

DOI ANGKĀ.

The Highest Mountain in Siam.

Doi Angkā is the highest mountain in Siam; its height is calculated at 8,450 feet (2550 metres) above sea-level. No other mountain in Siam, as far as is known, even reaches 8,000 feet (2,400 metres). Pahom Pok, 7,530 feet (2,250 metres), lying on the North-west boundary, seems to be the next highest.

The name Angkā, nevertheless, does not appear on any map of Siam for, on maps, this mountain goes under another name, that of Intanon. Before going any further we ought to explain, therefore, why we call this mountain Angkā and not Intanon. The late Mr. James McCarthy when carrying out a survey in Northern Siam, somewhere about 1890 or 1891, gave the name Intanon to this mountain in honour of the then reigning Chief of Chiangmai, Chao Intanon. As far as can be ascertained Mr. McCarthy never visited the mountain himself and perhaps did not know its real name. It is a very general rule among geographers that where any geographical feature has a local name that name should be preserved. Now our mountain has a well recognized local name and that name is Angkā, sometimes called Angkā Lūang to distinguish it from a small peak, Angkā Noi, on the shoulder of the mountain itself; occasionally the name is shortened to Kā. If you happened to be in the neighbourhood of this mountain and ask for Doi Intanon no one would know anything about such a mountain but if you mentioned Doi Angkā every villager would know at once what you meant.

Dr. Hosseus, the German botanist who travelled in Northern Siam in 1904-1906, complains bitterly of the difficulty he had in finding the mountain, as no one had ever heard of its "arbitrarily given name"; that did not deter him, however, from dubbing its highest point 'Richthofen Peak.'

The name Angkā (อังกา) is usually explained by the local people to be *āng* (อ่าง) *kā* (กา), or crows' bowl, the 'a' of the *āng* having been shortened, as it sometimes is, by the Lao. According to

legend the mountain received this name from the bowl like depression on the top where the crows used to drink when they went up to visit Buddha, who, it is said, at one time made a stay on the mountain. This visit of Buddha to Doi Angkā is illustrated by some other names in the district: Mûang Tûn (เมืองตุน) is one of them. The word *tun* (ตุน), as you know, means to awake; well the story goes that as Buddha was on his way to Angkā he fell asleep at Bân Mê Tân, a village close to the Burma boundary, but kept on walking in his sleep till he reached Mûang Tûn, a distance of about fifty miles over hilly country, when he woke up.

The Karen name for the mountain is Saowāka Kwi, which, being translated, is "Lake of Crows." It seems most probable that one name is the translation of the other, but which is the original, Lao or Karen, we cannot say.

Doi Angkā lies about 57 kilometres (35 miles) in a direct line to the Southwest of Chiengmai and can be readily seen on a clear day from that city, but better still from the rice fields to the south of the town where an uninterrupted view is obtained of the whole *massif*. In the old days when people travelled by river Angkā was a conspicuous object for several days before reaching Chiengmai and many a longing look was cast at it. Though it overtops all the other mountains in the vicinity it does not give the idea of great height, no doubt because the slopes, as seen from the East, are gradual and rise slowly to a rather rounded top. The ridge on the North side is broken by a deep cleft which goes by the name of Pā Ngēm. Ngēm (เนม), corresponding to the word ngām (งาม) in Siamese, is the name applied to the iron fork at the end of the pole used for poling boats, which fork the rock is supposed to resemble. Probably this ridge is referred to in the Phongsāwadān Yōnok, where, as Prof. C. B. Bradley informs us, a Doi Ngēm is mentioned.

Though Angkā is the highest mountain in Siam it is not near the headwaters of any of her large rivers, in fact no river of any size takes its origin on the slopes of Angkā, the two largest are the Mê Wāng and the Mê Kāng, both flowing eastwards to the Mê Ping. In this respect it resembles most high mountains, including Everest itself.

Mount Victoria, about 10,000-feet (3,000 metres), to the West of the Irawaddy, is probably the highest mountain in the Indo-Malayan Peninsula, though it only just comes within its limits, then comes Pū Bia, 9,350 feet (2,800 metres), to the East of the Mē Kōng. There are three other mountains in the Pū Bia group over-topping Angkā which is thus about sixth in the Peninsula.

Angkā is on a spur of the main range which forms, as it were, the backbone of Siam and can be traced far up into Tibet and southwards to the Malay Peninsula. This range is a result of the great folding movement which gave origin to the mountains and valleys running transversely to the eastern end of the Himalayas. It is down these valleys that those three wonderful rivers, the Salwin, the Mē Kōng and the Yangtze, run closely parallel for so many miles.

We can say very little about the geological structure of Doi Angkā except that it is chiefly composed of metamorphic, or metamorphic and plutonic rocks, like many other mountains in the same range. No sedimentary rocks were noticed anywhere on the mountain. On the eastern slopes are to be found schistose rocks, stated by Dr. Hosseus to be gneiss, while at the foot on the western side is a coarsely crystalline granite-like rock.

The Karens who live on the slopes of Angkā know the mountain well, and, no doubt, before their time it was equally well known to the Lawā. Some of the Lāo villagers, both on the east side and on the west, also know the mountain. These people, however, have left no record of their visits. The northern, or Pā Ngēm, ridge of the mountain is crossed by the path between the Mē Wāng and the Mē Chēm valleys, which must frequently have been followed by Europeans but they do not seem to have made any attempt to ascend the rest of the mountain. Mr. Gilmore tells us that, as far as the Survey records go, it is probable that McCarthy fixed the position of the mountain by intersection from other points without actually visiting it himself.

