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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 1]

[1917

I.—NOTES ON UGANDA FUNGI.

I.—THE FUNGUS-FLORA OF THE FORESTS.

T. D. MAITLAND and E. M. WAKEFIELD.

During the past two years one of us has spent some considerable time collecting and observing the fungi which occur in the forests of Uganda. The collections thus made have been deposited at Kew, where they have been supplemented by other general collections of Uganda fungi due to the energies of Mr. W. Small, Botanist in the Agricultural Department, Uganda, and of Mr. R. Dummer. The species received now number some hundreds, and although far from exhausting the mycology of the region, they appear to be fairly representative of the types of fungus flora to be found, at any rate in the Uganda Province. It has therefore seemed advisable to place on record some of the knowledge which has been acquired, the more so because, as far as we are aware, the only list of Uganda fungi previously published is that of the collection made by Scott Elliot during the Ruwenzori expedition.*

The present account deals only with those fungi, chiefly the macro-forms, which occur as saprophytes in the forests. With the exception of the few species collected by Mr. Small on Mount Elgon, the fungi enumerated all come from forests lying in the eastern part of the Uganda Province. There are other large forests in the western district which have not been touched, but their fungi are probably not strikingly different from those of the forests visited.

ECOLOGICAL NOTES.

(T. D. Maitland.)

The first collections of fungi were made in several small forests lying within the Victoria Nyanza region, north-west of Lake Victoria Nyanza. The names of these forests are Wakigu, Namamvwe, Nabaziza, Ntongo, Bumpenge, and Namutambula.

* Miss A. L. Smith in Journ. of Bot. 33, 1895, p. 340.

They lie in a semi-circle stretching from Jinja on the one hand to Entebbe on the other. It will be seen that their dispositions are not varied enough to provide extensive modifications in their vegetation, and that a description of one forest will serve for them all.

These forests, with the exception of Bumpenge, lie in valleys, and their growth is restricted to a certain area on the incline, their vegetation ceasing abruptly at the margin of the grassy land surrounding them. Each of them, including the lower region of Bumpenge, possesses a small rivulet, which eventually finds its way into the Great Lake. It is usual also to find small stretches of stagnant swamps.

Although the forests are not extensive, they contain some large timber trees which are exploited by the natives. The wild date palm (*Phoenix reclinata*) is dispersed in considerable numbers throughout these forests, as well as in the swamps and grassy lands surrounding them. The Bisu palm (*Raphia Monbuttorum*) is only sparsely distributed, but some very fine and majestic trees are to be seen. The decayed stumps of the various palms afford a good hunting ground for fungi, especially for species of *Ganoderma*.*

In each of the forests the undergrowth consists in some parts of a tangled mass of lianes and shrubby plants, in others of a short vegetation of *Scitamineae*, *Liliaceae*, and *Gramineae*.

The actual habitat of some of the fungi is striking. As already stated the larger species of *Ganoderma* occur almost always on dead palm stumps, but are by no means confined to the forests, for an abundance of these growths is found on palm stumps in farm clearings and plantations. The most conspicuous of the larger fungi of these regions belong to the *Polyporaceae*. They are found principally on loose fallen branches, in many instances lying on the top of the undergrowth. *Polyporus gilvus*, however, is usually, if not always, found on much decayed fallen tree trunks in shady positions. *Polystictus occidentalis*, a common fungus, is another exception, as when found in the forest it is usually in open airy places. Most of the specimens of this species were gathered in the open country and invariably on smooth-barked trees, such as *Albizias*. *Polystictus sanguineus* is, one may safely say, confined to clearings and plantations, and invariably grows on the dead trunks of *Phoenix reclinata*.

There are not many striking types of *Agaricaceae* to be found, though numerous "flushes" of small species are to be seen on thoroughly rotted tree trunks in humid and densely shaded situations. Species of *Marasmius* are occasionally seen, and tangled masses of a "Horse-hair" fungus are met with amongst decayed branches of the undergrowth.

