

NOTES ON THE FLORA AND FAUNA OF RUWENZORI WITH
SPECIAL REFERENCE TO THE BUJUKU VALLEY.

By

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SECTION I. GENERAL ACCOUNT OF THE ASCENT.

An account of all the earlier expeditions to Ruwenzori is given by Filippi and a few of the more important are mentioned below. Almost every expedition has been gravely handicapped by the adverse climatic conditions which prevail on the mountain and which have retarded its thorough investigation. Dr. Stuhlmann's expedition of 1891 to the western slopes was the first serious attempt to reach the central parts of the mountain. This was followed, in 1895, by a series of ascents by Scott Elliot, the most successful of which was from the west up the Butagu valley. After Sir Harry Johnston's expedition which reached 14,800 feet on the eastern side, via the Mubuku Valley, came the very important British Museum expedition of early 1906 under R. B. Woosman (see Ruwenzori Reports and Rendle and others). This expedition had as its object the collection of the flora and fauna of Ruwenzori and spent about three months on the mountain making its base camp at Mihunga in the lower Mubuku valley. From here several ascents were attempted, but none was successful as bad weather prevailed throughout the length of their stay. Very shortly afterwards the Duke of Abruzzi with a particularly well equipped expedition reached the lower foothills. This party penetrated up the Mubuku valley, ascended all the peaks of the range (Filippi 1908) and remained on the mountain for two months. Although they chose what was considered the best time of the year, they were very greatly handicapped by almost continuous rain and mist. Both this party and the British Museum expedition made collections of the flora and fauna of the Mubuku valley. The next important expedition of which there is a record is that in 1927 led by Capt. G. N. Humphreys, who crossed the mountain from east to west by the Bujuku valley route and who has now made an aerial survey of the range, followed by a further ground survey and the collection of botanical material.

It will be seen from this short account of previous expeditions that most of the collecting of the flora and fauna of Ruwenzori has been

done in the Mubuku valley and not in that of the Bujuku; no serious effort has previously been made to collect the flora of the latter valley.* The object of our journey was to collect, as far as possible in the short time available, the commoner and more characteristic plants of the Bujuku valley and collections of the smaller fauna were also made when time permitted. In this paper we give an account of the trip itself and the observations made on the flora and fauna of the valley.

The Bujuku valley leads most directly into the heart of the highest peaks and it was therefore hoped that it would best show the zonal changes to be found both in flora and fauna. Unfortunately these changes with altitude proved most difficult to demarcate as the only path followed a very tortuous route; in many places it led steeply up high ridges dividing confluent streams and on each of these ridges were found several floral zones differing with the altitude reached. The members of our party were four Government officials who had obtained a fortnight's local leave for this purpose; for this reason the time spent upon the mountains was only twelve days and we were very fortunate in experiencing a spell of exceptionally fine weather which lasted almost without a break throughout. Our aim was to reach the moraine lake at the foot of the main peaks and this we did under almost ideal conditions. Both the journey to Lake Bujuku and the return were accomplished in very easy stages; in this way we had plenty of opportunity to collect the more characteristic members of the mountain flora. Our route lay along the Mubuku river for the first two days' march and then followed the Bujuku. From the point of view of conformity of floral change to increased altitude the route which follows the Mubuku valley would, perhaps, be preferable since it follows a ridge on one side of the valley for the greater part of the way.

The approach to the mountain is now made much easier by the fact that a motor road has been constructed down on to the Lake George flats as far as the Mubuku river; from this road it is possible on a fine day to obtain many views of the northern end of Ruwenzori. A private road leads off to an estate on Bikoni hill six miles further up the Mubuku valley. Head-porterage of loads from Fort Portal is, therefore, avoided and a great deal of time saved, but this form of holiday is still rather expensive because porters are difficult to obtain and demand a higher rate of pay than the work entailed warrants and because the path, being so infrequently used, has to be cut afresh at the expense of each party. The porters who volunteered for the trip were Batoro and Bakonjo; the former are inhabitants of the plains and lower foothills, while the latter live on the slopes up to about seven or eight thousand feet and hunt right up to the snows. Besides

* The account of the scientific results of the Duke of Abruzzi's expedition is, unfortunately, not available in East Africa; it is therefore not possible to ascertain to what extent these collections included the Bujuku valley.

his wages each porter was given a blanket and, at the higher camps, a vest; we also carried a supply of millet meal for their rations on the mountain. An amusing side of the bargaining was that when it was decided the local chief came forward and asked if he might be allowed to be present when the porters were paid at the conclusion of the trip in order to collect taxes which were due from them; he evidently looked upon the expedition as a godsend to the Government's purse. We took as our guide the old headman, Bamwanjara, who had evidently done this work for almost every previous expedition and who proved to be extremely efficient and most useful in many ways. The path-cutters were sent forward on August 11th and the opportunity was taken on that day to pack our kit into small loads suitable for head-porterage up the mountain.

THE LOWER MUBUKU TO MIHUNGA.

The actual start was made on the 12th of August (1931) in beautifully fine weather. The ascent began with the fording of the rapid Mubuku river which is a very treacherous stream and needs great care in crossing. The banks of this river are lined with a giant *Phragmites* which is regarded as a variety of the European *P. Communis* (var. *isiaca*). After crossing the river the path follows the valley which here rises gently. The soil is very rich and appeared to produce good yields of almost every native crop, besides excellent European vegetables. The fertility of the soil was also shown by the luxuriant growth of elephant grass (*Pennisetum purpureum*) which here grew to a height of twelve or fifteen feet and which is a very sure indication of a fertile soil of good depth; it covered the foothills up to an elevation of over six thousand feet. These steep slopes showed no indication of the erosion visible near Fort Portal; we are informed that in this area rain falls lightly, much as in England, and not in tropical downpours. The undergrowth along the path through this grass consisted mainly of the following plants: Plantains (*Plantago palmata*), a white-flowered balsam (*Impatiens* sp.) and in the damper tributary valleys, wild bananas (*Musa* ? *Ensete*).

At an altitude of about five thousand feet our path passed out of the elephant grass and entered more or less heavily wooded country with a dense undergrowth of creepers and low-growing plants, among which was noticed a slender very tall *Lobelia* (*L. gibberoa*) with green flowers and purple stamens. At this altitude it appeared to flourish only in the very wet beds of small hill streams but at the higher levels it grew on the sides of the Mubuku valley some five hundred to a thousand feet above the stream. Other plants included *Ranunculus pubescens* (about two feet in height), a *Rubia* resembling a large *Galium* and a tall *Thalictrum* (*T. rhynchocarpum*). At the lower end of this zone the path led through swampy country and was intersected by large numbers of elephant tracks. Mihunga, the

first camp on the route, was reached about 2-30 p.m. after about four hours' climb during which we passed the hut previously occupied by the British Museum expedition. The last part of the ascent was more difficult for the porters as it led over the slippery broken-down stems of a woody yellow-flowered *Triumfetta* (perhaps *T. ruwenzoriensis*, Sprague in Stapf, 1906). Our tent was pitched under the shade of an immense fig-tree on the crown of a ridge with a view up the valley towards the Portal Peaks, while downstream we had a wide view of the valley flats clothed with elephant grass. The atmosphere at Mihunga seems cool after that of the hot plains below; the temperature at night (7-30 p.m.) and in the morning (8 a.m.) was 60° F.

MIHUNGA TO NYINABITABA.

A start was made early on the following morning as the journey from Mihunga to Nyinabitaba was reported to be long and tiring. During almost the entire day the sky was overcast but there was no rain. From our camp the track led steeply down the side of the ridge to a tributary of the Mubuku. The whole of this ridge is heavily forested but has a thick undergrowth of the *Triumfetta* noted before. The path crossed the Kyowha, a small stream at the foot of the ridge, and then passed over the floor of a fairly level, somewhat swampy valley for about a mile. After this it crossed the Mahoma, which is a fairly large, clear, cold and very rapidly flowing river. The swampy strip of country between the two streams is covered with a sparse forest of tall trees. A very prominent tree in this is a species of the *Leguminosae* known to the Batoro as the "Murongo" of which we were unable to collect any flowers or other specimens. The most noticeable feature of this forest, however, is the fact that many of the biggest trees are slowly dying out and no saplings appeared to be growing up to take their place. Tracks of elephant are numerous throughout the forest and the Batoro say that it is they who are destroying the trees but the size of the latter seems to make this explanation impossible. The whole of this swampy strip is covered with a heavy undergrowth of a woody plant which is known as "Mpuku" and which grows in many places to a height of fifteen or twenty feet; it was impossible to find any of these plants in flower. Growing abundantly, mixed with this plant, was the big pink-flowered *Acanthus arboreus* and other plants noted and collected in this area were a small malvaceous bush (*Pavonia kilimandscharica*) and a beautiful Rambler, bearing conspicuous pink flowers, which appears to be *Thunbergianthus ruwenzoriensis*. A balsam with shell-pink flowers was also common but seemed most at home along the banks of the Mahoma river where it grew in profusion.

After crossing the Mahoma river the path led through heavy forest and rose fairly steeply. The forest on the slope is here com-

posed of trees of a different type to those found in the swampy area before the Mahoma and has a totally different type of undergrowth. The commonest tree is one called the "Muhunga" which grows to about seventy feet in height and has broadly saggittate leaves; it was found impossible to collect specimens of the flowers. Scattered through this forest is a very tall tree known as the "Munankwasi" which exudes a gum used by the Batoro for fixing knives and axes to their handles. With the exception of saplings of the forest trees there is little or no undergrowth; epiphytic ferns were noted on the roots and trunks of the trees. This forest extends up the Nyinabitaba ridge from the Mahoma river for about a thousand feet, but towards its upper limits the undergrowth is different, consisting largely of a big *Piper* (*P. guineense*).