To Dr. Hosseus belongs the honour of being the first to publish an account of the ascent of Angkā, and in all probability of being the first European to reach the top. The mountain receives a

chapter in his book "Durch König Tschulalongkorns Reich". Dr. Hosseus made his ascent in January 1905 and followed what is undoubtedly the most convenient route from Chiangmai, *i.e.* via Chawmtawng and up the Mê Kāng; though he was convinced at the time that he had been wrongly directed and ought to have gone further to the North. Dr. Hosseus spent 24 hours on the peak; he had intended to stay longer but the cold was too much for his carriers, and, no doubt, for himself too, as he had only one blanket. He tells us that, at the foot of the mountain, he dissuaded the guide from bringing up four blankets by showing him that he had only one himself. The minimum temperature on the one night spent there was 2.8° C (37° F); it can readily be imagined how cold that would be in a tent with only one blanket. Dr. Hosseus left on the peak a flagpole and a bottle containing a paper with the names of his party, the date of his ascent and the name "Richthofen Peak", which he had bestowed on the highest point—quite in the Polar style. He does not say whether he put a flag on the pole or not. In 1910 one of us saw an old bottle, empty, on the peak but no flagstaff. In 1921 neither flagstaff nor bottle were seen though the Karen guide said he had seen the pole, not improbably he had carried off the bottle, such things being valuable in remote villages.

In his book Hosseus gives a fairly long account of the vegetation. Of the animal world he tells us that he saw tracks of tiger, wild pig and deer before reaching the top, but on the peak itself he saw only one small bird. The collection of plants then made on the mountain amounted, judging from Hosseus' lists, to between 50 and 60 numbers. The hurried nature of this trip can be realized when we learn from Hosseus that both on the ascent and the descent several hours were travelled by moonlight. The whole trip, from Chiangmai to Angkā and back to Chiangmai again, only occupied ten days.

The next ascent of Doi Angkā was made by one of us (H. B. G.) in August—October 1910. The route taken was from Chiangmai *via* M̄uang Win to the ridge that runs North from the Pā Ngēm. This is the route Hosseus thought would have been much shorter and quicker than the one he actually took, as will be seen it proved anything but easy.

A departure was made from Chiengmai on August 23rd. and the foot of the North Ridge was reached on the 28th., camp being pitched there, near a deserted *hai* (cultivation clearing). From that point it was easy to get on to the ridge itself; to do this, indeed, all one had to do was to follow the path which runs to Bān Nāchawn, but it was a different matter when it came to advancing along the ridge to the top of Angkā. August 29th. was spent in cutting a path along the ridge towards Pā Ngēm; progress was slow owing to the thick undergrowth, rain adding to the difficulties; however the party got about half way to the Pā Ngēm that day and in the afternoon returned to the camp at the foot of the ridge. No other attempt was made till September 18th. when, with four men, some provisions, a hap (a load in baskets), a ground sheet and a hanging lamp, a start was made again for the Pā Ngēm with the intention of going on to the summit of Angkā if possible. The track cut on August 29th. was followed, this part of the way being got over fairly quickly. Leeches were numerous, also *kuns*, or sandflies. The latter raise a small blood blister, scarcely noticeable at the time but subsequently irritating. Some of these sandflies were collected and sent to London to Dr. Alcock who pronounced them to belong to an undescribed species which he named *Simulium nigrogilvum*.* The party had protected themselves to some extent against attack, the men having wrapped their legs with strips of cloth, after the manner of the Karens who make shifting cultivations on these slopes. During the day there was a magnificent view of the country to the East and the camp at the deserted hai, from which were picked up prearranged helio flashes from a mirror.

The ridge runs roughly North and South, finally becomes very sharp, with steep descents on the East and West, and ends abruptly on the South, at the Pā Ngēm, in a wide ravine bounded by two towering rocks with a very prominent one at a lower level between them. These two cliffs with a deep chasm between them have given origin to the name Pā Ngēm, or forked rock; they are plainly visible from Chiengmai on a clear day. It is, however not a two-pronged fork, as it appears from Chiengmai, but a three-

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as it was, had been provided for one night only so by this time it was getting very scanty. It would hurt no one, however, to learn how interesting tea leaves and salt appear when there is little else to be had.

The next day, September 20th., opened with continuous heavy rain but a visit was paid to the rocks passed on the previous day, on returning the way was lost and Ground Sheet Camp not reached till nearly mid-day. The kit was then packed up at once, everyone taking a share, and an ascent made to the ridge again. After another hurried visit to the Pā Ngēm Peak the party made their way as quickly as they could to the hai camp at the foot of the ridge. A weary march it was; at least one member of the party, having had very little food in the past twenty four hours, soaked through from early morning and on his feet all day, had very nearly reached the point of exhaustion before camp was gained, frequently having to lie down in the pouring rain to rest himself.

On October 3rd the whole camp was moved, with the aid of elephants, from the hai to a site close to the northern peak of the Pā Ngēm and was kept there till October 26th. The time was spent in collecting, no further attempt was made to reach the summit of Angkā. Driving rain with a southwesterly wind was almost constant so it became necessary to rig up some sort of an arrangement for drying the plants. A drying house was built with earth and branches of trees and inside was installed a charcoal stove with bamboo bellows bought from the Karens at Mē Sapawk. It was very difficult to keep out moisture; by a strange irony plants even began to grow on the inner wall of the structure. During the period spent here the highest temperature recorded was 18.5° C (65.3° F.) and the lowest 11.0° C (51.8° F). Taking the average readings of the aneroid the altitude of the camp was about 2130 metres (7000 feet). While at the lower camp one of the party got rather badly stung on the hands by a nettle (*Laportea* sp. ?); for some days afterwards every time the hands were put in cold water there was a stinging sensation. The local name for this plant is *hām chāng hawng*, which may be translated 'the nettle that makes

pronged fork with the tip of one of the prongs, which are set in the form of a triangle, broken off. The summit of the North Rock was reached at 4.30 p.m., but finding the high rift impossible to cross and there being also the necessity to procure water, the party shared the contents of the hap and slowly descended the precipitous hillface on the west side to the head of a tiny runnel where they levelled the ground a little by digging out the humus on the slope and before 7 p.m. had the ground sheet up. The ground sheet just covered the party of five, arranged like sardines. A bed was made by spreading a burberry on the ground, a towel serving as a blanket. The tin of biscuits was found to be rancid, the tinned sausages flavourless and the potted meats uneatable while no dry wood was to be had for cooking purposes. Altogether the meal that evening was not a success. Nor under the crowded ground sheet was there much sleep that night; the sandflies, however, made a good thing out of it, such a windfall does not often come their way. There was nothing to do but lie awake watching the phosphorescent gleams of the rotting wood around one and wish for the dawn.

