesterday sanda daih, sangodoh daih.

**yet not**, kapoioh.

**you**, okkoh, koh, diun: (*plur.*) da moiun, kauah.

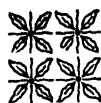
**young** (*of persons*), dalaing: (*of things*) melabong.

**your**, (*sing.*) okkoh tampoh, moh: (*plur.*) da moiun tampoh, moh.<sup>3</sup>

## Z.

**zealous**, merajin.

**zigzag**, malikoh, madiruh diruh.



<sup>2</sup> 'Panawengun', the two months after harvest before the new crop is planted.

<sup>3</sup> Moh is used after the noun, as 'Korra dangan moh?' How many companions have you?

# Additions to a Vocabulary of Brunei-Malay.

BY G. T. MACBRYAN.

Having seen the above vocabulary in the April number of the Journal I venture to forward a few words which I think are peculiar to Brunei-Malay and are not included in Mr. Marshall's list.

I also have the temerity to enclose a list (B) of words of which I have always found a different meaning to that given by Mr. Marshall or a different pronounciation.

<b>Anai.</b>	White-ants.
<b>Antah.</b>	"I Don't know" ( <i>Entah</i> , Sarawak Malay).
<b>Bagong.</b>	Boat, a boat of same make as " <i>Koleh</i> " (S'pore).
<b>Bari.</b>	To give = <i>bri</i> . Also <i>membari</i> and <i>bra-kan</i> , ( <i>bri-kan</i> ).
<b>Benasa.</b>	Broken, smashed.
<b>Bergalap.</b>	To play.
<b>Berjarang.</b>	To cook.
<b>Berkasi.</b>	To sneeze.
<b>Berlurih.</b>	To obtain, catch ( <i>ber-ulih</i> ).
<b>Bersual.</b>	To answer back.
<b>Biang.</b>	Friend.
<b>Bini.</b>	<i>Bini-bini</i> = Female of human beings.
<b>Dami.</b>	Like, manner. As <i>dami ani</i> = like this; <i>dami-atu</i> = like that.
<b>Gulaian.</b>	Vegetables cf. Dayak <i>gulai</i> = mix.
<b>Jangkau.</b>	To reach out (of the hand) conf. Winstedt <i>menyangkau</i> (Selangor).
<b>Jilama.</b>	A man, human being.
<b>Kada.</b>	<i>Kapada</i> = to ( <i>Brakan kada dia</i> = give to him).
<b>Kepang.</b>	Shingle (of roof).
<b>Lalai.</b>	Slow.
<b>Lundong.</b>	Lazy.
<b>Malai.</b>	(1) Compassion, good feeling. (High-class Brunei) conf. <i>Milanau</i> " <i>lai</i> ."
	(2) Accustomed, used to = <i>biasa</i> .
<b>Manas.</b>	Beads.
<b>Pachah.</b>	Blind ( <i>pichah</i> ).
<b>Pampang.</b>	(2) Stocks.
<b>Paya.</b>	Swamp.
<b>Payah.</b>	Troublesome.
<b>Ruang.</b>	A numeral co-efficient used of boats, etc. <i>Gobang saruang</i> = one boat.

<b>Sambat.</b>	Early.
<b>Tadak.</b>	Tattooing v. = <i>bertadak</i> (Sar. <i>Tedak</i> ).
<b>Tambus.</b>	To come out = cf. ' <i>tebus</i> .'
<b>Tamu.</b>	Meeting place (lit) for trading purposes, market, conf. <i>bertemu</i> .
<b>Tebassan.</b>	A farm lit: 'a clearing.'
<b>Tempuan.</b>	A short cut (a path cutting across a tanjong).
<b>Tuhus.</b>	To recede (of water, of flood in river).
<b>Uchap.</b>	Speech verb = <i>beruchap</i> .
<b>Undang.</b>	Prawn.
	<i>Undang siar</i> = the sea prawn.
	<i>Undang galah</i> = large fresh water prawn.

**List B. Variation from usage given by Mr. Marshall.**

No. 6.	<b>Alai.</b>	To dance (specially a war dance) not "to play music."
„ 23.	<b>Antai.</b>	<i>Entai</i> .
„ 60.	<b>Bebun.</b>	To collect, gather together.
„ 14b.	<b>Beribun or Bibun.</b>	To talk nonsense, trifle.
„ 116.	<b>Indong.</b>	a. Female (of an animals) cf. <i>bini</i> . b. Mother or aunt (of human beings). c. The principal, most important viz. <i>tiang indong tangan</i> .
„ 127.	<b>Ekong.</b>	<i>Ikong</i> (long ēe).
„ 128.	<b>Endah.</b>	<i>Enda</i> .
„ 130b.	<b>Eris.</b>	<i>Iris sa-iris</i> = a slice cf. <i>mengiris</i> = to slice cf. Winstedt <i>hiris</i> = slice onions.
„ 143b.	<b>Gelaga.</b>	<i>Gelagah</i> .
„ 174.	<b>Jangku.</b>	<i>Jang-ku</i> = said I. (Maxwell's translation correct).
„ 196.	<b>Kalabat.</b>	Gibbon monkey. ( <i>Wa-wah</i> ).
„ 266.	<b>Luargan.</b>	<i>Luagan</i> or <i>logan</i> meaning a lake or pool.
„ 409.	<b>Siabun.</b>	<i>Sabun</i> .
„ 450.	<b>Tajok.</b>	The meaning given by Mr. Marshall is the usual Malay meaning, but I have always heard Brunei's use this word with reference to the frame-work supporting the roof of a boat. The same as the " <i>Kundang</i> " of Sarawak Malay conf. Dayak <i>tajok</i> .