At an altitude of about 7,500 feet, the forest suddenly gives place to a patch of bracken* which extends up the ridge for five or six hundred feet; among this bracken there are only a few scattered trees. The sudden change in the flora appears to be due to an abrupt change in soil. The trees growing among the bracken appear to be able to grow on very shallow soil overlying rock; they are known to the Batoro as "Mukuka" (*Schefflera* sp. c.f. *S. polysciada*). At the time of our visit the bracken was luxuriant and reached a height of six or eight feet. It is evidently burned in February by the hunters who use the track as this appears to be the driest month at this altitude (7,500 feet) and from native accounts the bracken only becomes dry enough to burn once in two years. The most striking plant in flower among the bracken was a conspicuous Hibiscus with flowers of a reddish purple (*H. diversifolius* form). Other plants included *Euphorbia longicornuta*, a tall yellow *Coreopsis* (*C. elliotii*), the little white *Cerastium Africanum*, and a tiny creeping St. John's wort (*H. peplidifolium*). The undergrowth in the bracken consisted mainly of a grass mixed with a sedge (*Fimbristylis capillaris*). At the same altitude, across a small valley, we noticed the only tree-ferns seen on the trip; these were growing in a forest glade on a steep slope. On this and neighbouring slopes we noted a striking tree with branches growing horizontally of which the older leaves near the main trunk were dark green and the younger leaves at the tips of the branches a beautiful pale apple-green; between the two were borne masses of crimson fruit. This tree, known as the "Masabu," grows to a height of about sixty feet with the lowest branches about twenty or thirty feet from the ground and in consequence we were unable to collect specimens; its fruit appears to attract large numbers of birds including the Spotted Wood-pigeon which is common on these slopes of Ruwenzori.

* A geographical form of the common European, *Pteridium aquilinum*.

Along the path through the bracken were seen a number of butterflies including a black and white Satyrid (*Mycalopsis aurivillii*), a few Lycaenids and *Antanartia* spp.; a single specimen of *Argynnis excelsior* was taken at about 8,500 feet but this species was commoner in the marshy ground near the Mubuku immediately below.

Above the bracken the ascent becomes still steeper, the soil is poorer and covered with a mat of wiry grass (*Panicum adenocarpum* and *P. calvum*) interspersed with patches of bare quartz. Growing in this grass were numbers of small shrubby plants, principally Compositae and Leguminosae. Lower down the ridge the dominant species of the latter was a *Crotalaria* and the Compositae were represented by several yellow-flowered forms of which one (*Helichrysum fruticosum*) had small very sweetly scented leaves. In this zone was also found a Labiate (*Micromeria biflora*) with leaves having a strong smell of peppermint, and at the highest limits of the zone the principal tree is a very graceful heather (*Philippia Stuhlmannii*) which grows to a height of about ten feet and bears small brick-red flowers.

Towards the end of this zone of short grass and shrubs the ridge becomes a knife-edge. Although the side of the ridge was very steep we were surprised to find that it was frequented by numbers of elephant whose tracks had facilitated the preparation of our path. We found that the attraction for these animals was a tall Leguminous shrub which grew on the very top of the ridge and on which they had browsed so heavily that, despite its abundance, there was hardly a plant intact. This shrub (*Smithia ruwenzoriensis* form) bore very pretty white flowers striped with mauve. A little lower down the ridge grew large numbers of two species of *Tephrosia* one bearing big white flowers and the other purple ones. The purple species (*T. doggetti*) is known to the Batoro as "Muluku" and is said to be used for poisoning fish in the lakes, though the Baganda use a white flowered species (*T. vogellii*) to which they apply the same name. In the forest, just below the crest of the ridge, at an elevation of about 8,400 feet, we observed the first *Podocarpus* ("Obwipe") and bamboos.

Further on the ridge broadens, becomes slightly flattened on the top and the forest extends right across its crest. The path enters this forest and arrives at the first rock-shelter, Nyinabitaba (Nakitawa of Filippi), a pleasant spot which according to our aneroid, lies at 8,500 feet above sea level, but Filippi's figure (8,701) is probably more accurate. On the 13th, when we arrived at Nyinabitaba (Pl. C, fig. 2) the two pinnacles of the Portal Peaks, rising almost sheer from the opposite side of the valley, were bathed in sunlight; at night, however, the air was cold, our thermometer at 8 p.m. reading 55.5° F.

NYANABITABA TO KYANSABO.

On the 14th our path first dropped steeply downwards to the Mubuku river, after crossing which it went over a low ridge and finally emerged upon the steep ridge forming the right bank of the Bujuku which it followed at much the same level for about two miles finally dropping steeply to the river itself. After crossing the Bujuku the path climbed steeply and then ran along the base of the ridge on the left of the valley and after a little more than a mile we came to Kyansabo rock-shelter, a very bleak, wet and uncomfortable spot. Nevertheless we had no actual rain and the damp depressing effect is due to the heavy tangled undergrowth which here takes the place of true forest while the gloom is enhanced by the narrowness of the gorge and by the steep cliffs of the Portal Peaks.

The path from Nyinabitaba first leads through a forest composed mainly of *Podocarpus milanjanus*; it appears that the biggest *Podocarpus* trees are to be found not on the top of the ridge, but on its very steep sides. Lower down the ridge towards the Mubuku the *Podocarpus* disappears and is replaced by a rather miserable growth of scattered bamboos. The path through these led over a tangled mass of a scrubby Labiate, *Pycnostachys urticifolia*. On the valley floor was found a tree *Dracaena* (*D. reflexa* var. *nitens*) which attains a height of thirty or forty feet. Growing over the lower branches of the trees at this point were masses of *Canarina Eminii* with dark salmon-coloured campanulate flowers. Along the path on the low ridge separating the Mubuku and Bujuku valleys we observed a large aroid (apparently *Arisaema ruwenzoricum*) with a beautiful green spathe streaked with cream, and which grew to a height of more than three feet. We also passed through an area where there were numbers of a very beautiful Amaryllid (probably a *Choananthus*) with flowers of a very dark reddish salmon, borne in fours and fives at the end of a long upright stalk. The forest here was very thick and consisted of an intimate mixture of *Podocarpus*, bamboos and *Dracaenas* under the shade of which the flowers of this Amaryllid showed up in bright contrast; the trees and rocks were covered with mosses and Selaginellas. The undergrowth changes about half a mile before the crossing of the Bujuku, when *Pycnostachys* gives place to *Mimulopsis elliotii*, a plant with dirty white flowers which has a stem with very numerous swollen nodes. This plant formed the predominant undergrowth encountered on the trip and extends from this ridge at about 8,700 feet to the Butakobwa river at 10,000 feet.

After crossing the Bujuku the path entered the only zone of bamboos which could be called a forest; in this zone they were the predominant plants. This forest did not extend for more than half a mile along the road and the bamboos ceased between 8,600 feet and 9,000 feet. The path then led through country with only scattered

trees of which the most characteristic was the big *Hagenia abyssinica* which grew to a height of about sixty or seventy feet and had an immense spread. The only other striking tree was a very tall Composite with attractive light mauve flowers (*Vernonia hymenolepis*) which grew to a height of thirty or forty feet. The undergrowth consisted almost entirely of a mixture of *Pycnostachys* and *Mimulopsis* while growing in more or less open spaces among this tangled undergrowth a tree, St. John's wort was observed in small numbers. All the trees were festooned with masses of a grey lichen which formed long streamers.

A feature of this zone of scattered trees, which extended from the bamboos to beyond Kyansabo rock-shelter, was the large number of runs and open spaces formed by wild pig. The temperature at Kyansabo at 8 p.m. was 50°F. and at 8 a.m. 43.4°F.; the height above sea level is about 9,000 feet.

Among the insects observed on the way from Nyinabitaba was a yellow Pierine butterfly which flew at a great height round the flowers of a big forest tree (*Dombeya runsoroensis*).

KYANSABO TO KIGO.

The journey from Kyansabo to Kigo rock shelter was, botanically, the most interesting part of the trip. Unfortunately it was a long and tiring day's march and it was difficult to spend as much time collecting as we would have liked. From Kyansabo the path continued along the base of the cliff which forms the left side of the Bujuku valley and passed over boulders and tree trunks overlain by a matted growth of the slippery stems of *Mimulopsis*, often two or three feet above the earth which it completely hid, thus making the march exceptionally difficult. Growing through this undergrowth were numbers of *Podocarpus*, a tree *Hypericum* with yellow flowers and a forest tree (*Rapanea rhododendroides*) with dark green leaves and red berries which seemed to have a very definite range as it was not noticed below Kyansabo and disappeared entirely by the time we reached Kigo. At Kyansabo it often attains a height of 30 to 40 feet while above this point it becomes increasingly stunted until, at the second Bujuku crossing (10,700 feet) it occurs in only the more sheltered spots and even in these does not exceed five or six feet in height. In the more or less open spaces in the undergrowth above Kyansabo the most noticeable plants included one or two species of *Cardamine* with pink flowers, a *Begonia* with bright red flowers, a green-flowered *Clematis* and two species of bramble. The first arborescent *Senecio* (*S. longiligulata*) was found at about 10,000 feet; this species reached a height of fully thirty feet and bore bright yellow flowers in a very much branched inflorescence. We saw numbers of very young plants growing around the older trees but very few of an intermediate age. Near these trees

we collected a tall and graceful *Thalictrum* which in many places reached six feet in height and has been identified by Kew as the same species (*T. rhynchocarpum*) which we collected lower down the mountain; the flowers, which were in profusion, were dull mauve in colour.