After a good deal of trouble some water was boiled for tea the next morning and about 9 A. M. a start was made for the summit of Angkā. Taking a minimum amount of kit and leaving the ground sheet standing where it was the party commenced climbing the south side of the rift, a track having to be more or less cut upwards for some time. In places there were high rocks, often covered with a mass of small flowers, and these had to be circumvented. Presently a fine ridge, still running South, was reached, here there were large trees thickly covered with mass. About 1.30 P. M. the party had reached what appeared to be the top but continued on till about 2 P. M., when it was obvious they were descending so they turned back. On or about the top an aneroid reading gave an altitude of 2479 metres (8170 feet), which is nearly 300 feet lower than the height given by McCarthy, but then no great reliance can be placed on one or two aneroid readings. Near this point an old bottle, empty, was found, perhaps the one deposited by Hosseus. The top was left about 3 P. M. and Ground Sheet Camp reached about 6 P. M. that evening. Another night was spent there, though not in sleep, the sandflies, helped by the cramped space and rain, prevented that. Food, such

the elephant roar'. Goral, a kind of wild goat, were very plentiful on the rocky ground around the Pā Ngēm; their colour, a prevailing light grey with white feet and throat, the head being somewhat darker, blended wonderfully with the rocks, which were covered with light patches of lichen. Not infrequently these animals attract attention to themselves by a curious habit they have of stamping one foot on the rocks and making a kind of low barking noise. This evidently is meant to intimidate the intruder as they look full at him all the time. Once a goral discovered itself by this stamping to one of us, who happened to have a loaded revolver; hearing the stamping he looked round and after some search spotted the animal standing on a rock some 50 or 60 yards below him. Thinking this to be a good chance of shooting a goral he aimed carefully and fired, the goral took no notice and went on stamping. Another shot was fired, with the same result. Finally all five shots had been fired and the goral was still stamping.

Before the end of October the whole party were more or less down with fever so, perforce, a return had to be made to Chiengmai.

Undoubtedly September—October was the most difficult time of the year for a visit to Angkā, not nearly so many difficulties would have been met with a month or two later. As it happened it was a question of going then or not at all.

The next expedition to the top of Angkā was some eight or nine years later when H. S. H. Prince Bavaradej, then Vice-Roi of the Northern Circles, with a large party, went to the top of Angkā from the Mē Chēm side, in the dry season, and returned by the same route.

In April—May 1921 the other of us (A. K.) ascended Doi Angkā from Chawmtawng, following, with but slight deviations, the route taken by Hosseus in January 1905. Chiengmai was left in the afternoon of April 26th., Chawmtawng was reached on the 28th. and the same afternoon the party moved on a few miles to Bān Kāng where arrangements had to be made for guides and carriers. Mules and ponies were the transport from Chiengmai and these, the local people said, could not be taken up the mountain. As things

turned out it would have been possible to bring them up a little beyond the Karen village, nearly half way up. Mûang Kāng was left on the morning of April 29th. and in about half an hour the ascent was commenced, most of the day was spent in following up the Mê Kāng stream through forest locally known as 'pā pé,' an open grassy forest consisting of medium sized trees, chiefly *Pentacme siamensis*, *Shorea obtusa*, *Terminalia mucronata*, *Dalbergia cultrata*, *Ochna Wallichii*, *Phyllanthus emblica*, and *Pterocarpus macrocarpus*. On the banks of the stream there were other trees such as *Eugenia ripicola*, *Hopea odorata*, and *Dipterocarpus turbinatus*, but not till later in sufficient numbers to form a regular evergreen fringe. The Mê Kāng here was a rapid torrent in a wide rocky bed, the hills sloping down to it on both sides. In the evening camp was pitched on the banks of the stream at an altitude of about 750 metres (2500 feet). On the ridges close to this camp *Pinus khasya* was growing, rather a low altitude for this pine, with oaks and many trees of the 'pā pé'. Along the stream valley here were many clearings for the cultivation of hill rice, the burning was now practically all finished and the ground ready for putting in the seed. Just before camping a long line of Karen spinsters, in their night-dress like smocks, passed, on their way home from working in these clearings.

The next morning the ascent was continued, now chiefly through oaks and pines. Here most of the dry grassy undergrowth had been burnt but flowers had already pushed their way through the baked soil, particularly noticeable were the blue spikes of *Aneilema scapiflorum*, as yet without any leaves, its flowers contrasting strikingly with the black earth. Orchids were fairly plentiful on the trees but all seen here were common species of the genera *Bulbophyllum*, *Pholidota* and *Eria*, the same as those found at similar altitudes on Doi Sutēp. Soon after starting the main path along the Mê Kāng was left and a branch path to the right taken, this led to a fairly new Karen village, Bān Nawng Lom, conveniently situated for the last part of the ascent of Angkā. This was a deviation from the route followed by Hosseus and avoided the marsh which he had to cross. After climbing a ridge to a height of 1050 metres (3500 feet) a slight descent had to be made into a fairly

wide valley containing some patches of rice field. Soon afterwards Bān Nawng Lom was reached, barely two hours march from the last camp.

Bān Nawng Lom is a small village of about 20 houses, the Karens inhabiting it belonging, apparently, to the Sgaw division of the race. Their language has no final consonants, they also leave them out in speaking Siamese so it is sometimes rather difficult to follow what they say. To the West of Bān Nawng Lom is another and larger Karen village, known as Bān Pratū M̄uang, situated on the main branch of the M̄ê Kāng. This latter village is often known as Bān Kun Kāng, the village of the headwaters of the M̄ê Kāng, and it was there that Hosseus went. Some of the villagers of Bān Nawng Lom were there at the time and remembered his visit very well; indeed those that saw, or averred they saw, the headman made to deliver up a suit of Karen clothes at the point of the pistol would have good reason to remember it. Hosseus' own account does not quite tally with this, but even from what he says the Karens must have found his visit an exciting break in the monotony of the daily round. There is a third Karen village, Bān M̄uang Ang, a good deal to the North. These Karens, like other hill tribes, use old flint-lock muskets for shooting game; if one could trace some of these muskets back to the time when they left the factory some curious histories would be obtained.