# The *Akuan* or Spirit-Friends

BY ZAINUL-ABIDIN BIN AHMAD.

There are more things in heaven and earth, Horatio,  
Than are dreamt of in our philosophy.

Shakespeare's *Hamlet*.

*Akuan* is the term generally in use among Negri Sembilan Malays to designate the Spirit-friends which certain individuals among them are believed to have from among the inhabitants of the spirit-world. Other terms are used in other parts of the Peninsula, and the belief varies with different states in matter of details. In this paper I am speaking of it as it obtains in the "Nine States," particularly those portions of it inhabited by the descendants of the old Mēnangkabau tribes. The persons credited with the possession of the spirit-friends are usually those having some pretension to the knowledge of a *parang*, a diviner, or a medicine-man. They may be men or women, "wizards" or "witches," but in either case they are almost always past middle age. The word *akuan* is derived from *aku*, to own or to claim as one's own; while the thing owned is supposed to be a spirit which may either remain in its natural airy state—a sort of Ariel to the Malay Prospero—or may take the shape of the body of some animal, ordinarily a tiger, for its permanent residence. The "owner" may possess one or both of these two types. But if he is master of the first type, he is as a rule master also of the second. As for the first type, their "owners" are mostly men, and the number of *akuan* belonging to each owner is always more than one, ranging from three or four to a dozen or more. They may be male or female, but more often the latter if the owners are men. Their relationship to the owner is, without exception, that of old acquaintances rather than of intimate friends or of servants and master. Hence, they are less under control and never so devoted to the owner as the animal type. Some far-off locality is assigned to each of them as dwelling place—such and such a mountain, rapid, *kēmpas* tree (*Cumpassia malaccensis*), ravine, plain or forest. The names by which they are mentioned are not proper names, but merely epithets descriptive of their sex and dwelling. They do not come unless ceremonially conjured in a solemn séance-like fashion. This is only done when their aid is imperatively needed on the occasion of very urgent sickness which has taxed all the wit and skill of the medicine-men to cure. Otherwise it is considered improper or even sacrilegious to mention them.

The method of conjuring them, which is more or less the same in main details for every "owner," may probably be of some special interest to students of modern Spiritualism. A general description of it like the following which has been gathered from a number of villagers who have themselves seen the proceeding independently of each other at different places and times, may be obtained almost anywhere among the rustic population of Ulu Jempul, Kuala Jempul, Batu Kikir, Juasseh, Sungai Dua, Sëri Mënantî, Rëmbau, Jëlëbu, Lëngging, Bëranang and other places. The ceremony is called *Bërëjin* (from *Jinn*, genii or demon) or *Bërhantu*, literally to call up spirits or to have spirit-meetings. It is always performed during the first part of the night at the patient's house, and occupies some three hours, say from 8 to 11 p.m. The function being one not often met with, the people within one mile and a half around regard it with great interest and come to attend in crowds. The "owner" of the *akuan* plays the part of a medium, and some one, usually his wife or one of his closest lady-friends or pupils, takes up the rôle of an interpreter, as the medium will talk in some language unknown to the uninitiated audience. Before the meeting begins the preparations for it have to be got ready. This consists of *bërteh* (toasted wet rice-in-the-husk), three or five or seven pots (*përëni* or *buyong*) of water, betel-leaves and all their accompaniments arranged in the most ceremonial manner in a richly ornamented *bujam*, or *përminangan*. To all these are added new, rich little mats, spread specially for the expected spirit-guests, so that the scene presented "is just like one when there is going to be a marriage ceremony" (*macham orang na' nikah*). All the relatives and friends of the patient are informed and asked to be present, as the occasion will finally settle whether the sickness is curable or fatal. As the expected hour comes, the actor of the evening arrives. All is now solemn and silent. He takes his seat on the rich mat reserved for him near the other articles of preparation. He veils his face, and then recites some strange songs of invocation in a weird appealing tune, and in a language partly unintelligible. He begins to be unconscious as the trance state of mind gradually overmasters and takes possession of him. He shivers terribly while the smell and smoke of the burning incense (*këmënyan*) becomes suffocatingly diffused in the air. He may dash his hands and feet against the floor and his body against the wall. He may even rise, walk about the room, throw off his veil, disclose his flashing blood-shot eyes, sit upon the earthenware pots, snatch some of the red-hot cinders from the incense-urn (*përasapan*, *pëbaran* or *tëmpat tara*) and chew them in his mouth—all these without causing himself the least injury. The house shakes and the spectators are full of awe. As the medium grows more and more frantic in his movements and recitations, the spirits invoked come one by one. Sometimes only one of them turns up, the others excusing inability. If they are Moslems their greeting on arrival would be "*Assalâmu 'alai-kum*" communicated through the me-