Beyond this point the path dropped steeply down the side of the ridge and ran through a thick growth of *Senecios* among which we met with the first specimens of a second tall slender *Lobelia* (*L. stuhlmannii*). We next passed the rock shelter of Nyamulejū, a very open and bleak spot which is stated by the porters to be a bad place to camp because men have been known to die there. Beyond Nyamuleju, the path, though still clinging to the side of the cliff, became more swampy; in the wetter places a tall *Rumex* (*R. afromontanus*) with an inflorescence reaching a height of over six feet, was very common.

The Bujuku river is joined by the Kanyuwankoko just above Nyamuleju and a little further on by the Butakobwa (perhaps the same as the Manureggio of the maps). Both of these rivers and other small streams which also flow from the Portal Peaks showed signs of having recently been in most violent flood; there had evidently been a very heavy storm on this part of the range. The volume of water had been so great that the Mubuku, into which the somewhat larger Bujuku flows, had risen rapidly; the new bridge under construction near Ibanda in the plains below, had been washed away and the river had entirely altered its course at this point.

Near the Kanyuankoko we found banks of a violet (*Viola eminii*) which bore either blue or white flowers. From here up to Kigo the most striking feature of the vegetation was the mosses, of which there were several different kinds which covered the ground for a foot or two in depth and also grew over the trunks and branches of the trees. Their colours varied through all shades of green and from pale straw colour to a rich dark reddish brown. Every tree and rock was festooned with grey lichen but the general colour effects were not so vivid and bizarre as those depicted by Wells, perhaps owing, in part, to the fact that many of the mosses on the trees were dry. Growing over the moss on the ground and climbing the lower branches of the trees was a leguminous plant with very deep violet-blue flowers (*Parochetus communis*) and in a fairly dry spot at about 10,500 feet was found the first extensive growth of Everlastings (*Helichrysum argyrocotyle*), which grew to a height of about three feet and bore very pretty pinkish flowers. A little further up we found another species (*H. guilelmii*) having a pure white flower and a *Rubus* with very large pink flowers, while the aroid met with lower down persisted along the drier parts of the sides of the valley.

About half a mile beyond the Butakobwa river the path dropped down to the valley floor where the soil is evidently constantly waterlogged. On a piece of boggy land we came upon the first examples of *Lobelia bequaertii* (Pl. G); these were nearly all in flower and there

were a few others which had evidently flowered about a year earlier, but we saw very few young plants.

For a little less than a mile before coming to the second crossing of the Bujuku (at about 10,700 feet) the forest consists of tree heathers (*Philippia* nr. *hexagona*) which were very close together and reached thirty to fifty feet in height. Their lower branches were more or less bare of leaves but the tops of the trees bore dense foliage which excluded almost all light even on a bright sunny day (Pls. E and F) Among the mosses in the heather forest grew a terrestrial orchid with vivid pink flowers (*Disa stairsii*).

After crossing the Bujuku the path lies along the first big valley "step" where the vegetation is dominated by tufts of a big sedge (*Carex runsoroensis*) which has brown flowers and yellow stamens. This flowered freely but the mosses which were also a feature of this bog, were entirely in a vegetative stage. Along the edges of this bog, on rather drier ground, *Helichrysum stuhlmanii* was dominant and grew almost into small trees with very hard woody stems; this same species was found to persist right up to the snows. Around Kigo rock, where the land is a little drier, the sedge is replaced by a carpet of the silver-leaved *Alchemilla ruwenzoriensis* on which we pitched our tent. This plant evidently grew on a stratum of peat which was overlying a bog and was very spongy to walk upon.

KIGO TO LAKE BUJUKU.

On August 16th we proceeded from Kigo rock shelter to Cooking-Pot camp above Lake Bujuku. The path first led up the side of the valley and then dropped down to the second valley step, across which it followed the stream, finally climbing the moraine to the source of the stream, Lake Bujuku.

On the side of the valley we passed through very thick vegetation composed mainly of tree heaths, *Lobelia stuhlmannii*, a bramble with large pink flowers and (in the more open parts) a tree *Hypericum* with orange and scarlet flowers, while on the valley step *Lobelia bequaertii* still persisted. On the sides of the valley and on the somewhat drier rocky moraines between the steps we met with another tree *Senecio* (*S. adnivalis*) which grows to about thirty feet and branches freely. On the swampy steps grew *Senecio erioneuron*, Cotton (1932) which differs markedly in habit from *S. adnivalis* being generally shorter, having fewer branches and with the dead leaves more persistent. A swamp-loving *Lobelia* (*L. wollastoni*) of great grace and beauty is first seen on these steps above Kigo; the flowers are a delicate grey-blue colour and, as the bract below each flower is small, they are more conspicuous than those of the other giant *Lobelias* which we saw. On the lower step its range overlaps that of *L. Bequaertii* but around Lake Bujuku it is the

only giant species; this distribution suggests that temperature may perhaps be the limiting factor in the range of *L. bequaertii*. Alchemillas, mosses and the yellow-flowered *Helichrysum* persist in the damper parts of the moraine up to and beyond the camp but the tree heaths (*P. hexagona*) disappear entirely before Lake Bujuku is reached and the only tree forms are the Senecios which are in places the dominant vegetation.

Cooking-Pot camp (Pl. J, fig. 1) consists of an immense boulder supported by a smaller one and beneath the former was plenty of room for our four beds and kit; but the tent was most useful, as we hung it over the front of the shelter which it helped to keep warm and dry.

We found on reaching Lake Bujuku that the level of the water was so low that the stream disappeared as a tiny trickle through a crack in the moraine debris. On our arrival we noted a pair of duck on the lake. Just as we reached the top of the moraine, the mist, which had descended in the middle of the morning, parted and the sun shone on the slopes of Mount Stanley (Pl. L); on comparing our photograph with one published by Filippi the same details of the mountain are clearly visible.

We were at Cooking-Pot camp from the evening of the 16th August to the morning of the 19th. During that period we made short excursions up the surrounding mountains and also collected in the valley itself. During our stay the weather was clear every day at dawn and we were able to see the snowfields bathed in the early sunlight; the weather remained clear and sunny until 9 a.m., but for the next two hours mist blew up and covered everything; this then cleared again and we had sunshine and uninterrupted views until 1-30 or 2 p.m. when the mist came up in great banks until about 6 p.m. After sunset we experienced a cold, frosty and clear atmosphere. The morning temperature was usually about 35°F. and there was a white frost on the ground each day. On several occasions we heard or saw small avalanches of ice or rock and on finally leaving Cooking-Pot camp to descend the mountain we heard through the mist a dull roar indicating a very heavy fall.

On the 17th a short trip was made up the Scott Elliot Pass; the start was late and it happened that on this particular day the mist did not clear at 11 a.m. and we were unable, therefore, to proceed to Elena Glacier as we had hoped. The most interesting plant collected on the higher slopes was a white flowered crucifer (*Arabis alpina*) found growing in wet places up to about 13,000 feet, while on the pass itself the only plants seen were a *Helichrysum*, which has not yet been identified, and which grew to a height of about eighteen inches, and two grasses (*Poa glacialis* and *Poa* sp.).

On the 18th an early start was made in bright sunlight and the Marguerita glacier was reached just as the mist rolled up. The path led either over very wet sodden ground or over masses of boulders

which had fallen at some time from the face of the glaciers above. Everywhere up to 13,500 feet the yellow *Helichrysum*, the deep moss and arborescent *Senecios* persisted, and growing in the moss the pink *Cardamine* was again noted. Above 13,500 feet the tree *Senecios* were the only vegetation seen and these persisted almost to the foot of the glacier at 14,500 feet. In the valley bottom above Lake Bujuku were found the same tussocks of rush, yellow moss, and *Senecio erioneuron* as were seen lower down. The sides of all the mountains were heavily clothed with tree *Senecios* and the tall slender *Lobelia wolla-tonii*. It may be pointed out that even the sides of the mountains were waterlogged through the constant seepage of water from the glaciers above. The soil was perhaps not so acid as that of the bogs in the valleys which had a pH of about 4.5 since the water of Lake Bujuku had a pH of about 8.

The return journey was begun on August 19th and we endeavoured during the descent to give more time to the demarcation of the floral zones of the upper part of the Bujuku valley and to the collection of insects.

SECTION II. ZONAL DIVISIONS.

The plant zones of Ruwenzori have been demarcated by Good and Rendle and in discussing the flora of the Bujuku Valley we have followed these writers to a limited extent. Rendle defines the highest zones as being from 12,000 to 15,000 feet but Good is perhaps more accurate in his figures of 12,800 to 14,800 feet.

THE HIGHEST FLORAL ZONE.

In the Bujuku valley the series of steps and moraines assist in the definition of convenient zonal boundaries. The highest zone may be taken as extending from about 12,500 feet up to the line of permanent ice and snow which is about 14,800 feet; the lower limit coincides approximately with the top of the moraine below Lake Bujuku. The altitude of Cooking-Pot camp, around which much of our collecting was done, is (from the position of the camp site marked by Filippi) about 12,900 feet.