It took some time to persuade the headman to supply two guides who knew the way to the peak, his idea being that it would be much better to wait till the next morning, so the mid-day halt was made in a shady grove by the village. The chief trees of the grove were *Carpinus viminea*, *Adinandra phlebophylla*, *Schima Wallichii*, a *Zizyphus*, an oak and one or two other species. The most notable plant, however, was a rose, *Rosa gigantea*, a climbing species with large stems as thick as ones leg, scrambling up through the trees at the edge of the grove and reaching a great height. This is, perhaps, the largest known wild rose, both in the size of the plant generally and the size of the flowers; it is also found in the Shan hills and as far North as Manipur, where it was first found by Dr, now Sir George, Watt. Unfortunately at this time

only fruit were to be seen; the flower is at first a very pale yellow, turning white. Along the stream which flows on one side of the grove there was a plentiful supply of yellow raspberries (*Rubus ellipticus*) which yielded a good plateful of fruit. A wild honeysuckle (*Lonicera siamensis*) also grew by this stream.

After obtaining two Karen guides the party left the village soon after mid-day and crossed a small ridge into the main valley of the Mê Kāng again. The valley here was fairly wide, sloping but slightly up toward the main peak of Angkā. On the right was a round-topped rock known as Pā Mawn, on the left an irregular rocky promontory called Angkā Noi, while straight in front were the steep slopes leading up to the main peak of Angkā, or Angkā Lūang. On these slopes, a little below the apparent summit, were three white streaks, which had, indeed, been visible from the plain before the foot of the mountain was reached. In this valley was a hot-weather elephant camp in charge of a party of Kamus. Three days previously these Kamus had feasted on some grubs they had found in decaying wood. Two had eaten much more than their companions and these two were now very ill. One of these men was found to be moribund and died not long after, the other, though very ill indeed, was not quite so far gone and eventually recovered. Deaths from eating grubs of this kind have several times been reported and careful people usually eat very sparingly of them, though they are considered very tasty morsels.

Soon after leaving the elephant camp a turn to the right was made and a ridge running down from Angkā towards Pā Mawn ascended. This ridge was covered with dense evergreen forest containing large trees, very few of which were in flower or fruit, among them a fine *Calophyllum* and a *Eugenia*; the undergrowth was fairly thick and composed of herbs and shrubs, including species of *Strobilanthes*, *Musa*, *Alpinia*, *Phrynium* &c.; palms were represented by *Pinanga Hookeriana* and several rattans. On reaching 1350 metres (4500 feet) the undergrowth consisted chiefly of a small bamboo. Very soon after this camp was pitched by a small stream.

The next morning on striking camp the course of the stream was followed up for some way. The evergreen was very dense but

fortunately there was a good path made by wild elephants, which continued for some time in the right direction. It was evident from the appearance of the tracks that the elephants had not been on the path for some weeks. On the trees were to be seen a few orchids, but, with the exception of a handsome *Cymbidium* (*C. Traceyanum*), none were in flower. After marching for nearly two hours an ascent was made on to another ridge where the forest was more open and contained several oaks, a *Podocarpus*, a *Rhododendron* and many other unrecognized trees. On these trees orchids were plentiful but chiefly belonging to two species: *Otochilus alba*, in flower, and a *Coelogyne* not in flower. To the right, in a deep, narrow valley, could be heard the murmur of a stream, one of the sources of the Mé Wāng. The altitude was now about 1650 metres (5500 feet). Soon after reaching this ridge the elephant path turned off and led down towards the Mé Wāng so a way had to be cut through thick undergrowth up a steep slope. About mid-day the altitude recorded was 1800 metres (6000 feet). Here, in the undergrowth, a *Capparis* (*C. sabiifolia*) covered in bloom, was common as was also a wild tea (*Camellia* sp.). The sandflies now began to get very troublesome and continued so till this level was passed on on the return journey. At about 1900 metres (6350 feet) another game path was struck, this time made by kating and rhinoceros; the kating tracks were, according to the Karen guide, quite fresh, made that morning, but no rhinoceros had been along since the previous day.

A halt for tiffin was called about 2 p.m., when a height of about 2200 metres (7350 feet) had been reached. The forest was still an evergreen composed of large trees, oaks and *Schima Wallichii* being the commonest. A little higher up, at about 2300 metres (7700 feet), ferns dominated the undergrowth and the trees began to be clothed with moss and other epiphytes, such as ferns, *Aeschynanthus* sp., *Agapetes Hosseana* and orchids.

What was considered the highest point was reached about 4 p.m. The aneroid used was only graduated to 8000 feet and by this time the arrow was off the scale so it was of no help. The top being fairly level it was not easy to decide what actually was the

highest point, nor was it material from a botanical point of view as the vegetation, a rather dense evergreen forest, was fairly uniform over the whole summit. After a little search the marsh, which gives its name to the mountain, was found and camp pitched within easy distance of it. This marsh contained quite good drinking water and was the source of one of the streams flowing down the western side of the mountain. Here there were still to be seen the remains of an old clearing and a bridge across part of the marsh, made on the occasion of H. S. H. Prince Bavaradej's visit.

The marsh was an open bit of ground, about 1—2 acres in extent, lying in a cup-like hollow. It consisted chiefly of a spongy mass of bog moss, *Sphagnum cuspidatum*, up through which grew grasses and sedges, the only one found in flower being *Carex tumida*. *Lycopodium cernuum* was also quite a common plant here, as it often is in open marshes at much lower levels. Round the marsh were trees and small shrubs, including *Pieris ovalifolia* and two species of *Rhododendron*, both of the latter had just passed their flowering stage but one still showed a few deep red flowers and proved to be *Rhododendron arboreum*. These shrubs and trees were thickly coated and festooned with moss and they also carried numerous other epiphytes such as *Agapetes Hosseana*, *Coelogyne* sp., *Arisaema* sp. and various ferns, particularly filmy ferns. The epiphytic orchids, as Dr. Hosseus had observed, though numerous in individuals were poor in number of species.