dium by the interpreter. Those of them who are not Moslems employ some other polite formula. At each arrival the interpreter introduces the guest to the audience—as Dato' of this mountain or that mountain, etc. They are, of course, not visible but to the unconscious medium who, through the interpreter, most politely motions them each to their reserved seat. When all have arrived and seated themselves, one of them asks: "What is it that you all want, friends, that you call us? We shall always be pleased to do you any little service that we can." These words are spoken by the medium to the interpreter in a strange language. On their being interpreted, the relative sitting closest to the patient speaks out, describing the patient's sickness, the length of the time he or she has suffered, the powerlessness of the medicine-men to cope with it, and asking for an explanation of the cause, the possibility of cure, and the treatment for such a cure. The interpreter communicates this to the medium who, as the embodiment of all the spirit-guests for the time being, replies after a few minutes' real or pretended meditation. The reply will be that the sickness was caused by such and such evil influence (*kētēguran* or *badi*); malicious persons (*di-buatkan orang*) or whatever it may be, at such and such place and on such and such occasion: that such and such is the treatment for its cure. Or he might say: "This so-and-so's sickness is incurable. There is no hope. Be resigned." If many of the spirits are present, they all agree in the decision given. This done, they all leave; and after some half-an-hour's more exertion, the medium comes back to his senses, extremely exhausted. He will immediately quit the house without a word, and go home accompanied, it is alleged, by "his" mysterious tiger.

On the other hand, if the *akuan* is one that permanently assumes the form of an animal, it is to all appearance sexless. Even if it belongs to any particular sex, the distinction is regarded indifferently. As for number, never or very seldom more than one of such animal-*akuan* belong to any one master. But that one acts towards him more like a faithful attendant than a far-off friend. The animal is not known by any special name. Its dwelling place depends upon the nature of the animal whose form is adopted by the spirit. Mostly the form adopted is that of a tiger, and so it lives in the forest over which it is supposed to wander like all ordinary tigers. Its assistance is not invoked, as it is always ready to help when the need arises, provided such emergency occurs, so to speak, within its "sphere of influence," that is to say, where it can make its appearance consistently with its natural form. A tiger, for instance, cannot live in the water, but in the jungle or in the dark it can render services to the "owner" in many ways. When he loses his way in the forest, the tiger would come and lead him out by distinct marks and scratches on the ground. He has no cause to fear anything, as the spirit-beast is always close by, assuring him of assistance and protection by making familiar

noises. Those in the company of the "owner" at such times may feel justly frightened. The more courageous of them may be inclined to use their weapons. But the master of the *akuan* will keep on urging: "Be reverent and silent. It is nothing. It is our protector. It need not cause any alarm, nor should any harm be done. There is no danger." And so on and so forth. What he says always turns out true, and never a mishap has been heard of, though the monster really does keep pace with them not many yards away. Besides these the tiger would do the master other services also. Such little courtesies as scaring away thieves and mischief-makers from his house are common-place examples. Popular belief goes even so far as to say that, in extraordinary cases, the "owner" even rides on the tiger when he goes out at night.

I knew an old woman at Bukit Kerdas (Jempul) who died three years ago and who, besides having a reputation as a fairly successful medicine-woman, was believed to have *akuan* of both descriptions. The spirit type were seven in number, scattered all over the country, and the animal type was in the form of a tiger. Her husband from whom, it is said, she inherited these *akuan* as well as her art of medicine, had died many years previously. Many people believed that the husband turned into a tiger after his death (see "The Tiger-Breed Families" Journal 85, pp. 36-39) and that the tiger-*akuan* was no other than himself. The spirit-*akuan* were conjured many times. Once the old woman herself was seriously ill. In her illness she herself invoked their assistance, and she got better. But during her last illness nothing came, and she died. The tiger-*akuan*, on the other hand, used to accompany her when she went into the forest, or was going out at night. Besides, the animal always came to the rescue whenever she or any member of her family happened to fall into circumstances which made them wish for companionship and protection. Many curious incidents occurred as evidence of the animal's attention. One, quite romantic, was as follows: The old woman had a pretty daughter (who is still alive). As is usual with love-sick Malay swains, those who entertain a fancy for a girl, delight to go stealthily to the house of their lady-love at night to be able to steal fuller glimpses (*měngintai*) of her face and doings than they could ever do anywhere during the day. Now, in the present case, two lads were specially enamoured of the young lady. One night the two arranged to go to *měngintai* to the house. Many friends had warned them that the house was always guarded by the old woman's tiger. But partly impelled by the desire to test the report and more especially by mad love, they decided to act against the warning. When they reached the house and each had taken up a position to command the view through the chinks in the bamboo walls and floor, they succeeded in enjoying the coveted sight only for a few moments. On one of them turning round to relieve his strained neck and eyes, he found himself, to his unspeakable horror, face to face with a tiger, sitting about two yards from him and watching

apparently with great interest what he and his companion were doing. He pulled back his companion and the two had to beat a retreat as stealthily as they had come, and make the best of their way home, resolved never to try the experiment again in future.