The following flowering plants were collected in this zone and are arranged in systematic order following Hutchinson (1926):—

Arabis alpine, L. (89).*

Cardamine sp.

Sagina abyssinica, Hochst ex A. Rich (97).

Alchemilla geranioides, Rolfe (95).

Helichrysum guilelmii, Engl. (87).

Helichrysum sp. (86) at 14,800 feet on Scott Elliot Pass.

* The numbers given in parentheses are collectors' numbers registered at Kew.

Senecio adnivalis, Stapf. (100, 115).
Senecio erioneuron, Cotton. (70, 81, 82, 83, 99, 116, 117;
 perhaps 98 sece. Cotton p. 439).
Senecio sp. near *Humphreysii*, Good (88). This plant, which
 stands about a foot in height, had purple flowers and grew
 on the Uganda side of the divide on comparatively dry
 ground among the rocks, at about 13,100 feet, beside the
 stream running from the glacier on Mount Speke.
Lobelia wollastonii, Baker form (80).
Carex runsoroensis, K. Schum (108).
Festuca abyssinica, Hook (90).
Poa glacialis, Stapf (93) at about 14,000 feet on Scott Elliot
 Pass.
Poa spp. (91, 92, 94, identical).
Agrostis sp. (111).
 Mosses (96, 101, 102, 103, 104, 112).

A tall species of Umbellifer occurred in the clefts of Mount Stanley
 and below Stuhlmann Pass; Good records two specie (*Peucedanum
 dissectum* and *Torilis gracilis*) from the highest zone. The tree St.
 John's worts which, according to Good, extend into this zone, barely
 touched its lower limit. Our specimens of *Ranunculus oreophytus*
 were collected lower down the mountain but this species was also seen
 at Cooking-Pot camp.

The level bog in front of our camp was carpeted with big tufts of
Carex runsoroensis between which grew a Sphagnum over black mud;
Senecio erioneuron occurred in his bog together with a few *Lobelia
 Wollastoni* but the latter species was apparently commoner on the
 sides of the mountain at the edge of the bog. On the slopes of the
 mountain, and in other less boggy places the flora consisted of
Alchemilla spp. and *Senecio adnivalis*. One specimen of *S. erioneuron*
 was collected in a damp cleft on the mountain side but differed slightly
 from the specimens collected in the level bog. The grasses were
 collected mostly on the higher slopes or where rocks had recently been
 brought down from a glacier and where the soil was consequently very
 shallow.

THE SECOND FLORAL ZONE.

This zone includes the lower part of the moraine below Lake
 Bujuku and the two steps one above and one below Kigo; it ends at
 the point where our path crossed the Bujuku just below the junction
 of the Waigga River. Our aneroid at this point read 10,700 feet, but
 from Filippi's map the altitude appears to be nearer 11,000 feet.

The following plants were found in this zone:—

Ranunculus oreophytus, Del. (68).
Subularia monticola, A.Br. (76), a tiny plant growing at the
 water's edge beside the Bujuku stream.

Rumex afromontana, Th. Fries jr. (121).
Hypericum lanceolatum, Lam. (50) and (74). This name has been applied by Kew to the two forms mentioned above in the general section. The one (74) collected at higher levels (above 11,000 feet) had orange flowers with the petals scarlet below, while the other (50) collected at lower levels (below 10,500 feet but above 9,000 feet) had yellow flowers. Good records two forms, *H. ruwenzoriense* de Wild. with yellow flowers and *H. bequaertii* de Wild. with orange flowers; the ranges of these two forms appear either to overlap greatly or to be ill-defined in the areas collected by Capt. Humphreys.
Rubus sp. (105).
Peucedanum Kerstenii, Engl. (60).
Philippia nr. *hexagona*, Alm. and Th. Fries jr. (74).
Galium sp. (78).
Carduus sp. (107).
Helichrysum stuhlmanii, O. Hoffm. (67).
Senecio syncephyllus, S. Moore (114).
Senecio adnivalis, Stapf.
Senecio erioneuron, Cotton.
Senecio spp. (71 and 75).
Lobelia wollastonii, Bak., extending from the highest zone into the upper part of this zone.
Lobelia stuhlmanii, Schweinf.
Lobelia bequaertii, de Wild. (This form is considered by Kew to be specifically distinct from *L. deckenii* which is now not considered as occurring on Ruwenzori; older records of *L. deckenii* refer to *L. bequaertii*.)
Carex runsoroensis, K. Schum. Again in all the bogs.
Cyperus emini, C. B. Clarke (100).
Iuzula johnstonii, Buchen (110).
Bromus sp. (118).
Deschampsia latifolia, Hochst. (139).
Asplenium praemorsum, Sw. (120).
Lycopodium Saururus, Lam. (73).
Moss (? *Sphagnum*) (113).

The zone is, on the whole, similar in general appearance to the one above; a few strictly high level species such as *Lobelia wollastonii* hardly descend to this altitude and the development of the tree Senecios has not reached the climax which is attained in the higher zone. This second zone may be characterised by the association of arborescent Senecios, tree heaths (*Philippia* sp.), Helichrysums (which here reach their maximum development), *Lobelia bequaertii*, and Alchemillas; comparatively few of these last were collected as the diversity of species was not recognised in the field. The boggy steps here, also,

were dotted with tussocks of *Carex runsoroensis* among which grew the Sphagnum. Ferns which were absent in the highest zone appeared towards the upper limit of the second zone.

THE THIRD FLORAL ZONE (10,700' TO 9,500').

This stretches from a point at the bottom of the lowest valley step, where our path crossed the Bujuku, and merges into the mixed forest and shrub above Nyamuleju. It is less well defined than the two previous zones, partly because the path follows a hillside and does not descend at a uniform gradient. The upper part of the zone is characterised by a forest of tree-heathers on the trunks of which are thick clumps of moss and on the branches festoons of lichens. Two species of these heathers occur, at the upper limit the dominant species is the *Philippia* (*P. nr. hexagona*) while lower down the proportion of *Erica* (*E. ruwenzoriensis*) increases and this species could be seen in flower on the hillsides and at the lower limit of the zone where it seemed entirely to replace the *Philippia*. *Lobelia bequaertii* enters the top of this zone in a suitable boggy spot but *Lobelia stuhlmannii* is the characteristic species of *Lobelia*. A number of smaller plants are characteristic of this zone, which is the lowest which shows definite alpine characters. The species of arborescent *Senecio* found here is *S. longiligulata*.

The following plants were collected in this zone:—

- Clematis* sp. (52).
- Thalictrum rhynchocarpum*, Dill. and A. Rich.
- Ranunculus volkensii*, Eng. (129).
- Ranunculus stagnalis*, Hochst, ex A. Rich (69).
- Ranunculus pubescens*, Thunb. (128).
- Arabis alpina*, L. (132).
- Viola eminii*, R. E. Fries (63).
- Cerastium viscosum*, L. (125).
- Geranium simense*, Hochst (126).
- Epilobium fisaietalum*, Steud. (134).
- Melothria longipedunculata*, Cogn. (51).
- Hypericum lanceolatum*, Lam. (50).
- Alchemilla ruwenzoriensis*, Rolfe (57).
- Hagenia abyssinica*, Wild (152).
- Parochetus communis*, Hamilt. (61).
- Parietaria ruwenzoriensis*, Cortesi (62).
- Peucedanum kerstenii*, Engl. (57).
- Peucedanum runsoricum*, Engl. (47).
- Anthriscus dissectus*, C. H. Wright (55).
- Erica ruwenzoriensis*, Alm. and Th. Fries jr. (48, 49).
- Rapanaea rhododendroides*, Menz. (58).
- Galium serrato-hamatum*, S. Moore (53).
- Conyza* sp. (136).

Helichrysum argyrocotyle, S. Moore (65).
Helichrysum guilelmii, Engl. (66).
Helichrysum stuhlmannii, O. Hoffm. (67).
Senecio syncophyllus, S. Moore (65).
Senecio longiligulata de Wild. (56).
Senecio sp. (71).
Veronica glandulosa, Hochst ex Benth (64, 124).
Disa stairsii, Kraenzl (72).
Polystachya sp. (151) epiphyte.
Carex ? cognata, Kunth. (135).
Bromus sp. (131).
Pelypolium lineare, Thunb. (130).
Asplenium bipinnatum, C. Chr. (137).
Pteris sp. (138).
 Mosses (127) and (140).
Physcia leucomela, Wainio. (150).
 Liverwort (135).

THE LOWER FOREST AND BRACKEN ZONES.

It has been mentioned above that the lower zones are difficult to demarcate; a rather full description of them has therefore been included in the general account of the ascent, while the plants collected below 9,500 feet are listed below with the locality and altitude appended but without further comment.

Clematis sp. (27, 28), Kyansabo, 8,000 feet.
Thalictrum rhynchocarpum, Dill. and A. Rich. (1), Mihunga, 6,200 feet.
Ranunculus pubescens, Thunb. (205), Ibanda, 4,500 feet.
Stephania abyssinica, A. Rich (170), Nyinabitaba, 8,500 feet, Mubuku Valley, 6,000 feet.
Piper guineense, Schum. and Thonn. (185), Mubuku Valley, 7,000 feet.
Peperomia reflexa, Dictr. (14), Mihunga, 6,000 feet, epiphyte.
Sedum sp. (172), Bujuku Valley, 8,000 feet.
Cerastium africanum, Oliv. (15), Mihunga, 6,500 feet.
Harpagocarpus snowdenii, Hutch and Dandy (6), Mihunga, 6,200 feet.
Basella alba, L. (17), Mihunga, 6,200 feet.
Geranium aculeolatum, Oliv. var. (5), Mihunga, 6,200 feet.
Impatiens sp. (201), Ibanda, 4,000 feet, extends to 6,000 feet.
Impatiens sp. (185), Mubuku Valley, 6,500 feet, extends to 9,000 feet.
Faurea saligna, Harv. (179), Mubuku Valley, 8,000 feet.
Hypericum peplidifolium, A. Rich. (194), Nyinabitaba, 7,500 feet.