In the bushes round the marsh small birds were plentiful and seemed to have little fear of man. One small sun-bird or flower-pecker, which had a metallic green crest and yellow breast, was particularly tame and hopped about within hands reach.

The summit was, as mentioned above, covered with an evergreen forest, among the trees being a *Schima*, probably *S. Wallichii*, several oaks, a maple (*Acer Garrettii*), *Helicia erratica* and many other species not identified. It was disappointing to find but few plants in flower. The temperate plants, too, made rather a poor show, more might have been expected at this height. In this respect Angkā differs markedly from Doi Chiengdāo, on the top of which, though more than 1000 feet lower than Angkā, the temperate genera

are the most conspicuous components of the vegetation. The trees, like those surrounding the marsh, were covered with moss, though not quite so thickly, and had the same epiphytes. Lianes and smaller climbers were fairly plentiful, representing several genera such as *Jasminum*, *Clematis*, *Smilax* and *Piper*. Where large trees stood close together the undergrowth was very scanty, an occasional fern or small *Ophiopogon*, but where the trees were farther apart and light could get through the undergrowth was much more abundant, sometimes consisting of a nearly pure growth of *Polygonum chinense*. The most striking feature in the undergrowth was, however, the bleached, nearly white, stems and branches of a number of dead shrubs. These belonged to a species of *Strobilanthes*. Several species of this genus flower periodically and then die, though not before they have scattered seed enough to bring on another crop. According to the Karen guide this species flowers about once in seven years; it had probably flowered the previous year as there was already a good show of small seedlings coming up. After a long search one bush was found with two or three belated flowers. Some of the absentees on the peak are worth noting, no palm, not even a rattan, no *Podocarpus*, in fact no conifer of any kind, and no *Ficus* was to be seen.

The next day an attempt was made to reach the white patches, mentioned as having been seen from the plain. After travelling North along the main ridge for a kilometre or so the party struck off to the left along one of the secondary ridges running eastward and, after descending to about 2000 metres, came out into open scrubby growth, consisting in great part of a dwarf bamboo, perhaps an *Arundinaria*, with scattered bushes of a white flowered *Vaccinium* (*V. Garrettii*), a yellow flowered *Polygala*, a *Viburnum*, *Eurya japonica*, var. and a *Rubus* which threw its long thorny stems everywhere through the undergrowth. Here was also seen the dried remains of a fine gentian, unlike any seen before in the country. The guide said that some seven years previously there had been a big forest fire which had destroyed the trees here, this scrubby growth having come up since. There was a considerable haze, otherwise there would have been a good view to the East and North from this spot. The party found they had come out

below the three white marks but from their position it was easy enough to see what they were, landslides. Indeed there was one on the very ridge on which they stood, though not visible from below. The forest fire was probably responsible for these slides. After the fire the roots of the burnt trees would rot away, then the soil, freed from their binding influence and lying on a steep slope, would easily slide under heavy rain. These landslides rarely happen with intact forest. The system of shifting cultivation on clearings may be put down as ultimately responsible for the slides for it is from fires started in these clearings that forest fires most often take their origin. The slide examined was probably not more than two years old, in most places the earth was bare, looking as if it were still subject to small slides, in others there were a few herbaceous plants, chiefly tufts of *Polygonum* with here and there the large pink *Lobelia* (*L. rosea*). On the ridge near the edge of the slide were a few rhododendron bushes and one or two seedlings of *Pinus khasya*; this being the highest point at which pines were seen.

Two nights were spent on the top, camped close to the 'Crows' Bowl'. The hot season notwithstanding these nights were bitterly cold, three blankets were not sufficient for warmth, and to keep ones knees drawn up for fear of putting the feet down into the cold end of the bed was rather provocative of cramp. The evening peace was disturbed by the ubiquitous sandflies, but one could escape their attentions by sitting in the smoke of a fire. The stillness of the night was remarkable, no chirruping of crickets or croaking of frogs was to be heard, in spite of the proximity of the marsh.

At mid-day on May 3rd. the party left the top and made a quick descent, camping that evening not far from the Karen village, Bān Nawng Lom. Angkā was not going to let them off too easily however, as before they could reach camp a heavy downpour of rain overtook them. The next morning a visit was paid to the prominent rocky hill, Pā Mawn, about 1600 metres (5300 feet) in height and, apparently, one immense block of gneiss. Pines (*Pinus khasya*) were the dominant trees on this hill but near the foot a very fine *champi* was found, Professor Craib has described it as a new species

under the name *Michelia Rajaniana*. In the afternoon the descent was continued and the next day, May 5th., the foot of the mountain was reached.

The last visit to the mountain was one paid to the Pā Ngēm in July 1922. In passing from Bān Nāchawn in the Mē Chēm valley to Mūang Win in the Mē Wāng valley the ridge running North from Doi Angkā had to be crossed and it was proposed to try an ascent along this ridge. In approaching the mountain from the West the ravages caused by clearings were very evident. Most of the lower slopes of the mountain, except for strips of forest along the streams, were seen to be covered with an open savannah, consisting of coarse grass and small trees. This savannah is the growth that results on abandoned clearings which are fired practically every year. If such abandoned clearings could only be protected from fire the original forest might return. The point where the path surmounts the ridge is about 1500 metres (5000 feet) above sea level. This point was reached at mid-day on July 16th. 1922 and it was decided to pitch camp here and make an attempt to work South along the ridge to Pā Ngēm. From the previous experience in 1910 and from the accounts given by guides it did not appear that the Pā Ngēm could be reached in a reasonable time. However early that afternoon a small party started to attempt it, carrying only very light kit. The way was found unexpectedly easy; there was very little forest on the ridge, from the appearance of the charred remains of stumps and logs it had been burnt off a few years previously. What, however, really helped most of all was a well marked, broad track made by kating, whose daily habit it evidently was to feed on the grass along the ridge. In some of the depressions there were patches of evergreen forest and a few small trees here and there on other parts of the ridge; one of the commonest of these was *Glochidion velutinum* which often bore a large crop of mosses, ferns, orchids and other epiphytes. One of the most striking of these epiphytes was an *Argostemma* with small white, star-like, flowers making masses of bloom on the trunks of the trees. The epiphytic orchids were chiefly small species with inconspicuous flowers, such as *Eria muscicola* and *Liparis Prainii*, both very plentiful on the mossy trunks and branches of trees. Another common small tree was