Another one: On one occasion the old woman was spending a night at a friend's house about half-a-mile away, leaving only her daughters and grand-daughters at home. As they were sitting with their mat-plaiting and basket-work and chatting light-heartedly they heard the silent panting of an animal like a cow under the house. On turning their torches upon it to see what it was, they found it to be a tiger. So terrified were they that they put up wild screams for help till people came, and the tiger sneaked away into the darkness. (I can vouch for so much of the story as a fact, for I was one of those neighbours who heard the screams and went to help). The old lady came home and told them that the beast was only keeping them company and protecting the house. If they had harmed him, she told them, some terrible catastrophe would certainly befall the family. On another occasion, the old lady with three of her granddaughters went out *mēnimba* (i.e. fishing by baling dry the water of a shrinking pool and then catching the fish—a favourite pastime in the village during the hottest part of the year) at a certain pool close by the road-side. When they had baled the pool dry and were beginning to secure the fish, one of the party saw two tigers crossing the road in their direction from the thick jungle on the other side. The grand-mother's attention was instantly called, and she, realising the danger, had no other alternative but to tell them to be quiet and calm. Suddenly from beneath the scrub, a few yards away between them and the two tigers, rose a third and bigger tiger. Without seeming to notice the panic-stricken youngsters, the beast walked right towards the advancing pair, and after persuading them, as it seemed, to turn to another direction, he marched away from the scene. The two followed suit. But the young girls could not regain control of their nerves, and their grand-mother had to hurry them home, taking only whatever fish they had caught and leaving the remainder without further search.

It may be added as a digression that the grave of the old lady's husband used to be regarded by many as an object of pious reverence. The *chēm̄paka* trees (*Michelia champaca*) planted over it were overhung with strips of white cloth (*panji-panji*) as emblems of sanctity, and indications of the number of "vows" (*niat*) that had been paid there. I daresay they still continue to be so overhung at the present time. Credulous people have for long been attracted to "make their vow" by the grave. Incidentally, this practice may be described here in a few words: A person, for the fulfilment of some great prayer, "makes a vow" saying: "If I recover from this illness" or "If a male baby be born to me" (or whatever that desire is) "I will cut two goats at so-and-so's grave and call people to eat there." If the prayer is granted he



goes there to execute his promise. He cuts (*sěmběleh*) the promised goats or whatever it may be; cooks some saffroned-rice (*nasi kunyit*), invites people to eat, has prayers of thanksgiving (*do'a selamat*) read for him by some *lěbai*, (cf. Skeat, *Malay Magic*, p. 42), and fires some big crackers as expression of peace and joy. Thus he "pays his vow," discharging himself of the binding promise he made to the spirit of the grave. If he fails to do so the spirit will appear to him in a dream demanding fulfilment, and in case of further default some untoward event is certain to follow.

One more story about the tiger-*akuan* will finish the matter. A man living in Měmpanas, an outlying corner of Kuala Pilah, on the right bank of the Muar River, told me that he once had a long illness. No effort of the medicine-men was spared to restore him to health, and yet he did not recover. But he had a tiger-*akuan* which, by the way, he is believed to have even now. During his delirium the animal appeared to him and told him that his affection had become chronic and that his only chance of life would be in having his body licked by it. On coming to himself, he told this to his people and asked to be exposed the following night in the open verandah without any light. This was done. The door was bolted and the people kept themselves inside breathlessly watching what was to happen. The tiger came, stripped him naked and began to lick all over his body, so that the "lip-lap" sound of its tongue was clearly heard. Then it went away leaving him drenched with its salivary fluid. Two days after, he was completely cured.