Dombeya runsoroensis, K. Schum. (195), 6,500 to 9,500 feet.
Pavonia kilimandscharica, Gurke (9), Mihunga, 6,000 feet.
Pavonia schimperiana, Hochst (207), Mihunga, 6,000 feet.
Hibiscus diversifolius, Jacq. form (17), Nyinabitaba, 7,000 feet. This form is so different both in habit and habitat from the form found in tropical Uganda swamps that it is difficult to believe that the two forms are conspecific.
Kosteletzkya adoensis, Hochst. var. *hirsuta* Oliv. (189), Mubuku Valley, 6,000 feet.
Phyllanthus sp. (11), Mihunga, 6,000 feet.
Euphorbia longicornuta, Pax (18), Nyinabitaba, 7,000 feet.
Rubus doggettii, C. H. Wright (161), Bujuku Valley, 8,500 ft.
Rubus sp. (40), Kyansabo, 8,500 feet.
Rubus sp. (174), Bujuku Valley, 8,500 feet.
Tephrosia doggettii, Bak. form (182), Nyinabitaba, 8,500 feet.
Amphicarpaea africana, Harms. (3), Mihunga, 6,200 feet.
Smithia ruwenzoriensis, Bak. form (182), Nyinabitaba, 8,500 feet.
Psophocarpus palustris, Desv. (197), Mihunga, 6,500 feet.
Zornia tetraphylla, Michx. (210), Ibanda, 4,000 feet.
Pilea ceratomea, Wedd. (37), Kyansabo, 8,500 feet.
Cornus volkensii, Harms. (173), Bujuku Valley, 8,500 feet.
Schlefflera c.f. *polysciada*, Harms. (196), Nyinabitaba, 8,500 feet.
Peucedanum runzoricum, Engl. (45), 8,500 feet, Kyansabo.
Philippia stuhlmanni, Engl. (20), Nyinabitaba, 8,500 feet.
c.f. *Grumilea* sp. (13), Mihunga, 6,000 feet.
Rubia sp. (4), Mihunga, 6,200 feet.
Galiniera coffeoides, Del., Bujuku valley, 8,500 feet.
Pentas carnea, Benth. (178), Nyinabitaba, 8,500 feet.
Borreria Ruelliae, K. Schum. (206), Ibanda, 4,000 feet.
Oldenlandia abyssinica, Hiern. (209), Ibanda, 4,500 feet.
Erlangea ruwenzoriensis, S. Moore (184), Bujuku Valley, 9,000 feet and (171) 8,000 feet.
Carduus sp. (162), Bujuku river, 8,500 feet.
Conyza ruwenzoriensis, R. E. Fries (180), Nyinabitaba, 8,000 feet.
Coreopsis elliotii, S. Moore (19), Nyinabitaba, 8,000 feet.
? *Gynura crepidoides* (188), Mubuku Valley, 6,500 feet.
Melanthera brownii, Sch. Bip. (204), Ibanda, 4,000 feet.
Helichrysum argyrocotyle, S. Moore (175), Bujuku Valley, 8,000 feet.
Helichrysum fruticosum, Vatke (183), Nyinabitaba, 8,000 feet, extends from 7,000 feet to over 9,000 feet.
Senecio maranguensis, O. Hoffm. (154), Nyinabitaba, 8,500 feet and (187) 7,500 feet.

- Senecio multicornumbosa*, Klatt. (200), Mihunga and Mubuku Valley, 5,500 feet to 6,500 feet.
- Vernonia hymenolepis*, A. Rich (46), Kyansabo, 9,000 feet.
- ? *Ethulia conyzoides* (44), Kyansabo, 8,500 feet.
- Ardesiandra sibthorpioides*, Hook form (16), Mihunga, 6,500 feet.
- Plantago palmata*, Hook form (203), Ibanda, 4,500 feet to 6,000 feet.
- Canarina eminii*, Asch. aus Schwein. (29, 30), Kyansabo, 8,000 feet.
- Lobelia Gibberoa*, Hemsl. (211), Mihunga, 5,500 to 8,000 feet.
- Cynoglossum* c.f. *geometricum*, Baker and Wright (8), Mihunga, 6,200 feet.
- Solanum ruwenzoricum*, C. H. Wright (43), Kyansabo, 9,000 feet.
- Discopodium penninervium*, Hochst (41), Kyansabo, 9,000 ft.
- c.f. *Thunbergianthus* sp. (10). This plant appears to be the one described by Good as *T. ruwenzoriensis* f. *macrocalyx*, and is a comparatively small Rambler.
- Rhamphicarpa herzfeldiana*, Vatke (202), Ibanda, 4,000 feet
- Streptocarpus ruwenzoriensis*, Baker (2), Mihunga, 6,200 ft.
- Mimulopsis Elliottii*, C. B. Clarke (38), Kyansabo, 9,000 feet.
- Justicia pinguior*, C. B. Clarke (191), Nyinabitaba ridge, 7,500 feet.
- c.f. *Coleus* sp. (166), Bujuku Valley, 8,500 feet.
- c.f. *Coleus* sp. (89), Kyansabo, 8,500 feet.
- Pycnostachys urticifolia*, Hook f. (26), Nyinabitaba, 8,500 ft.
- Micromeria biflora*, Benth. (190), Nyinabitaba ridge, 7,000 ft.
- Leucas martinicensis*, R. Br. (198, 199), Mihunga, 6,500 feet.
- c.f. *Arisaema ruwenzoricum*, N. E. Brown (85, 86), Kyansabo, 8,000 feet.
- Dracaena reflexa*, Lam. var. *nitens*, Bak., Kyansabo, 8,000 ft.
- Dioscorea beccariana*, Martelli (212), Mihunga, 6,000 feet.
- Aneilema aequinoctialis*, Kunth. (12), Mihunga, 6,000 feet.
- Epipactis africana*, Rendle (21), Nyinabitaba, 7,500 feet.
- Disa Stairsii*, Kraenzl. (22), Nyinabitaba, 8,000 feet. A very pale specimen and without the very bright pink colour of those found at higher altitudes.
- Disperis* sp. (25), Nyinabitaba, 8,500 feet.
- Orchid (24), Nyinabitaba, 8,500 feet. Perhaps *Cynosorchis anacamserpoides*, Kraenzl., a specimen of which, determined by Kew, had lost its reference number.
- Carex johnstonii*, Boeck. (165), Bujuku Valley, 8,500 feet.
- Carex echinochloe*, Kunz. var. *chlorosaccus*, Kukenth (192), Mubuku Valley, 6,000 feet.

- Fimbriatylis capillaris*, Kunth, var. *trifida*, C. B. Cl. (184), Nyinabitaba, 8,000 feet.
- Panicum adenophorum*, K. Schum. (177), Nyinabitaba, 8,500 feet.
- Panicum calvum*, Stapf. (177), Nyinabitaba, 8,500 feet.
- Podocarpus milanjanus*, Rendle (160), Bujuku Valley, 8,500 feet.
- Hymenophyllum kuhni*, C. Chr. (31), Kyansabo, 8,000 feet.
- Elaphroglossum hirtum* (Sw.), C.Ch. (157), Bujuku Valley, 8,500 feet.
- Dryopteris boreana*, C.Chr. (159), Bujuku Valley, 8,500 feet.
- Asplenium anisophyllum*, Kze. (159, 167), Bujuku River, 8,000 feet and 8,500 feet.
- Asplenium abyssinicum*, Fée (168), Bujuku Valley, 8,500 feet.
- Asplenium lunulatum*, Sw. (169), Bujuku Valley, 8,500 feet.
- Lycopodium phlegmaria*, L. (155), Bujuku River, 8,000 feet.
- Lycopodium clavatum*, L. (23), Nyinabitaba, 8,000 feet.
- Selaginella* ? *Goudotiana*, Spreng (208), Muhunga, 5,000 feet. apparently extends to 8,000 feet, but no spore-bearing branches were seen.

THE FLOWERING OF LOBELIAS AND SENECIOS.

In the account of the collections made by the British Museum expedition, Rendle and others quote Woosnam's remarks on the ages and flowering period of these plants. He estimates the life of a tree Senecio at from fifty to a hundred years emphasising the importance of taking into consideration the time required for the accumulation of the persistent dead leaves which are so characteristic of some of the species. He suggests that these plants flower every few years; a very few Senecios were seen in flower by us and similarly only a few showed dead flower-heads which might perhaps have been a year old. It seems clear that these plants cannot flower annually and Woosnam's estimate of the interval between flowerings would appear to err, if at all, on the conservative side.

In describing the Lobelias, the British Museum expedition state that they found but two plants of *L. deckenii* (i.e. *L. bequaertii*) in flower but, as will be seen from the photograph (Pl. G) this species was flowering very freely at the time of our visit. Dawe (1906) who ascended the Mubuku Valley in July, 1905, appears to have found all the species of Lobelia in flower. The two other species, *L. Wollastonii* and *L. stuhlmannii* were also flowering in considerable numbers. There were a few dead plants of *L. bequaertii* but these were considerably fewer in numbers than those which were in full bloom and it was only with some difficulty that we found a few plants from which we could collect ripe seed.