The larger *Sphaeriaceae* are well represented, and are usually found on fallen, well-decayed tree trunks in damp and shady situations. *Xylaria grammica*, *X polymorpha*, and *Tham-*

*The same fact has been noted in Nigeria by Mr. C. O. Farquharson. (See *Kew Bull.* 1914, p. 254, and *Journ. of Bot.* 54, No. 641, May, 1916, p. 123.)

nomyces Chamissonis are common under these conditions. They appear to be almost entirely confined to the heart-wood of dead trees, and especially hard-wooded trees, as in many cases it is well-nigh impossible to cut specimens out.

On the other hand *Hexagonia discopoda*, *Stereum lobatum* *Hymenochaete* spp. etc., prefer the bark of dead branches, while other species thrive on decayed outer wood, and yet others, as *Polystictus luteo-nitidus*, on leaf-mould. It would appear that certain fungi are suited to certain stages in the decay of wood.

The second series of forests visited run along the northern boundary of the Mawokota District. They commence at about mile 16 on the Kampala-Mubendi Road, and continue to about mile 26, but here deviate somewhat from the main road. The sections visited are known as Balisangakibugo, Tiriulire, Mwen-gizanyagi, Nakatumba, and Nakinyika, and are drained by the Mayanja and its tributaries which flow north and north-west of the Great Lake into the river Kafu.

These forests are perhaps the most striking within easy reach of Kampala, and, like most Buganda forests, nestle in a series of valleys, the afforestation being restricted to a certain area on the slopes of these valleys.

In general character they do not vary to any considerable extent from those strictly in the Victoria Nyanza region. The same undergrowth is met with—*Dracaena*, *Amomum*, *Cyperus*, lianes, and in parts a low shrub. This undergrowth is, generally speaking, not difficult to penetrate, and only when nearing the outskirts of the forest is a more tangled and denser vegetation encountered. This consists first of a thick shrubby growth, then of a mixture of Elephant Grass (*Pennisetum purpureum*), prickly *Solanums*, *Convolvulus* spp., and *Cucurbitaceae*. *Musa ensete* is also fairly common.

The forest trees are, if anything, more striking here than in the other series of forests visited. The tall white-barked trees with *Usnea*-like lichens hanging from their branches are very beautiful; likewise the giant "Mwafu," *Canarium Schweinfurthii*, with its massive arms laden with the Bird's Nest fern (*Asplenium Nidus*), *Platyserium* sp., Polypodiums, and Orchids. *Phoenix reclinata* enjoys a wide distribution both in the surrounding country and in these forests.

The fungus-flora is more or less identical with that of the forests in Kiagwe and Busiro, round the lake, since the forests are in most respects alike. Of the *Polyporaceae* the most abundant representative seen was *Polystictus aratus*. This species was plentiful on stout fallen branches and on dead branches still adhering to the tree. *Stereum lobatum* was widely dispersed, and the forms here were larger than any previously gathered. Species of *Xylaria* were also very numerous, including some very stout forms of *X. grammica*. The following fungi were also found to be widely distributed throughout these parts:—*Ganoderma lucidum*, *G. australe*, *Polystictus luteo-nitidus*, *P. flabelliformis*, *P. funalis*, *P. vinosus*, *Polyporus gilvus*, *Stereum Schomburgkii*, *Lenzites repanda*, *Lentinus infundibuliformis*, *Hydnum*, *Laschia* and *Marasmius* spp.

Nabuvumba Forest, in Busiro district, in many respects resembles Nakinyika Forest, in Mawoketa, both being for the most part humid and swampy. An outstanding feature of Nakinyika Forest is the numerous *Landolphias* and fine large trees of *Canarium Schweinfurthii*.

In Bulimezi, Kangavwe Forest is rather remarkable for the huge boulders dispersed throughout, many of them moss-covered. Not many fungi of a striking character were met with there, *Fomes rimosus* being the most outstanding. In addition to those sent, *Stereum Schomburgkii*, *Polystictus obstinatus* on the edge of the forest, *Laschia Volkensii*, and several *Agarics* were observed. This forest covers the top of Kangavwe Hill (1274 m.) in lat. 0°35' and long. 32°20'. The dry aspect in all probability accounts for the paucity of fungi as compared with the forests in the valleys.