The *akuan* in the shape of any other animals than tiger is probably very rare. I have heard only of one single case, occurring in Juassch, where a certain man is reported to have a *crocodile-akuan*, living in the river opposite his house. He feeds it, treats it kindly and at his call the animal comes up to the surface. He is even said to ride upon the animal's back when necessary. Nobody but he dares to bathe in that part of the river. The crocodile is always there. According to his own story, the spirit came to him in a dream asking to be "owned" and protected (*běla*) in return for which it would look after the water-supply of his paddy-fields, bring him luck and protect him and his family from evil spirits. He accepted the offer and was told that he could always find the new friend in the shape of a crocodile in the river opposite his house. The next day he found this to be true, and thenceforward he has been the "owner" of the crocodile. The terms of agreement seem to have been faithfully adhered to by both. The man gathers in a good harvest every year,—quite above the average,—is always at ease and contented, and never gets ill, neither any member of his household. One striking fact about this case is that the "owner" is no *medicine-man*. The animal is not to be harmed, or all the benefits accruing from its friendship will be withdrawn, and some disaster threatened to the unfaithful "owner." Before the animal came to this man it had offered it-

self to a woman-neighbour of his. But on its commencing to stay in the river in front of her house, the woman's people disturbed it with sticks and fish-spears (*tirok*) so that the animal could not rest in peace. When it was leaving the place, the woman had a dream in which the spirit said to her, "I (*awak*) desired to act to your profit, but it seems you do not care to have my service. You disturbed me. Now I don't want to have anything more to do with you. If you want my friendship again you must sacrifice one of your children to me." I do not know if any similar case occurs anywhere in the Peninsula.

To sum up: such are among the alleged phenomena purported to lend support to the numerous spirit-beliefs of the Malay peasantry. An upholder of the doctrine of Transmigration of Souls may possibly be tempted to suspect some connection between this *akuan*-belief and the doctrine. But apart from mere suspicion, there is nothing in the popular conception of it to show that its believers have even the barest idea of that theory. The "owners" themselves never have any such idea. But that the *akuan* may pass down as a legacy from parents to children or from a dead husband to a surviving wife appears to be a generally accepted possibility. With the introduction of modern ideas and surroundings the belief in *akuan* is gradually dying out among the younger generation of Malays. But among their old-fashioned elders of the purely conservative type, whose contact with this new influence has not gone to any extent beneath the surface, the grip of the belief and other kindred superstitions is still very strongly in evidence. However, it is remarkable that in matters of this kind, investigators can hardly have much data to go upon owing to the scarcity of "actual cases." One must also allow for the Malay habit of exaggeration and their fondness for the marvellous and mysterious. The same applies to the wide-spread belief in *polong*, *pontianak*, *pénanggalan*, *pélèsit*, etc., etc., which is now confined only to the most superstitious. The difference between the *polong*, *pontianak*, etc., and the *akuan* is that the former are malignant spirits, kept for inhuman purposes, (cf. Skeat, *Malay Magic*, pp. 327-331) while the latter are good and serviceable auxiliaries.

The Muhammadan religion, it is true, discountenances all such belief in the powers of the devils. Any recognition of a power, other than God, as a being superior to man is repugnant to it. But ignorance is as much a power as knowledge: where it exists the impossible becomes possible. The most opposite beliefs and doctrines can subsist side by side in two water-tight compartments in any raw and uncultivated mind. And so it is with the majority of the Malays. With all these they "are among the most orthodox of Muhammadans."

# Points of the Compass in Kedah.

BY A. W. HAMILTON.

Amongst the inland Malays of Kedah more especially in those districts where the Siamese language is still prevalent the usual Malay terms for expressing the points of the compass (*utara, sčlatan, timor, barat*), are not in use except as designations for the direction of the wind and the seasons dependant on them (*i.e.* *angin barat* a west wind or *musim timor* the N. E. monsoon).

The current terms in use in daily life to express the relative positions of objects or the direction of a road, etc. are as under:—

North. Kaki tidor.  
South. Kěpala tidor.  
East. Mata hari naik.  
West. Mata hari jatuh.

A man will thus describe his house as being *sabělah kěpala tidor* or South of somebody else's abode; and if asked where he was sitting with reference to another person might reply "*dia dudok di sini, dan saya dudok di sabělah kaki tidor nya*" *i.e.* he was sitting here and I was sitting on the north side of him.

The expressions *mata hari naik* and *mata hari jatuh* are of course common to the whole peninsula and the sentence *dia sudah pěrgi sebělah mata hari naik*. He has gone East would be understood anywhere.

The curious local expressions *kěpala tidor* and *kaki tidor* appear to have arisen from the invariable orientation of Siamese houses which are built with their axis East and West, the entrance facing the rising sun.

The occupants when lying down for the night in their rather narrow dwellings are thus constrained to lie across the house with heads to the wall and feet to the centre so that all the heads in a village will be pointing one way, *kěpala tidor* or South, and all the feet another, *kaki tidor* or North.

## The Grave-Stone of Sultan Mansur Shah of Malacca.

BY ZAINUL-ABIDIN BIN AHMAD.

The following suggestions with reference to Mr. J. P. Moquette's scholarly paper on the above subject translated by Dr. Winstedt in J. R. A. S., S. B. No. 85 may not be out of place here:—

(a) That the word **المرحوم** which comes *after* **مظفرشاه** in Mr. Moquette's reading of Plate I be placed immediately *before* **مظفرشاه**; firstly because *that is* the usual order (i. e. *al-marhûm* first and the name of the deceased following) when the expression is used, especially by the Malays; and secondly, seeing that the word **السلطان** which lies directly above the word **منصور**, (see third line in Plate I) is read *before* **منصور**, it follows that the word **المرحوم** which lies also directly above the name **مظفرشاه** can also be read first. As far as I can judge from the plate, nothing seems to be there that makes it particularly necessary to violate usage and read **المرحوم** last.