It is not easy to judge the length of life of *L. bequaertii* and to decide at which periods these plants come into flower. The time of our visit coincided with a maximum flowering period and it seems that this cannot be more frequent than every two or three years; perhaps the fine warm weather which we experienced may have helped to initiate the production of flowers.

There were considerable numbers of *L. stuhlmannii* of all ages from tiny seedlings to plants in full flower; it is probable that the suggestion made by Woosnam, that this species is longer lived than *L. bequaertii*, is correct.

COMPARISON WITH OTHER FLORAS.

It is not at present possible to make a detailed comparison between the alpine flora of Ruwenzori and that of other mountains in East Africa as systematic work is still incomplete. The whole literature is not available in East Africa, and the writers hope that at some later date they may be able to continue work on this subject in the field. One of the writers recently contributed to an account of some of the plants of Mount Elgon (Hancock and Soundy). There is one difference between the floras of the two mountains: on Mount Elgon the higher slopes are mostly grassy meadows, whereas on Ruwenzori they are rocky hill-sides or bogs. Certain groups of plants are, therefore, absent from Ruwenzori and those especially missed were the Anemonies, gentians and Iridaceae. On the higher more northern ridges of Ruwenzori (not visited by our party) Good records a carpet of *Alchemilla* as the sole vegetation.

the flora around the crater lakes between Fort Portal and the northern end of the range is at present being investigated and it is difficult to state its relationship to that of Ruwenzori. The soil is of recent volcanic origin, the dominant plants are short grasses and the climate more resembles that of the lower slopes of Elgon. The flora of the northern end of Ruwenzori including the more luxuriant bamboo forests of Musendama, was not collected and is not here discussed; that of the lower-lying country at the southern end of the range near lakes Edward and George included in the account of the British Museum expedition.

FAUNISTIC NOTES.

The fauna of the mountain has been dealt with extensively by various British Museum specialists in the Ruwenzori reports and the vertebrates, more especially the birds, received very careful study. It is unfortunate that the insects could only be dealt with very briefly and in some cases the range of altitude given is highly deceptive since in many cases it is clear that the statement " from 6,000 to 13,000 feet " merely means that the insect was captured somewhere within this range. A good example of this is the male of *Danaïd chrysippus* f.

alcipus of which only one specimen was collected but of which the range is given as 6,000—13,000 feet.

Among the Senecios and Alchemillas the most noticeable insects were small Geometrid moths (*Larentia* spp.) resembling the European "Carpets." At the bases of the leaves of *Senecio adnivalis* and *S. erioneuron* were found weevils *Subleptospiris turbida*, Mshl., which superficially resembled those found in similar situations on Elgon, and the flowers of this species yielded specimens of Cryptophagids and *Athela ugandae*, Bernh. (*Staphylinidae*). The flower heads of *Lobelia wollastonii* were carefully examined and the dominant insect was a small weevil *Pseudomesites lobeliae*, Mshl., which appeared to be feeding on the fruits; in addition were found numbers of *Omalium algidum*, Fauv., a Staphylinid recorded by Scott from the closely related *Lobelia rhyngochopetalum* in Abyssinia.

In Lake Bujuku a specimen of *Cephanodes hylas*, a clear-winged Sphingid moth, common in Uganda at lower levels, was found floating on the water; it appeared at first to be dead but revived after being taken into camp. This insect has a very powerful flight and it seems improbable that it was carried up by wind; it would almost seem that it had been endeavouring to cross the mountain.

Among the species of insects collected at the higher levels two show apparent Palearctic affinities: a male Chironomid, *Spaniotoma* (*Orthocladium*) sp. was collected on flowers of a giant Senecio at about 12,000 feet and the following note was received from the Imperial Institute of Entomology: "Very similar to several European species and unlike anything Dr. Edwards has hitherto seen from Africa." The second was a single female *Tipula* from about 12,500 feet concerning which it was noted: "This species is very different from all the other African *Tipula* in the British Museum; it has a decidedly 'Palearctic' appearance and seems related to *T. marmorata* and similar European species."

The only other fly collected in these floral zones was a Psychodid, *Clytocerus* sp., below Kigo, 10,000 feet.

The Lepidoptera from these regions included:—

Larentia heteromorpha, Hamps. (*Geometridae*), Bujuku, 12,000 feet.

Larentia barnsi, Prout, Bujuku, 12,000 feet.

Larentia hancocki, Prout (*Geometridae*), Bujuku, 12,000 feet.

Larentia wellsi, Prout (*Geometridae*), Bujuku, 12,000 feet.

Larentia alluaudi, Prout (*Geometridae*), Kigo, 10,500 feet.

Homalopsyche hyacinthopa, Meyr. (*Tineidae*), Bujuku, 12,000 feet.

Polymnestra capnochcalca, Meyr. (*Tineidae*), Bujuku, 12,000 feet.

Plutella orosema, Meyr. (Plutellidae)*, Bujuku, 12,000 feet.
Labdia iriphaea, Meyr. (Cosmopterygidae), Bujuku, 12,500 ft.
Scoparia tyrophanta, Meyr. (Pyralidae), Bujuku, 12,000 feet.
Harpencyreus reginaldi, Heron (Lycaenidae), below Kigo, 10,500 feet.

Cupido aequatorialis, Sharpe (Lycaenidae) with the above. Four males and two females of this species were collected on a sunny hillside toward the lower limits of the heather zone (Pl. VI), being found with *H. reginaldi* more particularly on the flowers of a tall ragwort. These specimens of *C. aequatorialis* are smaller and have the brown markings on the underside darker than in two males and seven females collected on the Bwamba pass and at Nyakasura near Fort Portal. A single male from Nkokonjeru, a hill rising to about 7,000 feet near Mount Elgon, is darker than any of the specimens from the lower levels near Toro.

Trapezotis anisastra, Meyr. (Tineidae), below Kigo, 10,000 ft.
Tinea amphitrita, Meyr. (Tineidae), Kyansabo, 10,000 feet.
Acrocercops chenopa, Meyr. (Gracilariidae), Kyansabo, 10,000 feet.

Among the Coleoptera *Ruwenzoria viridis*, Labois (Galerucidae) was taken below Kigo at about 10,000 feet and *Silidius ruwenzoriensis* Pic. var. *hancocki*, Pic. (Telephoridae) at 11,000 feet near Kigo.

Among the insects collected at lower levels it is almost impossible to decide which can be considered truly endemic or even characteristic of African mountains in general. The following are worthy of mention:—

Argynnis excelsior, Butl. (Nymphalidae), Nyinabitaba, 8,500 feet and below Mihunga, 6,000 feet; also found at the top of the Bwamba pass, 8,500 feet and collected by the late C. C. Gowdey from near Lake George.
Hypolycaena jacksoni, B. Bak. (Lycaenidae) by a stream in forest near Mihunga about 6,000 feet.
Gnophodes grogani, E. Sharpe (Satyridae), forest on Bwamba pass, 7,500 feet.
Mycalasis aurivillii, Butl. (Satyridae), Nyinabitaba ridge and Bwamba pass, 7,000 feet up to 8,500 feet.
Mycalasis matuta, Karsch. (Satyridae), Mihunga, 6,000 feet, and Bwamba pass, 6,000 feet. Apparently confined to about this altitude.

* The following note by Mr. Meyrick has just been received: "Nearest the European *incarnatella* and the Abyssinian mountain species now in course of publication." (*Exot. Microd.* IV, p. 228, 1932.)

Hydrelia argyridia, Butler (Geometridae).

Argyroploce phyllodoza, Meyr. (Eucosmidae), Nyinabitaba, 8,500 feet.

Philotherma thoracica, Butl. (Lasiocampidae), Nyinabitaba camp, 8,500 feet. It is possible that a Lasiocampid larva found on *Philippia stuhlmanni* only a few yards from where the moth was captured may have belonged to the same species.

The bamboo forest in the Bujuku Valley was not growing vigorously and a day trip was therefore subsequently made to the bamboos at the top of the Bwamba Pass (8,500 feet) in order to compare the fauna with that collected on Mount Elgon. A small collection of insects was made and special attention was given to bored bamboos. It is unfortunate that no moths were bred from the larvae collected but they appeared not to be Noctuids, as was found to be the case on Elgon (Hancock and Sounday) but more probably Pyralids. The mosquito fauna was carefully collected and both in open and bored bamboos were found larvae of *Culex nebulosus*, Theo. In addition *Uranotaenia shillitonis*, Edw. (MS) occurred sparingly and one pupa of a *Megarhinus** was found but was damaged in the pipette and died. Mosquitoes were also collected in the Mubuku and Bujuku valleys but the larvae from different altitudes were unfortunately mixed in the jars. It is, however, almost certain that larvae collected in a pool among the stones in the flood-bed of the Bujuku at 8,500 feet included *Culex andersoni*, Edw. Larvae were also collected in small grass-grown pools in the Mubuku Valley and it is probable that among these was *Culex ninagongoensis*, Edw. *Culex hopkinsi*, Edw. (MS) has a larva which closely resembles *C. andersoni* and at the time the larval differences were overlooked so that it is not now possible to state whether this species inhabited the pool in the stream bed or occurred lower down in the valley at about 6,000 feet.