The Mabira Forests, visited in September, 1915, lie within the Nile and Sezibwa River watersheds on the left bank of the Nile, and about 15 miles from the Ripon Falls, where the Nile leaves the Great Lake. They extend north to the great Sezibwa Swamp and cover an area of about 137 square miles.

Although of the same type as the forests scattered throughout the Buganda Kingdom, they are on a very much larger scale, and cover hill and dale, instead of being confined to the valleys. One outstanding feature of these forests, as compared with most others, is the wide distribution of the rubber tree *Funtumia elastica*, Stapf—a feature which has made them famous, in addition to the exploitation of the large and valuable timber trees.

Although large, these forests can be traversed with comparative ease, for the undergrowth—except where some large trees have been felled and have thus given it the advantage—is not sufficiently thick to necessitate cutting a way through. *Draecenas* form a large part of the undergrowth, and also young seedling forest trees and lianes. Numerous paths made by animals ramify through the forest.

The climatic conditions of this large forest area differ from those of the surrounding country. The rainfall is greater and the humidity higher. Hence, with the fallen trees and branches and other decaying vegetation, conditions are very favourable for the development of a rich fungus-flora.

About 28 miles of the forest were traversed and many specimens collected which were not represented in the gatherings from other forests. Speaking generally, however, the fungus-flora is very similar to that found throughout the Victoria Nyanza Region. *Fomes rimosus* was collected here, for the first time in the Victoria Nyanza Region, and was well represented. It was found in low-lying, humid places, contrasting with its habitat in the high and dry Kangavwe Forest in Bulimezi. *Lenzites repanda* is perhaps the most abundant species, and is not confined to the forests, for it occurs abundantly on dead stumps in clearings and plantations on the outskirts. *Trametes corrugata* is also very common, but confined to the more open parts rather than to the interior. Only one specimen of *Fomes hornodermus* was found, on a live tree six feet up the trunk, but

apparently not parasitic. *Fomes pectinatus* appears to prefer lianes, occurring on both live and dead bark and roots.

Most of the forests are more or less humid at all times of the year. Agarics are perhaps slightly more in evidence in the rainy season, but on the whole the types of fungi to be met with are the same at all seasons.

SYSTEMATIC LIST.

(E. M. Wakefield.)

AGARICACEAE.

Lentinus strigosus, *Fr.* Elench. I, p. 47.

Mabira Forests, *Maitland* M 5, not common; Kampala, *Small*.

Lentinus villosus, *Kl.* in *Linnaea* VIII, 1833, p. 479.

Mabira Forests, *Maitland* M 9.

Lentinus velutinus, *Fr.* in *Linnaea* V, 1830, p. 510.

Mabira Forests, *C. B. Ussher* 55, 1908.

Lentinus blepharodes, *Berk. et Curt.* in *Journ. Linn. Soc.* X, 1869, p. 301.

Wakigu Forest, *Maitland* 7A; Kipayo, *Drummer* 1425; Mabira Forests, *Maitland* M 10.

Lentinus infundibuliformis, *Berk. et Br.* in *Journ. Linn. Soc.* XIV, 1873, p. 42.

Victoria Nyanza region, *Maitland* 58; Balisangakibugo Forest, *Maitland* 185 A; Mawokota, *Small* 252; Mabira Forests, according to *Maitland* fairly common on dead stumps.

These African specimens do not quite conform to the Ceylon type. They have a coarser appearance and a more strigose surface of the pileus, but do not appear to be specifically distinct.

Lentinus exilis, *Kl. ex Berk.* in *Ann. and Mag. Nat. Hist.* III, 1839, p. 379.

Kipayo, *Dummer* 645, 1420; Mabira Forests, *Maitland* M 12, M 13 (the latter approaching *L. dactylophorus*).

L. dactylophorus, *Lév.* in *Ann. sci. nat. sér. 3*, vol. 2, 1844, p. 174.

Kampala, *Small* 80.

Probably only a form of *L. exilis*, distinguished by its smaller size, deeply infundibuliform shape, and more distinct ring.

Lenzites repanda, *Fr.* *Epicr.* p. 404.

Common everywhere. Kampala, *Small* 56; *Dummer* 944, 2530; Victoria Nyanza region, *Maitland* 53, 60; Mubendi Road Forests, Mawokota, *Maitland*.