(b) That the reading of **دارالمآل** (*dâri-'l-ma'âl*) be substituted in place of **دارامال** (*dâri âmâl*). For this I have several reasons:—

(1) **دارآمال** is not compatible, as far as rhythmic flow is concerned, with **دارالحال** with which it ought to correspond; because the latter (i. e. **دارالحال**) has the article **أل** and the former has not. From a grammatical stand-point there does not appear to be reason enough that **دارالحال** should have the article and **دارآمال**

should not. But if, to avoid all this, we use **أَل** and say **دارالآمال**, the clear-cut shape of the word in the inscription does not justify our doing so.

(2) **آمال** is the plural of **أَمَل**, and the word "hope" which is given for the translation can only be suitable if the Arabic is in the singular form. Besides, **آمال** is pronounced with a long vowel on the first syllable, and thus spoil again any rhythmic agreement with **محال** of which the first syllable is short.

(3) If the form **المآل** is substituted, the agreement in rhythm with **المحال** is readily established, for the two would then be of the same form (noun of place) derived from roots of the same measure. The combination makes a perfect little rhymed-prose, with apparently punning sound—a feature so commonly prominent in short Arabic maxims and pithy sayings—such as would become any epitaph.

(4) The meaning of **دارالمآل** which is "the abode of return" or "The Final Abode" would just suit **دارالحال** which is the "abode of change" or "The Transient Abode".

(5) In an inscription where, as in any monogram, the letters and different parts of the words are highly interwoven, it is not uncommon to find that one and the same stroke serves the double purpose of representing two letters of like appearance, or that two or more letters of more or less the same form become blended into one, or even die away in the meshes of loops and flourishes. In this light I think we are quite justified to assume that in the in-

scription the first "l" of the word **المآل** is partially blended in the final "l" of the same word. (See the first line of Plate II).

No doubt the changes suggested here are not of much consequence. Still I hope they make for some improvement on the reading so far deciphered.

It might be well also to call attention to the little misprints in spelling, which might be overlooked and might later lead to real mistakes:—

(a) The first السلطان (*as-sultan*) in the reading of Plate I should be written للسلطان (*lis-sultan*) as we find it correctly written in the Romanised reading; and the word منصو(ر) should read منصو(ر)

(b) The words بسم الاربعاء on page 3 should, I think, read يوم الاربعاء

(c) The words ليس الدنيا (*lais a'd-dunia.*) in the reading of Plate III should read ليس للدنيا (*laisa li'd-dunia.*).

That the “n” of السلطان and the “r” of Mansur cannot be traced may indeed be due to the mistakes of the mason. So also may the absence of any dots or diacritical points (*titek*) from the inscription be accounted for. But it is quite possible also that both have their explanation in (b) 5 above, or may have been worn out because of their smallness.

On any other matter regarding this subject, I am not able to form any independent idea; nor have any strong view to express beyond that, in my opinion, the reconstructions are really very ingenious, and the reading certainly much more acceptable than the one which used to be accepted before it.

# **The old Kedah-Patani Trade-route.**

BY A. W. HAMILTON.

A glance at the map will shew that the whole length of the boundary between Kedah and Siam from the Perak border to the Perlis frontier consists of irregular masses and chains of hills rising in places to a height of more than 3,000 feet.

The actual boundary is an imaginary line between certain fixed points on the crests of these hills following the watersheds so that all streams flowing westwards are within Kedah territory and these flowing to the east within the dominions of Siam.

The whole of this frontier region is covered with a thick forest growth which renders it almost impassable except in certain naturally favoured regions to the passage of human beings.

In the course of time man in his journeyings has discovered the easiest passages through this chain of hills and has gradually confined himself to certain definite tracks which usually follow the beds of streams until some suitable vantage point is reached for crossing the divide.

From very early times it must have been known that the easiest and most direct trade route between the thriving Malay States of Patani and Kedah was through the defile known as Gënting Pahat. The chiselled-out pass (Boundary Stone No. 34), and until the completion of the railway from Patani to Senggora and its continuation thence to Kedah this route was still in vogue for the droving of cattle and the passage of Patani field labourers to Kedah territory for the rice harvest.

As this route in its latter stages has seldom been traversed by Europeans and as the rapid development of road communication in Kedah may at any time bring it into prominence again a short description of the route as it was in June of this year may not be without interest.

Leaving Alor Star in a motor car a short hour's run along a new and good road brings the traveller to Kuala Nërang twenty miles distant where the road ends on a bluff a hundred feet above the river and some two hundred yards below the confluence of the Padang Tëräp and Pëdu streams. Kuala Nërang is a growing village and the headquarters of the whole district of Padang Tëräp which stretches as far as the Siamese frontier.