Simuliid larvae were taken from stones in the Bujuku at 8,500 feet and further larvae collected at the bottom of the Bwamba Pass included *S. gilvipes*, Pom. to which species it is probable the larvae collected in the Bujuku Valley belong. In the same stream at the foot of the Bwamba Pass were found a number of torrenticolous beetles resembling species of *Elmis* and some pond skaters (Veliidae).

A small collection of zoo- and phyto-plankton was made in Lake Bujuku and from a few boggy pools at above 13,000 feet. No insect life was found but Planarians occurred under stones at the edge of Lake Bujuku and a number of small Crustacea were collected with a fine silk net. The temperature of the lake was 0.6°C., the alkali reserve

* The only specimen of *Megarhinus* known from the Bwamba Pass is in exceedingly poor condition but appears to be *M. aeneus*.

0.0004N., and the amount of phosphates was 0.2 parts per million calculated as P_2O_5 , organic; inorganic phosphates were not demonstrable by the Caeruleo-molybdate test. The material from these waters has been kindly taken over by the Cambridge expedition to the African lakes and the analyses were done by Dr. Griffith, Assistant Agricultural Chemist, and a member of our party.

ACKNOWLEDGMENTS.

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MAP.

Uganda Survey Department sheet number X, IV N.E. 1/50,000 drawn by
D. O. Mathews.

END OF VOLUME 10.



ILLUSTRATIONS

PLATE A.

- Fig. 1. Forest on the Bwamba pass, western slopes of Ruwenzori, about 7,500 feet. showing tree ferns.
- Fig. 2. View from the top of the Bwamba pass looking east over the top of the banks of clouds overlying the plains. Taken at 8,500 feet.

PLATE A.

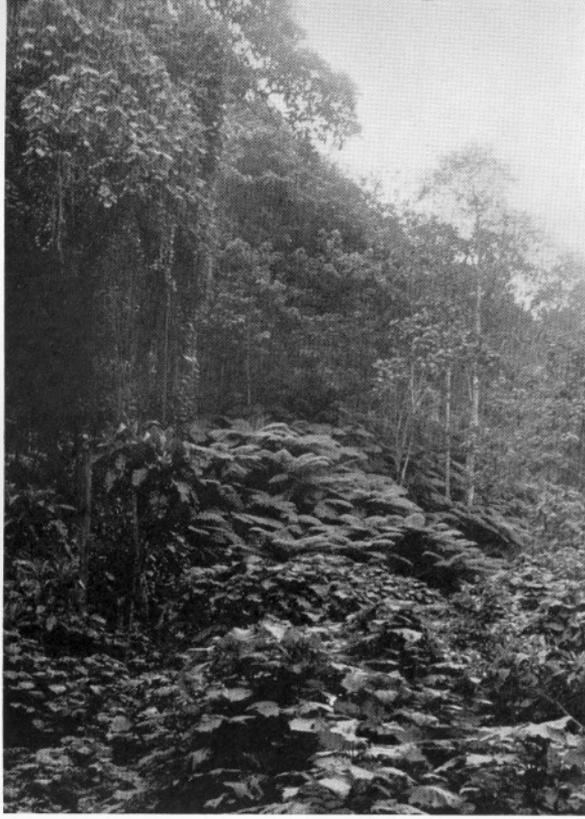


Fig. 1.

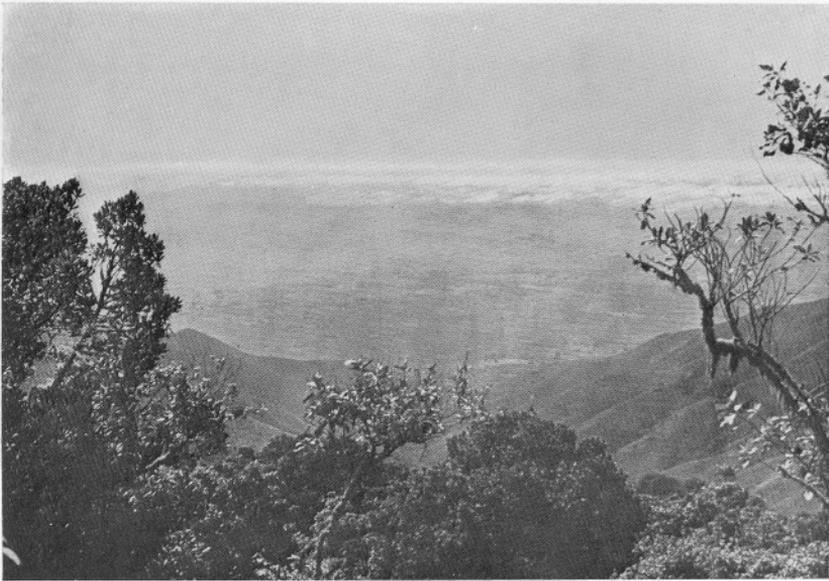


FIG. 2.

Photos: G. L. R. Hancock.

PLATE B.



Photo: G. L. R. Hancock.

The bamboo forest at the top of the Bwamba pass, 8,500 feet.

PLATE C.

The Bujuku stream above Kigo on the second valley step, showing giant
Senecio and *Lobelia bequaertii*, at 11,600 feet.

Nyinabitaba camp on a forested ridge 8,500 feet.

PLATE C.



Fig. 1.



FIG. 2.

Photos: G. L. R. Hancock.

PLATE D.



Photo: G. L. R. Hancock.

Vegetation above Nyamuleju at about 10,000 feet showing lichens hanging from tree heaths and flowering specimens of *Lobelia stuhlmannii*.

PLATE E.



Photo: G. L. R. Hancock.

Heather forest at about 10,000-10,500 feet showing the thick cushion of moss on the trunks (top right), lichens, mosses, ferns and young plants of *Lobelia stuhlmannii*.

PLATE F.



Photo: G. L. R. Hancock.

The Bujuku river flowing through the heather forest at about 10,500 feet.

PLATE G.

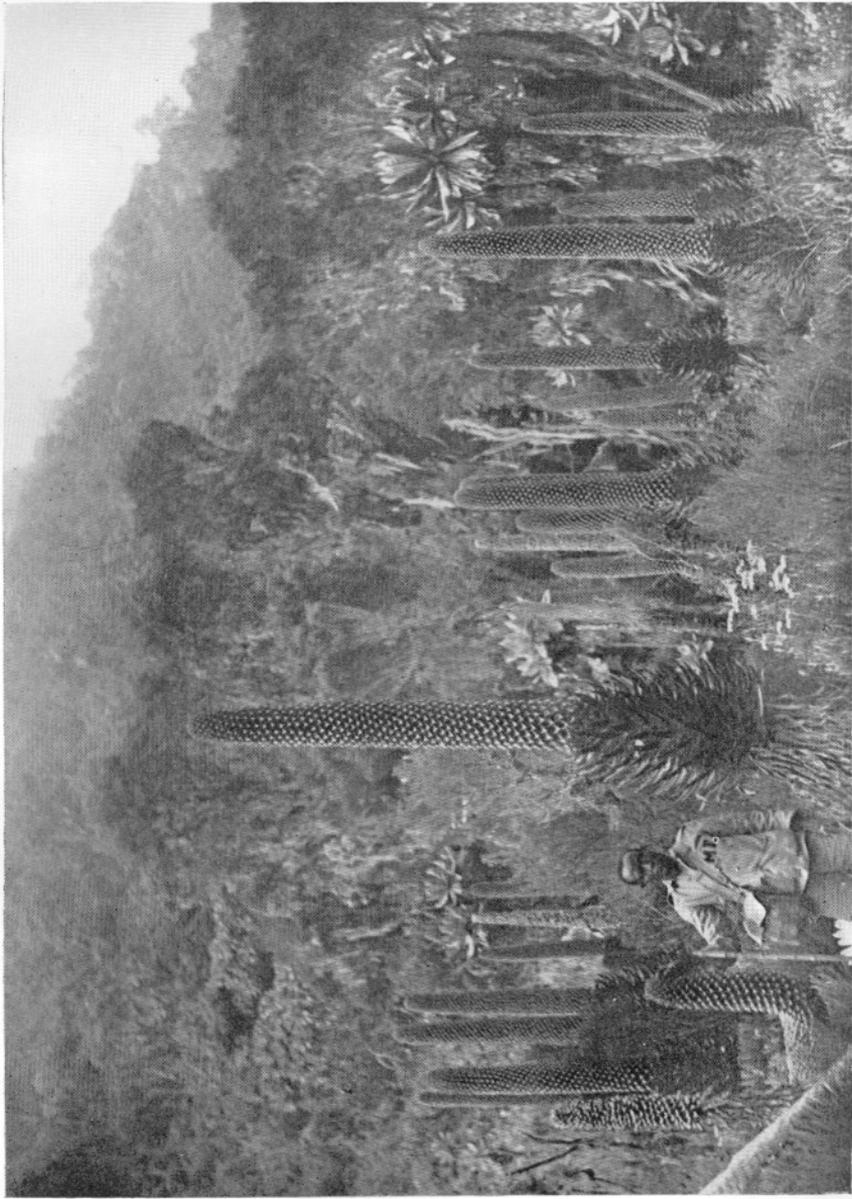


Photo: G. L. R. Hancock.
A group of *Lobelia bequaertii* in flower, at about 10,700 feet.

PLATE H.

FIG. 1. The Senecio forest near lake Bujuku, 12,800 feet, showing cushions of moss on the tree trunks.

