

branches. If, however, the tip of such a tree be removed until firm wood is obtained (usually about 6 inches) some ten days before planting, the axillary buds will have become plump and active. Planting may then be carried out with much less danger of checking the growth of the tree and almost immediately continue its growth.

The subsequent lateral branches must be pruned or removed according to the purposes the tree is desired to fulfil, but in order that there be as little waste of sap as possible, they should be removed when quite young.

Ornamental and flowering shrubs require frequent pruning. In the case of the former, sufficient only should be removed to preserve the shape of the shrub unless it has become scraggy, when severe pruning is necessary. For the latter the secateurs may be used frequently and more drastic treatment may be given them.

The pruning of flowering shrubs can be done immediately the flowers have faded but the best and most favourable time to do so is at the commencement of the rainy season. They may then receive a severe pruning without causing so great a check as when done at any other time of the year.

When a shrub or tree has been pruned, it should immediately receive a liberal dressing of manure, either by mulching or by digging it lightly into the soil. Well decayed leaves and old cow-manure mixed together is the most suitable manure for this purpose.

The following list comprises a few Ornamental and flowering plants which require such pruning:—*Acalyphas*; *Angelonia salicariaefolia*; *Aristolochias* (a few); *Beloperone oblongata*; *Bougainvilleas*; *Brunfelsia*; *Clerodendrons*; *Congeeas*; *Crossandra*; *Daedalacanthus*; *Duranta*; *Eranthemum* (except *E. Malaccensis*); *Cryptostegia*; *Excaecaria bicolor*; *Galphimia glauca*; *Graptophyllum* (Caricature plant); *Hibiscus* (all); *Holmskioldia*; *Ipomoea carnea*; *Ixoras*; *Jasminum* (slight); *Jatropha*; *Lantanas*; *Murraya* (slight); *Mussaendas*; *Quisqualis indica* (Drunken sailor); *Nerium*; *Palicourea gardenioides*; *Petraea volubilis*; *Plumbago rosea* (frequently); *Rondeletia odorata* (slight); *Russelias*; *Sanchezia nobilis*; *Panax fruticosus* (all vars.); *Strobilanthes Dyerianus*; *Tecoma stans*; *Thunbergia erecta*; and *Wormias*.

J. W. ANDERSON.

IN UNKNOWN PAPUA.

MR. STANIFORTH SMITH'S TOUR.

London, Feb. 16.

Mr. Staniforth Smith, Administrator of the Territory of Papua, lectured this week before the Royal Geographical Society on his recent adventurous journey through the Western District of Papua. Here are some notable results of his adventures which prove that the terra incognita consisting of huge up-raised coral beds has a larger area of elevated land than any other discovered in the territory.

The Natives.

The description of the country given postulates a somewhat sparse population over this elevated portion of the Western Division. At Sambregi, immediately to the north-west of Mount Murray, are a cluster of villages with an aggregate population of about 1,000 people. Throughout our trip we saw only one other village of any size, which we reached on December 27th. This was on a large tributary of the Kikor flowing south of east. In every other instance the tribe or clan lived in one communal dwelling, varying in dimensions according to the size of the community, and capable of housing from ten to seventy people. These dwellings, especially the smaller ones, are generally hidden away or perched on steep ridges, that are not easy of access, probably from motives of defence. The population of this area of elevated land is estimated at 15,000 inhabitants, or about one and a quarter persons to every square mile.

The native inhabitants of the interior do not appear to be a homogeneous people; racial distinctions are apparent that seem to indicate a mingling of Papuans and Papuo-Melanesians, to use the terminology of Dr. Seligmann. Some of the inhabitants of a village were dark-skinned, dolichocephalic men, with wiry frames and somewhat slender limbs, and, in disposition, rather morose and unemotional. In not a few instances the somewhat prominent nose was arched, presenting the appearance of the so-called Semitic type. Other villagers again were unusually light skinned—more the colour of a Samoan. The high altitude might accentuate this. I was unable to obtain the cephalic indices of any of the natives, as they were very shy, and we could not afford to make a long stay anywhere. The faces of the light-skinned men were broader and shorter than their darker neighbours, their limbs stouter, and they appear to be more vivacious and intelligent, and also to be fonder of ostentation in the shape of ornaments and paint. The Melanesian migration into New Guinea is believed to have advanced along the north-east coast as far as Cape Nelson, where their progress was stopped by the warlike Binandili tribes; and along the southern coast till they reached the populous villages of the Gulf country. It is, however, not yet known how far the immigrant race penetrated inland. Certain of the inhabitants of the main range near the Gap, at Mount Albert Edward, and on the Chirima, as well as in the neighbourhood of Mount Yule, are lighter skinned and broader headed than the Papuan, and it is possible that the Melanesians have gradually diffused themselves inland along the southern slopes of the main range, where the original inhabitants were few in number, and therefore less able to successfully resist the advance. The greatest obstacle would be the natural features of the country, which would necessitate very slow progress. This might account for the marked distinction in physical characteristics which have not yet been obliterated by miscegenation. The light skinned people were nearly always in a minority. Mr. J. P. Thompson, in his book, 'British New Guinea,' speaks of the