Crossing the river at this point the route follows the right bank of the Padang Tērap stream sometimes approaching within a stone's throw of the river and at others diverging from it to a depth of half a mile or more owing to the sinuous nature of its course. The country is open and roughly cultivated by Malays who have planted sporadic groves of coconut durian and other trees whilst themselves living near the banks of the main river and planting rice wherever the configuration of the ground admits.

The first kampong of any importance is Bēlimbing after which at about the third mile a range of low hills called Bukit Kēpah is encountered which have to be skirted before emerging on the plain of Padang Tērap which used to be the site of the headquarters of the district until they were moved to Kuala Nērang some eight years ago.

The path now crosses the Sungei Sari a small shallow stream which descends from the region of the mines at Pintu Wang and touching the outskirts of the villages of Padang Chēnērai, Poka and Pēring leads to the kampong of Padang Sanai where there is a Police Station on the banks of the river.

The distance from Kuala Nērang to Padang Sanai is roughly ten miles and the traveller who wishes to do so may return from here to Kuala Nērang by perahu being poled down stream in twice the time which it takes to walk.

Leaving Padang Sanai the way at the end of a mile passes through the village of Pēngkalan Pa Tanai where there is a Siamese wat of bamboo construction and then fording the main stream which is by now only a very clear burn running swiftly over a bed of shinning black boulders and pebbles strikes for Kuala Sēraya where there is a moribund Quarantine Station with a solitary Malay in charge and an already defunct Police Station.

The distance of 3 miles between Padang Sanai and Kuala Sēraya consists of a stretch of flat open and almost park like land dotted with young trees of no great height, but after this the country becomes more thickly wooded and its surface is broken into ridges whilst the path follows the parent stream more closely and every now and then descends into it and emerges on the further bank only to cross the sector of a bend and dip into the stream again.

At Kuala Sēraya the stream divides the left hand branch proceeding N. W. to Kampong Sēraya 3 miles distant which is a large village of some sixty Malay houses, whilst the main stream continues on to Kampong Durian Burong which is at a like distance from Kuala Sēraya.

Between the Quarantine Station at Kuala Sēraya and the village of Durian Burong which is a Malay village of 20 houses standing pleasantly in rice fields and groves of coconut and betelnut



palms there are no human habitations, and the country remains untouched except where it has been cleared at various times in patches for the cultivation of hill padi or maize.

The hills now begin to close in on either hand and form a rough wedge into the heart of which the traveller proceeds. Two miles after leaving the village of Durian Burong the path debouches into a little glade in the hills dotted with fruit trees which have run wild and having all the appearance of a deserted village.

This is indeed the case and the only name by which it survives in local memory is Kampong To Naidam Mok after an old Siamese of that name who last held the position of Naidam or official in charge of cattle quarantine and dues at that spot.

The track here branches into two that on the right leading through the Siamese district of Tiba to Patani whilst that on the left entering the jungle follows the rough course of what may still be termed the main stream for some two miles further to its source at Batu Kēlikir (Boundary Stone 31) where there is an imperceptible gravelly watershed leading into the Siamese district of Chēnak whence there is an easy descent to the village of Ban Pēkop some two miles distant from the frontier and inhabited by Malays.

The path on the right winds round the shoulder of a hill for a mile and then enters the little village of Pērdan Sungkai situated near the banks of the Sungei Timun another small rivulet which comes down from the frontier and joins the stream from Batu Kēlikir a short distance below.

This little village of less than ten houses is the last outpost of Kedah territory in this region and is inhabited solely by Siamese who do not speak Malay and live by a little general cultivation of maize and hill rice though they also possess a series of diminutive rice fields.

The way now lies through the heart of the forest covered hills and follows the winding course of a boulder strewn stream the Sungai Gēnting Pabat which mounts gradually.

In places the path actually follows the bed of the stream but generally a way has been found along the shoulders of the impending hills which hem it in when not too steep and consequently owing to the easy gradient and the absence of any stiff climbs the walking is comparatively simple.

At the end of two miles the stream continues its course along the hillside to the right whilst the path takes a sharp turn to the left and enters a narrow defile or cutting on the very crest of the hill through which can be seen the bright sky on the further side. It merges into the slopes of the hill on either hand.

This cutting which is the actual Gënting Pahat is some fifty yards long by ten feet deep and though only 3 feet broad at the bottom widens gradually from the height of a man's shoulders until it merges into the slopes of the hill on either hand; it is probably due to the action of two small streams rising on different sides of the watershed eating back gradually until their valleys have coalesced.

The walls of the cutting are composed of reddish earth plentifully mixed with small black pebbles and may have been shaped as the name appears to imply or merely be due to the wearing effects of traffic. In the centre of the cut is the boundary stone (No. 34) which divides Kedah from Siam and at the end of it in Siamese territory is the prostrate trunk of a giant Mërbau which has defied decay for many a year and is regarded as a këramat whereon the suppliant or thankful passer by lays a stone of propitiation. The nearest village in Siamese territory on the further side of the border is Sënaok some two miles distant whence the way is open to Patani.