Debregeasia longifolia, a quick growing tree which springs up on abandoned clearings and after fires on high mountains. On the ground there was a rather luxuriant herbaceous vegetation, grasses, composites, labiates, bracken, various species of *Smilax*, *Hedychium*, *Alpinia*, *Polygonum*, *Saussurea* &c. Higher up, at about 1800 metres (6000 feet), a handsome shrubby *Hypericum* with large yellow flowers became a conspicuous feature of the vegetation, this was one of the new species described by Professor Craib from the 1910 expedition. Another strikingly ornamental plant was *Streptolirion volubile*, a climber with pure white flowers.

At 5.30 P. M., when the party had reached a height of about 2000 metres, it was decided to camp on the narrow ridge as there seemed some chance of getting water in the valley to the West. The day had been showery and in the evening it began to get very cold so by the time camp was pitched every one looked very wet and miserable. In spite of the rain it was a long time before water was obtained and a longer before a fire was got going from the soaked wood. However everyone eventually got their food and cheerfulness reigned all round. The rain was not heavy, it was more in the nature of a driving mist which was very penetrating. The next morning was somewhat brighter and in half an hour or so the Pā Ngēm was reached. Near the foot of the last slope there was a dense growth of straight, slender saplings of a *Viburnum*, (*V. cylindraceum*), many of these were dead but all, dead and alive, were thickly entwined by a climbing leguminous plant, a species of *Shuteria*. The steep slope leading up to the North Peak of the Pā Ngēm was grassy, rocky in places, with scattered trees. The commonest of these trees was the red flowered *Rhododendron* (*R. arboreum*) found on the edge of the marsh at the summit, but here much larger, other trees being *Quercus Junghuhnii*, *Anneslea fragrans* and *Gordonia Dalglieshiana*. A good many of these trees had their upper branches dead and leafless, though ornamented with long, pendant tufts of a lichen, *Usnea* sp. It is possible that before the trees along the ridge had been burnt off they served as a protection to the *Viburnum* and to the trees that now showed dead branches; the death of the *Viburnums* and the branches being due to exposure to cold winds following the removal of this protection.

When the ridge was visited in 1910 although there were trees along it many of them were in bad condition, nearly leafless at a time, September, when healthy trees are in full leaf, and others were quite dead, as *plate 3* shows. When a fire did come along these dead and dying trees were naturally rapidly burnt off, leaving the ridge in the state it was found in 1922. Prolonged drought sometimes causes the death of trees, particularly on a well drained slope such as the Pā Ngēm ridge. To see if there had been anything approaching a drought in the years previous to 1910 the Chiangmai meteorological records were searched and a period of scanty rainfall was found in 1905-1906. From the end of October 1905 till the end of April 1906, a period of six months, only 0.34 inches of rain were recorded in Chiangmai, while the whole rainfall for 1906 amounted to only 35.95 inches, or more than 15 inches below the average. It seems quite possible that this scanty rainfall was the cause of the trees on the ridge dying back.

The rocky slope was now ascended without difficulty. Here, on rocks and trees, a small, white flowered, rush, growing in tufts, was conspicuous. In the same situations there was also a curious species of *Liparis*, the flowers green with red markings. As the party approached one rock a fine male goral was seen lying on it and watching their movements intently, he did not stir till those in front were less than 100 yards from him, when he made up his mind to be off. Later on, about the rocks near the top, quite a number of these animals were seen and a kid was shot. The skin of this animal was sent to the British Museum but it was too young for a definite determination to be made. When the top of the N. Peak was reached there was a mist swirling round but it cleared away sufficiently now and then to disclose glimpses of a wild and rugged scenery difficult to associate with the Tropics. Between the rocks on the peak grew grass which had been very closely grazed by the goral, giving the appearance of a mountain sheep pasture. Among this grass some violet-like leaves were noticed and after a long search a single flower and some buds were found, it was a yellow *Viola*, the first seen in this country, it turned out to be an undescribed species which Professor Craib proposes to call *Viola angkae*. There were indica-

tions of other temperate looking plants but they had not yet reached their flowering season. One, from its leaves, was evidently the *Heracleum* (cow-parsnip) collected in 1910.

The same day a return was made to the main camp and the next day, July 18th, the rest of the descent was made and Mûang Win reached in the evening.

Anyone wishing to do botanical or zoological collecting on Doi Angkā will still find plenty to be done. Although four visits have been paid to the mountain with the express purpose of collecting botanical material it has so far only been nibbled at; in all less than three hundred plants have been collected, an absurdly small number for such a mountain. Of the collections that have been worked out somewhere about 12% of the plants have turned out to be new. So far as is known no zoologist has ever visited the mountain.

For a botanist probably the latter half of November would be the best time for a visit as then a great number of the herbaceous plants would be found in flower. The Department of Ways have on their programme a motor road to Chawmtawng, when this is finished the foot of Angkā will be within an easy day of Chiangmai.