"remarkably light bronze colour," of some of the natives of the upper Fly river.

I obtained a small vocabulary—principally substantive nouns—from the Sambregi tribes, immediately to the northwest of Mount Murray, in the hope that it would contain sufficient information to enable philologists to determine if the language was Papuan or Melanesian; unfortunately, this was lost with all other papers in the Kikor river.

By exercising great forbearance and patience, we were fortunately successful in making friends with these bushmen everywhere. As they had never seen white men before, our arrival caused great excitement. At the first small communal dwellings we reached they all turned out with their bows and arrows, and stood shouting their war cries. They naturally thought we were a marauding party, and naturally, and rightly they were prepared to defend their wives and children and homes. While they were in this condition of extreme excitement our party sat down, and, although our arms were ready for any emergency, appeared to take no notice of them, except to hold up some red cloth. They then retired, and, when some presents were sent up to the house, we found that they had all fled, the hostile demonstration being probably to allow the women and children time to get away into the jungle. Great care was taken that nothing was touched, and a tomahawk, a knife, and some red cloth were left in the house. Not seeing them return, we started on our march next morning, and in the afternoon were overtaken by the natives, who, when they found that we had no desire to hurt them, evinced the greatest joy, and made us presents of food. After that for some days we experienced little trouble in establishing friendly relations with the natives we met. Possibly, by some bush telegraphy they had notified the other tribes that we had no desire of injuring them. In many instances the friendship of the natives was of great service to us. Not only were we able to buy food, but they showed us native tracks, and, in one instance, took the whole party over a wide river in their canoes.

The inhabitants of the Sambregi villages were particularly interesting as they live at an elevation of 6,000 feet above the sea-level, the highest elevation, I believe, of any Papuans so far visited. The physique of some of the young men was magnificent, the Kagi men of the main range approaching most closely to them in this respect. While the tracks between the villages of Sambregi were in wretched repair, and the houses below the standard of native dwellings in Papua, these people excelled in drainage schemes. The gardens in the rich low-lying portions of the valley are drained into the Sambregi creek by water channels varying in depth with the contour of land. In some cases the drains are as much as 8 feet in depth; no water lodges in them, and they are kept in excellent repair. With the exception of the native irrigation channels near Dogura in the Eastern Division, in no other part of the territory do the natives show such knowledge of channel construction. Although it is most

improbable that any of these bushmen have ever seen the sea, it is evident that they are able to carry on some trade with the coastal men, probably through many intermediate tribes, as we found them wearing sea-shell ornaments, and possessed, in some instances, of iron implements, such as a much used axe blade and plane irons. They also knew the names of the Kikor, Turama, and Bamu rivers, but their ideas as to the directions of same were sometimes far from correct.

While these far-inland bushmen are probably cannibals, we were unable to find any direct evidence. At Sambregi, one youth had a skull hung round his neck, and one man a pair of human jawbones; these, however, many have been the remains of relatives. In their dubus, or communal dwellings we saw no skulls or other human bones, although the jaws of pigs and other trophies of the chase were in evidence.

It appears that the natives bury their dead, and, at any rate in some instances, dig up the bones at a later period and put them on platforms. In one instance we saw a tiny house like a small dove-cot built on piles about 6 feet from the ground. In this was a skull painted with red ochre, and some bones. We also saw a platform recently erected, and the natives indicated that it was for human bones. In a rock shelter we saw two skulls and bones placed side by side in a circle of stones; close by were evidences of a grave having been opened and bodies exhumed.