## Some rhyming Sayings in Malay.

BY A. W. HAMILTON.

From time to time the diligent listener and gleaner of unconsidered trifles will during his intercourse with Malays happen upon little scraps of proverbial lore or the rhyming equivalents for such which are part of the common stock in trade of conversation but are not to be found in any printed work on the language.

Of such are the following which have been collected no further afield than in Singapore and Penang and in the localities where they are current it is only necessary to quote the first line to convey the meaning contained in the second.

1. Pinjam ekor sēmbilang;  
Pinjam pinjam hilang.  
To lend the tail of a sēmbilang fish:  
To lend continuously is to lose.

A caustic remark applicable to a goodhearted person who has lent an article once too often, or to an importunate borrower.

2. Mērpai mēmbunoh kēra;  
Bēlum mati bēlum jēra.  
The pigeon slays the kēra monkey:  
Only when dead will you profit by experience.

A saying applicable to a person or child who persists in a course from which he has been advised to desist.

3. Takok takal muka pintu;  
Orang nakal memang bēgitu.  
Cleave the block in the doorway:  
That is the inevitable result of being naughty.

A reproof administered to a mischievous child who has perhaps fallen down and is crying over a trifling hurt.

4. Ikan tokak makan mēranggong;  
Sēdap tēkak badan mēnanggong.  
The tokak fish bite two at a time:  
If you indulge your appetite your body must bear the consequences.

A jibe at the expense of a person suffering from the effects of a debauch of any description.

5. Tua tua kēladi;  
 Makin tua makin jadi.  
 Old as an aroid tuber ages;  
 The older, the more there is of you (i.e. the worse you become) or  
 Tua tua lēngkuas;  
 Makin tua makin buas.  
 To age as a lēngkuas ages:  
 The older you are the wilder.

A scathing remark sometimes addressed to a man who on account of his years ought to know better than to indulge in the frolics and pursuits of youth.

6. Kalau ta' chēngal giyam;  
 Kalau ta' kēnal diam.  
 If its not chēngai wood it will be giam:  
 If you dont know, keep quiet.

A joking repartee often addressed to a person who is at a loss to answer a query as to the name of a tree or other object.

7. Bukan kētam tarah;  
 Bukan makan muntah ka darah.  
 It has not been planed only rough hewn:  
 It has not been a feed but an orgy.

An appreciative remark after a plentiful repast to which justice has been done.

8. Měrono Měrene sa gantang garam;  
 Kasana Kamari hari sudah malam.  
 Come here, go there, a gantang of salt:  
 Thither and Hither and the day is done.

A reproof to a laggard who occupying himself in small inconsequential matters is wasting the precious hours of daylight which ought to be devoted to some more important task in hand.

9. Santan tairu gula mēlaka;  
 Pěrěmpuan ta' malu jantan ta' kata.  
 Coconut milk, curds and jaggery:  
 If the woman be immodest, what need be said of the man.

An apt reply to a woman who complains of forwardness on the part of a man to which in the opinion of the speaker she has laid herself open by her own behaviour.

10. Měntimun bongkok di balek tiang;  
 Ayam bėrkokok alamat nak siang.  
 A bent cucumber behind the post:  
 When the cock crows it is the sign of dawn.

A line sometimes quoted as a signal for a lover not to delay his departure or in a meaningless context.

11. Buah sěntul buah kěchapi;  
 Kěpala gondol di makan api.  
 Sěntul and kěchapi fruit:  
 A bald top consumed by fire.

A rhyming skit on a bald head.

12. Minyak sanyong-nyong tanak di bėlanga bėsi;  
 Hang nyom mai aku nyom pi.  
 Sanyong-nyong oil boiled in an iron pot:  
 Come smiling to me and I will go smiling to you.

A facetious remark put in the form of a charm for inducing a meeting between a man and a maid.

## Bishop G. J. Hose.

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Since the last Journal passed into the press the Straits Branch of the Royal Asiatic Society has lost its senior member, the Right Reverend George Frederick Hose, who died at Normandy near Guildford, Surrey, on March the 26th. Born on September 3rd, 1838, he became Chaplain of Malacca in 1868, Archdeacon of Singapore in 1874, and Bishop of Singapore, Labuan and Sarawak in 1881. He retired in 1908. While Archdeacon of Singapore our Branch of the Royal Asiatic Society was founded by his efforts; and he was our first President. An account of his work in the East will be found in the 54th part of the Journal.

He was one of those who chose the Branch's name: but before his death he had given approval to the change whereby we become the Malayan Branch;—a change which will take place with the first of next year, so that this Journal is the last that will appear under the familiar title. The series which it concludes may be dedicated appropriately to his memory.

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