FIG. 2. Lake Bujuku, 12,850 feet showing *Lobelia wollastonii*.

PLATE H.

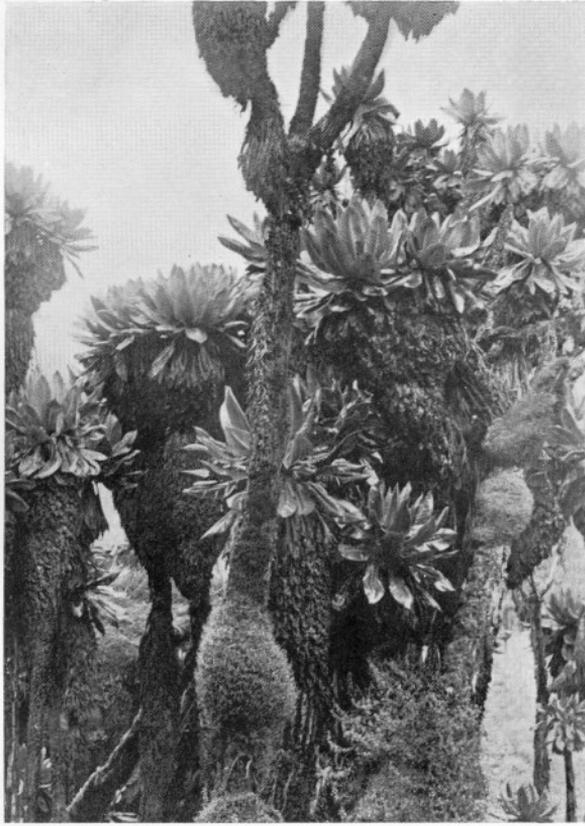


FIG. 1.

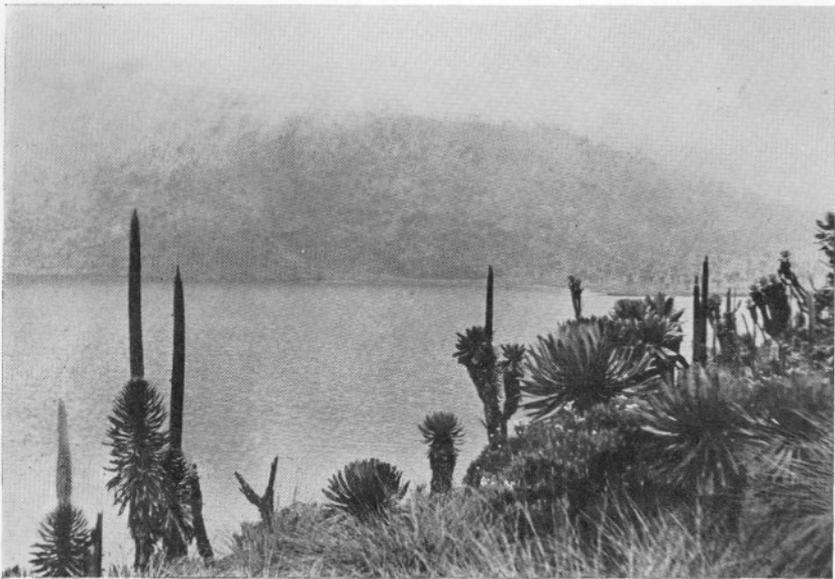


FIG. 2.

Photos: G. L. R. Hancock.

PLATE I.

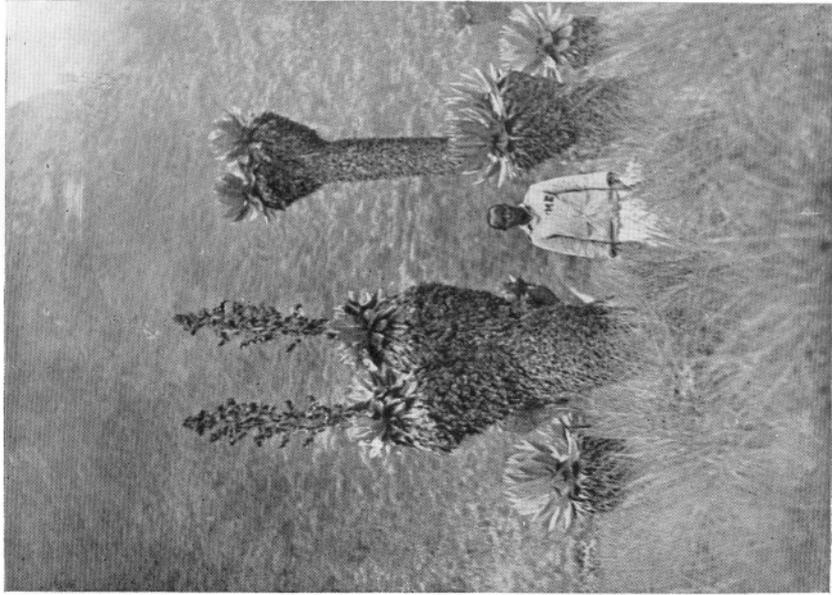


FIG. 1.

Photo: G. L. R. Hancock.

Fig. 1.

Senecio erioneuron growing in a bog among

Lobelia wollastoni and *Senecio erioneurno* at the same point as fig. 1.

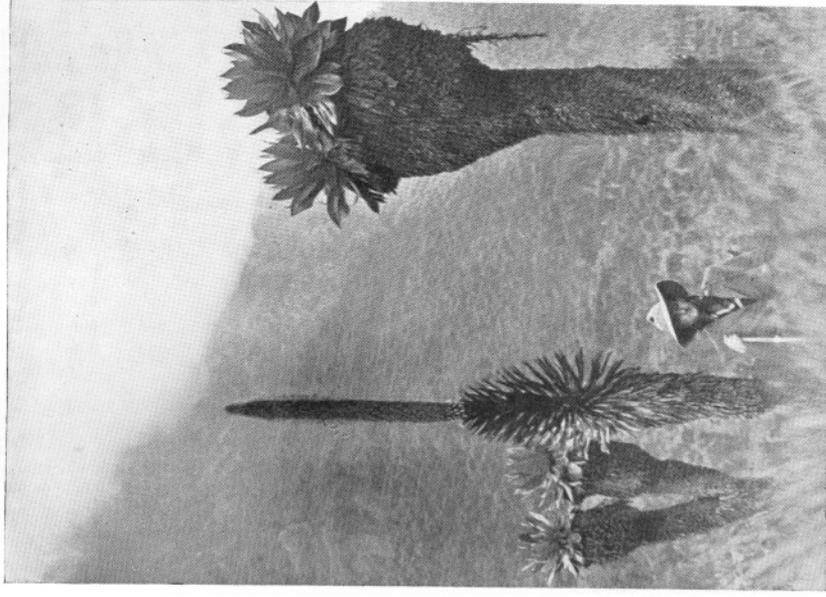


FIG. 2.

Photo: G. L. R. Hancock.

Fig. 2.

Carex runsoroensis above lake Bujuku at nearly 13,000 feet.

Fig. 1.

Carex runsoroensis above lake Bujuku at nearly 13,000 feet.

PLATE J.



FIG. 1.

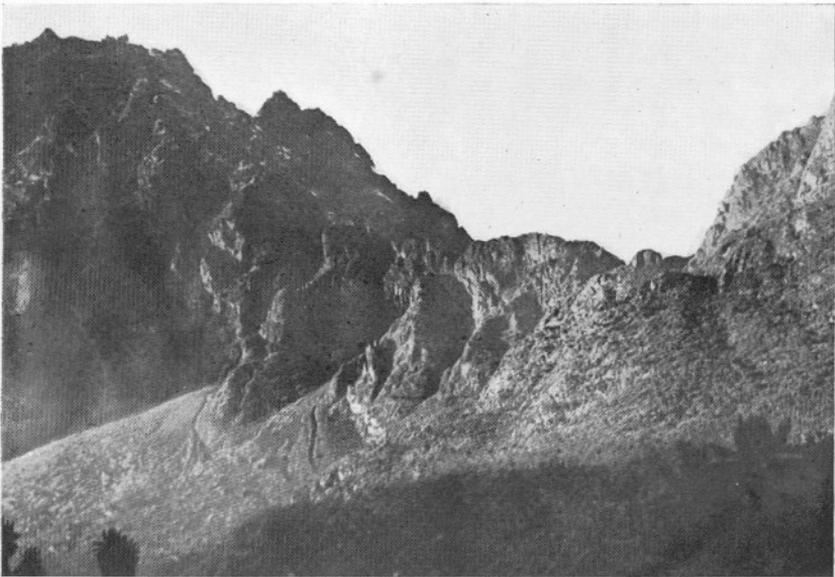


FIG. 2.

Fig. 1. Cooking-Pot camp, nearly 13,000 feet, showing *Senecio adnivalis*.
Fig. 2. Mount Baker and Scott-Elliot pass from Cooking-Pot camp.

Photos: G. L. R. Hancock.

PLATE K.



FIG. 1. Photo: C. W. L. Fishlock.

Fig. 1. Lake Bujuku and Mount Baker from near Stanley Glacier. The clouds are moving up towards the lake from the Bujuku valley.



FIG. 2.

Photo: C. W. L. Fishlock.

Fig. 2. Mount Speke from near Stanley Glacier.

PLATE I.



Photo: G. L. R. Hancock.

Mount Stanley from below Lake Bujuku, showing giant Senecios, *Alchemilla* and *Carex runsoroensis*.