For clothing the natives wear a piece of netted cloth hung down from the waist in front from a wide girdle of bark; at the back dried grass or the bright coloured leaves of a plant. In other instances, tapa cloth was hung from the waistband. As a head-dress they wore the black plumes of the cassowary, or the feathers of the white cockatoo; very occasionally we saw the plumes of the raggiana bird of Paradise. Their hair was usually worn short in front and long behind, clotted into tags and rolls, either with oil or honey and wax of the little black stingless bees. The hair is not bleached with the lime as in other parts of the territory. They wore cane armlets, anklets, and waistbands. These canes were used for fire making. The septum of the nose is pierced and the lobes of the ear, and various things hung thereon from a pencil of bone to circular pieces of cane and the claws of birds. It is remarkable that during our whole trip we saw no evidence of tattooing nor any cicatrices or mutilation of the body. Skin disease was exceedingly rare, and only seen in one or two instances in the adults, and rather more frequently amongst the children. In fact, the natives generally were a remarkably healthy lot of people. In time of war, and probably on festive occasions, they paint themselves either wholly or in part with yellow or red clay, or with ground charcoal and oil. The women wore a tapa cloth rami from waist to knee. They also have tapa cloth cloaks which cover the head and reach to the ground; this I have seen nowhere else in the territory. In their dubus or communal dwellings they keep rolls of tapa cloth blankets as the nights are cold on the great plateau.

They have no pots or cooking vessels and consequently all their food is roasted over the fire; the only exception I saw was in the case of the leaves of an oleaginous plant which they boil as a vegetable in bamboos. We saw no evidence of polygamy, and the probability is that it is not largely practised. From the inhabitants we saw, the women folk seemed less numerous than the men but this may have been owing to the warriors keeping them in the background. Children seemed fairly plentiful. The time of the men is principally occupied in clearing ground for gardens, hunting the pig, cassowary, and flying fox, building houses, making weapons, and cutting down sago trees. The women make all the sago—a continuous and exacting occupation—look after the gardens, do the cooking, and carry water required for household purposes in bamboos. They also hammer out the tapa cloth from the bark of a tree, and look after the rising generation.

These bushmen are certainly not a nomadic people. Their buildings are substantial, and, in every instance, they had a considerable garden and a number of village pigs. Their weapons consist of the bow and arrow, a heavy pig spear which is not used for throwing, and a man-killing club. Very rarely we saw stone clubs; these had probably been introduced from the coastal districts. The bow and arrow men wore plaited gauntlets from wrist to elbow on the right arm. The stone axe and adze are largely used. The natives do little carving except on their arrows (which are made of bamboos often tipped with bone or a cassowary's claw), spears, and wooden clubs. They also carve out wooden bowls to hold water; these have no ornamentation. The tribes on the western portion of the plateau seemed to be at war with each other during our visit; they were frequently met in full war paint; with bundles of arrows and killing clubs; in one instance they informed us by signs that they were on their way to fight a neighbouring tribe. Possibly, constant internecine strife keeps their numbers down, and accounts for the comparatively sparse population, as the climate is bracing and healthy and the natives singularly free from disease and full of vigour.

Their method of making fire is superior to the usual Papuan system. They get a piece of dry soft wood, split one end and insert a piece of tapa cloth, then taking a piece of cane, which they carry twisted round their waists, they place it under the wood on which they stand. Grasping each end of the cane, they pull it backwards vigorously; when it has eaten halfway through the wood to the tapa cloth the heat generated is so great that the cloth smoulders and is blown into flame. The whole process is accomplished in ten or fifteen seconds. I am informed that certain natives on the main range about Kagi adopt this system also; if so, it is interesting as possibly shewing some connection between them.

With the exception of two large villages, all the natives we saw were split up into small tribes, and each community has one communal dwelling, varying in size, according to their numbers, which would probably range from ten or fifteen up to seventy or eighty.

The dwelling is erected on 'a forest of piles composed of thin but durable wood, and is elevated from 10 to 12 feet above the ground. The sides of the great living room are only about 4 feet high, and the pitch of the roof is low. The roof is made of the fronds of the sago palm, each separate leaf being doubled round the rafters (which are only about 6 inches apart), and sown with native fibre to keep it in its place. At one side of the entrance is a partition, which does not reach as high as the roof; this divides the house lengthways into the men's quarters on the one side, and the women's and children's on the other. In each subdivision there is a gangway the whole length, and on one side of each a raised floor which is sub-divided alternately into sleeping platforms and fireplaces, each about a yard in width: above the fireplace is a platform filled with wood, and above each sleeping place another platform on which the men keep their weapons and other effects, and the women their tapa cloth, bamboo drinking vessels, and food supply. The dogs share the buildings with the natives. The house is generally surrounded by a garden. Variations of the above were seen. Near Mount Murray there were two additional rows of sleeping platforms and fireplaces on the ground level, one on each side with a separate entrance for each. Again, about 300 miles up the Kikor at the largest dubu we had seen (which we estimated was 70 yards in length) the partition, instead of running lengthways, was across the centre of the building dividing the men's and women's quarters. We have travelled down the Kikor about 116 miles to this point before we came upon the first coconut trees we had seen on our journey, nor did we see any more until we reached the mouth of the Kikor. We found that the language or dialect of the people was continually changing as we advanced. At the Sambregi a vocabulary of the most useful words, principally substantive nouns, was compiled; this, besides being of philological interest, we hoped would be of use to us in communicating with the natives we subsequently met; we found, however, that after advancing about 20 miles, the dialect changed, and very few of the words could be understood. Further on the language was quite different.