H. B. GARRETT.

A. KERR.

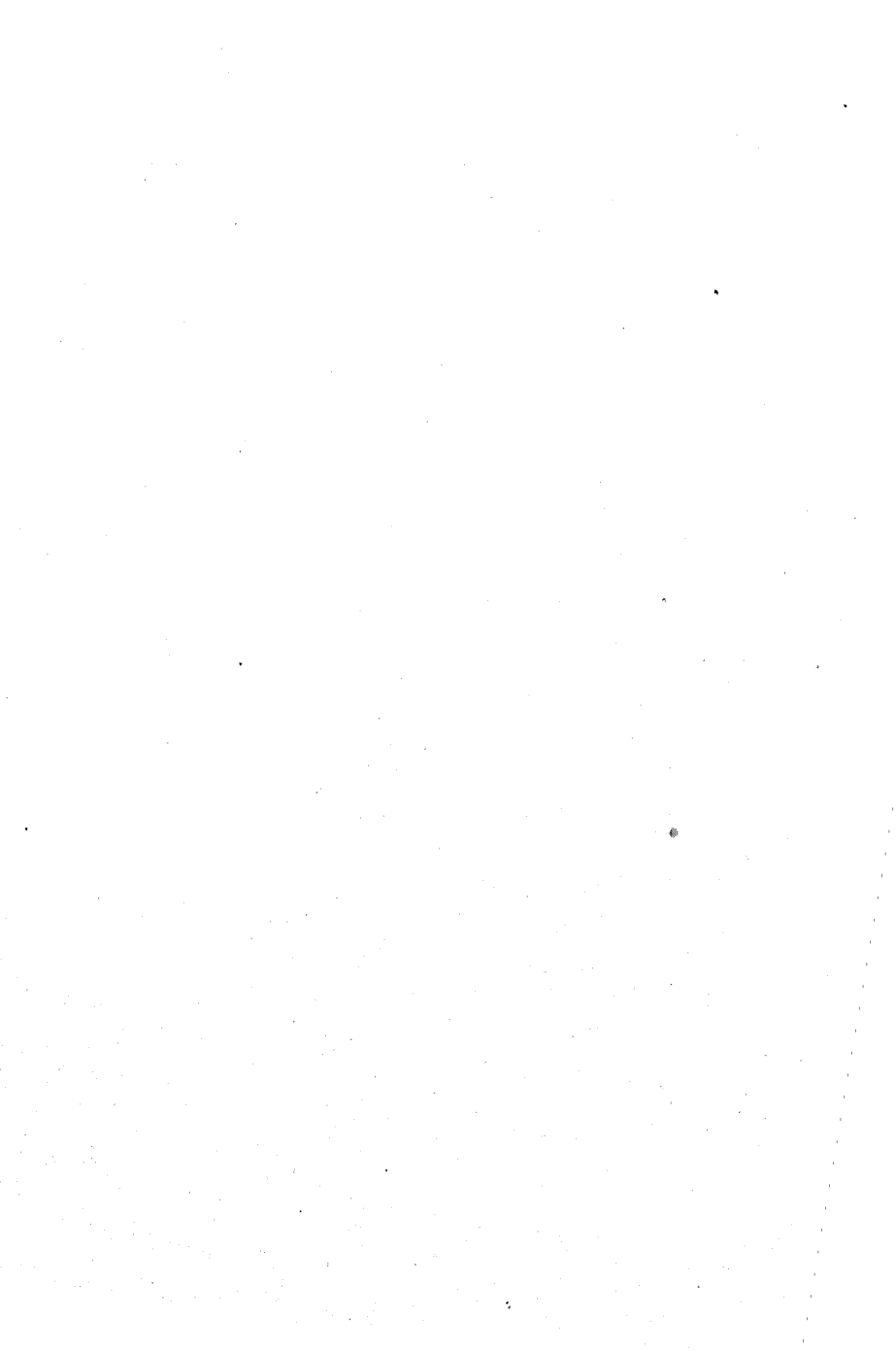


PLATE 1.

Dense evergreen, with a patch of wild bananas, round the source of a small stream, the water supply of the camp at 1,500 metres (1922).



PLATE 2.

Rhododendron arboreum growing on the slope leading up to the N. Peak of the Pā Ngê. A man is standing by the tree near the centre of the plate. (1922).