While the many tribes of natives we met on our exploration showed no suspicion and absolute confidence in us, after we had succeeded in establishing friendly relations, frequently coming to our camp and sitting round the fire at night, and bringing their women and children to see the "pale faces" during the daytime, they all without exception, refused even to taste any food we offered them, although they would take it and wrap it up in leaves, probably as a curiosity. This refusal may indicate that they possessed a knowledge of poison (we saw a fish-poison tree in one of their gardens), it may, on the other hand, have risen from a fear of "pouri-pouri" or witchcraft, or again, it may be that they were conservative in their commissariat and did not care to eat new foods they were not accustomed to.

Climate.

The climate of the plateau was cool and bracing, the nights being sharp and cold. This doubtless accounts for the healthy appearance of the people who also gave evidence of greater activity than the coastal races. The rainfall on the eastern portion of the plateau was heavy and of almost daily occurrence, generally commencing about four o'clock in the afternoon. As we advanced west the rainfall became less frequent and torrential, only falling on an average about three or four times a week. This might be accounted for by the great distance we were from the sea.

Coal.

There is every probability of beds of good coal being found on the borders of the great plateau, although I do not think that any minerals of value will be found in the elevated region caused by the upheaval of the coral beds. Coal has been found on the upper waters of the Purari by the Mackay expedition, and it was found by us both on the lower and upper waters of the Kikor river. On the upper waters of the Kikor there is undoubtedly a very extensive field of excellent coal. Unfortunately, the large number of specimens we were bringing down were lost when the rafts capsized. We followed down a creek for some days that brought us to the Kikor. Everywhere the beds were strewn with lumps of good-looking, bright, hard coal, and for about 15 miles down the Kikor coal was seen in almost every little creek and waterway, as well as on the banks of the river. The attempt to develop this field by the Kikor waterway is evidently impossible, as for 120 miles the river is one succession of rapids, whirlpools, and gorges. There is no reason why this coal-field should not extend further west, in fact a seam of coal was seen on the western side of the river, and, if so, it might be worked from the Strickland river, which it was estimated could not be more than 20 miles distant.

The coal we found on the lower Kikor was one isolated lump considerably weathered. However, as the creek was a very small one, running northward for only a few miles, it is evident that the seam from which it came could not be far off, and, when a magisterial station is established on that river, a fuller investigation might be made. If a large bed of good coal could be found here, I believe barges might be brought up the river to within 6 or 7 miles of it, although two very small rapids occur on the route. These run swiftly when the river is high, but are barely noticeable when the river is not in flood.

Flora.

The whole of the country traversed was covered by dense jungle and scrub, and we literally had to cut our way through the 374 miles traversed on foot, except where we occasionally met a native track going in the desired direction. It was surprising that over rough coral ranges and valleys, trees of considerable size and dense scrub could find a roothold and sufficient nourishment. The roots spread all over the surface of the rocks, constituting steps and ladders up

the steep mountain-sides, without which their ascent would have been most difficult. A remarkable fact was that we saw no grass whatever, except a little reedy grass near the rivers during our whole trip.

Of the economic flora, by far the most important was sago (*Sagus Rumphii*). We found these useful storehouses of nourishing food growing as far north as we penetrated, and up to an elevation of 3,500 feet. It had previously been considered that sago only grew along the coast and in the alluvial mud of riverbanks near the sea-level. This constitutes the staple food of all the inland natives we met, except the inhabitants of the Sambregi villages, who live principally on sweet potatoes, the elevation (6000 feet) being too great for sago. Wild breadfruit trees are fairly numerous. The fruit, unlike the Samoan breadfruit, is full of large seeds nearly the size of walnuts. These, when roasted, are palatable and make a good substitute for potatoes. The natives when hungry eat the pith of a small palm that grows plentifully over a large area of the country traversed by us. In time of scarcity our police and carriers consumed a good deal of this. To our palates it had a watery and woody taste that was far from agreeable; in fact, when hungry I tried to eat it, but in each instance it made me sick. I collected the seeds of several indigenous fruits, which, while not palatable, might have been improved by cultivation, but these were lost with other things.