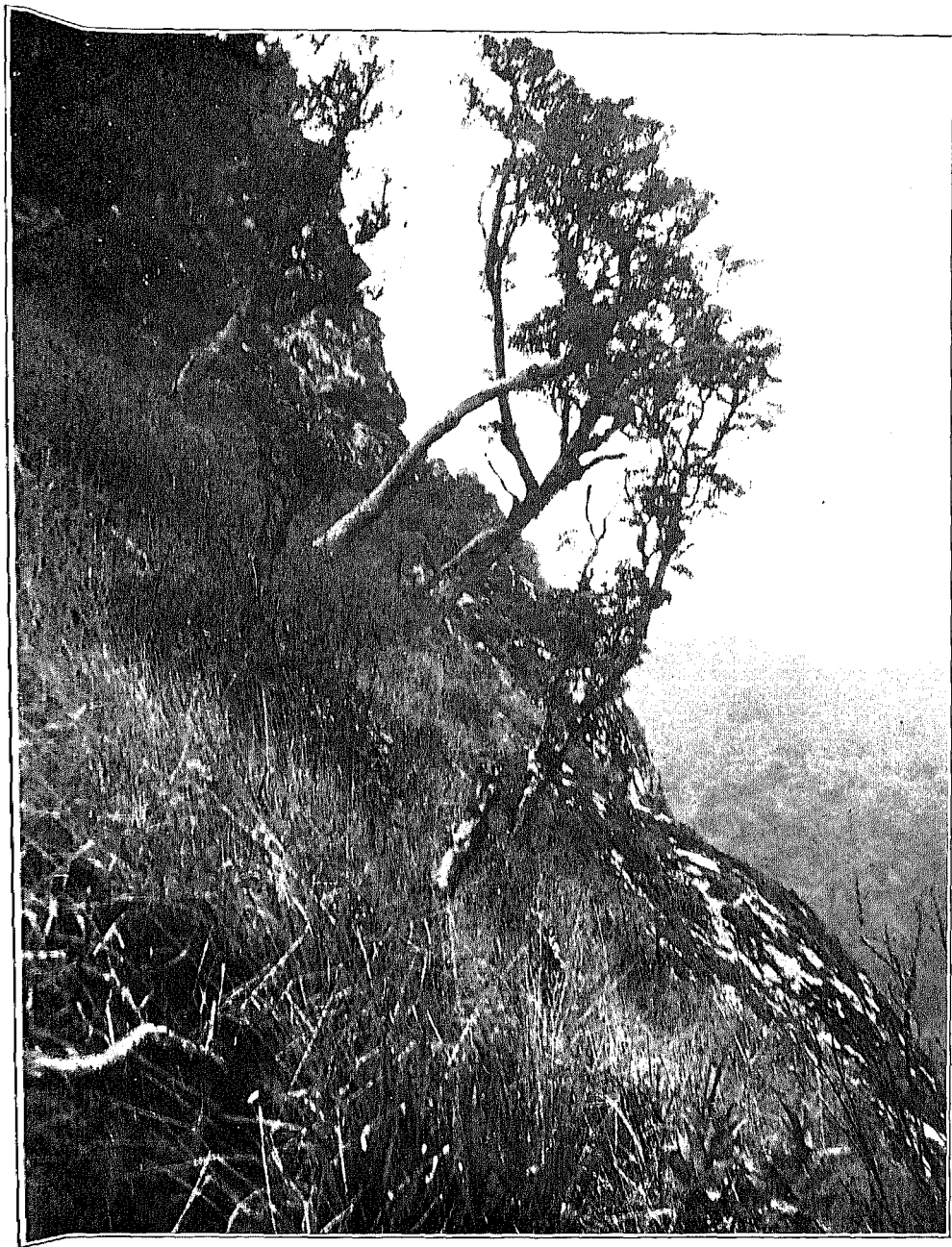


PLATE 3.

A photograph taken from nearly the same spot as plate 2, but looking North along the ridge away from the Pã Ngêm. It shows well the poor condition of the trees in 1910.

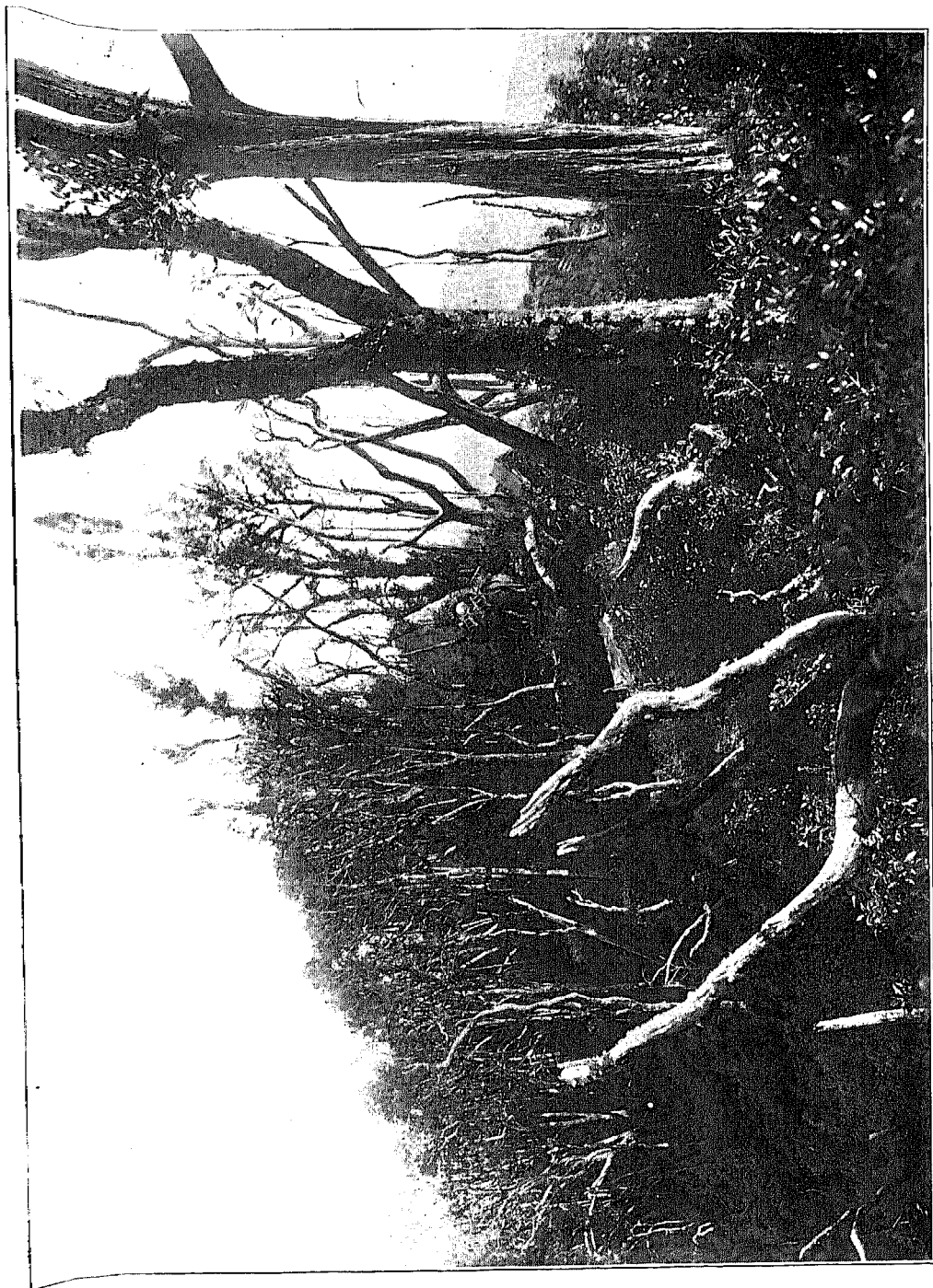


PLATE 4.

Moss thickly covering the branches of a *Rhododendron arboreum* growing on the edge of the marsh, the 'Crows' Bowl,' at the summit of Angkā. Near the middle of the main limb can be seen the small leaves of another epiphyte, *Agapetes Hosseana*.



PLATE 5.

A. Scrub, consisting chiefly of a dwarf bamboo, on a ridge, at 7000 metres altitude, that had been fired some years previously. In the background are some shrubs, a *Polygala* and a *Vaccinium*.

B. A rocky slope on the Pa Mawn. *Pinus khasya* in the background.



B



A