Cultivated in the native gardens we found sweet potatoes, taro, yams, sugarcane, bananas, betel-nuts and ginger, the last-named cultivated as a medicine. Maize is unknown. No coconut trees were seen on the whole trip until we reached the lower waters of the Kikor river, nor are there any mango trees or tapioca. The natives grow a green vegetable, the leaves of which they boil in bamboos. It makes a very good substitute for cabbage and appears to contain a lot of vegetable oil.

Tobacco is cultivated in every native garden, which might lead one to suppose it was indigenous; the name, however, tends to show that it is an introduced plant. It is universally called "Saku" by the bushmen, which is evidently derived from "Kuku," the coastal name. In one of the gardens on the headwaters of the Kikor I found a Kava plant (*Macro-piper methysticum*) although I saw no evidence of the manufacture of the beverage.

Fauna.

The wild pig, judging by the amount of ground that is rooted up, is plentiful everywhere. It is the chief source of meat-supply for the natives, and is continually being hunted with dogs, the killing weapons being bow and arrow and spear. The only animals domesticated are the pig and the dog. The wallaby is very scarce, owing to the absence of grass. Cassowaries are fairly plentiful, their back plumes forming a favourite head-dress. Flying foxes are very numerous. Their flesh is much relished by the bushmen. Tree-rats were occasionally seen, and the streams abound in fish of excellent quality. Two or three were shot with a rifle, but as we had neither fishing lines

nor nets, this luxury was usually denied us. The natives catch the fish by spearing them and by fish-traps composed of stones or pickets across the streams. The little black stingless bee is common everywhere, and the honey and comb is much prized for food and as a dressing for the hair.

Cockatoos, both black and white, and pigeons were plentiful. Those wonders of avian architecture, the play grounds of the bower bird (*Amblyornis subalaris*), were seen on Mount Murray, at an elevation of 7000 feet. Of insect pests, the land leeches were very troublesome. The feet of the police and carriers were often red with blood from their bites. We tried painting their feet with sulphur ointment, but it proved quite useless. Scrub itch was very bad, except in the valley of the upper Kikor. The scrub itch is caused by a minute red insect that buries itself under the skin. Mosquitoes did not trouble us while on the highlands, but both they and sand-flies were very troublesome on the Kikor river.

The "leaf" or "stick" insects were fairly plentiful, and in some instances their resemblance to the plant life in their immediate environment was wonderfully accurate. One insect resembled a stick covered with green moss; the green colouring appeared so exactly like moss, that a member of our party refused to believe it was not actually moss until he had examined it with a magnifying glass.

On the map accompanying this report the course of that portion of the Kikor river lying to the west of the 114th meridian of east longitude is only approximate, as, while descending this river, most of our instruments were lost, and the compass-bearings and estimated speed could not be checked by observations for latitude. In addition to which the great difficulties that beset us on our return journey did not permit of the careful mapping previously undertaken.

The most important results of the exploration were:—

(1) We went practically right across the centre of the unexplored portion of the territory of Papua, travelling approximately 524 miles through totally unexplored country (374 miles on foot and 150 by river.)

(2) We ascertained that instead of the Western Division of Papua being low-lying recent alluvial country, as previously supposed, it is (except along the coast and in the vicinity of its navigable rivers) an upraised plateau having an area of approximately 12,000 square miles, the lowest valley being over 2,000 feet above sea-level.

(3) The upper waters and watersheds of the great rivers emptying into the Papuan Gulf are now roughly defined, thus completing our knowledge of the river system of the territory.

(4) We have now data for estimating the population of the whole territory with some accuracy, the hinterland of the Western Division being formerly an unknown quantity.

(5) We found coal deposits in two places along the watershed of the Kikor river, the coal country along its upper waters being very extensive.

(6) We found sago growing inland as far as we penetrated and at an elevation up to 3,500 feet.

(7) We established friendly relations with the natives everywhere, and were successful in avoiding all fighting. *Singapore Free Press*, 15th and 16th March, 1912.

Before proceeding to Papua as Administrator Mr. Staniforth Smith spent some time in Ceylon and Singapore, studying the agriculture and Economic Botany. From Singapore many cases of useful plants were taken for introduction to Papua and seeds are periodically communicated.