Schizophyllum commune, *Fr.* *Syst. Myc.* I, p. 333.

Common, *Maitland* 29, *Small* 132, *Dummer* 157.

POLYPORACEAE.

- Polyporus picipes**, *Fr.* *Epicr.* p. 440.
Kipayo, *Dummer* 2110; Kampala, *Maitland*; Mabira Forests, *Maitland* M 8.
All these specimens have slightly larger pores than the typical form of the species.
- P. dictyopus**, *Mont.* in *Ann. sci. nat. sér. 2*, vol. 3, 1835, p. 349.
Kipayo, *Dummer* 2111.
- P. megaloporus**, *Mont.* in *Ann. sci. nat. sér. 4*, vol. 1, 1854, p. 124.
Nakinyika Forest, *Maitland* 131.
- P. cinnamomeo-squamulosus**, *P. Henn.* in *Engl. Bot. Jahrb.* 30, 1901, p. 43.
Nakinyika Forest, *Maitland* 132; Mabira Forests, *Maitland* M 26 (fairly common).
- P. gilvus** (*Schw.*) *Fr.* *Elench. I*, p. 104.
Kipayo, *Dummer* 1145; Victoria Nyanza region, *Maitland*; Mubendi Road Forests, Mawokota, *Maitland*; Mabira Forests, *Maitland*.
- P. anebus**, *Berk.* in *Hook. Lond. Journ. Bot.* 1847, p. 504.
Balisangakibugo Forest, *Maitland* 182.
- P. pubertatis**, *Lloyd*, *Syn. Sect. Apus of Polyporus*, 1915, p. 358.
Balisangakibugo Forest, *Maitland* 168, rare.
The single specimen sent agrees with the Japanese species in texture, colour of the flesh, spores, etc. It is, however, much larger than the type, more applanate, and with a more irregular, tubercular surface of the pileus.
- Amauroderma sericatum**, *Lloyd*, *Syn. Stipit. Polyp.*, 1912, p. 120.
Kampala, *Maitland*; Nabaziza Forest, *Maitland* 4; Kipayo, *Dummer* 2144.
This plant grows on the ground in very shady places, and is usually gregarious. It is more slender than *A. rugosum*, and is distinguished microscopically by the smooth spores and by the presence of stout brown hyphae in the pore walls. At the mouths of the pores the pointed ends of these hyphae almost form projecting setae. In the Uganda specimens the pileus is usually more zoned and less uniformly silky than in the type, but the other characters agree.
- Ganoderma australe** (*Fr.*) *Pat.* in *Bull. Soc. Myc. Fr.* 1889, p. 71.
Kipayo, *Dummer* 908; Kampala, *Small* 317, 318; Mabira Forests, common, *Maitland*.

Ganoderma lucidum (*Leys.*) *Karst.* in *Rev. Myc.* 1881, No. 9, p. 17.

Common everywhere. Kampala, *Small* 70, 320, 319 (yellow form), *Dummer* 644; Victoria Nyanza region, *Maitland* 47; Namutambula Forest, *Maitland* 12A; Nambeya, Bulimezi, *Maitland*, 154; Mubendi Road Forests, Mawokota, and Mabira Forests, *Maitland*.

G. mastoporum, (*Lév.*) *Pat.* in *Bull. Soc. Myc. Fr.* 1889, p. 71.

Kipayo, *Dummer* 643.

G. fornicatum (*Fr.*) *Pat.* in *Bull. Soc. Myc. Fr.* 1889, p. 71. Wakigu Forest, *Maitland* 207.

Fomes senex (*Nees et Mont.*) *Fr.* *Nov. Symb.* p. 62.

Kampala, *Small* 248; Mubendi Road Forests, *Maitland*.

F. pectinatus (*Kl.*) *Fr.* *Nov. Symb.* p. 66.

Nabaziza Forest, *Maitland* 8A, on a living liane, near the base, and also on a dead stump; Nabuvumba Forest, *Maitland* 150, on a living liane, 2½ to 3 feet from the ground, the stem being to all appearance quite healthy.

F. rimosus (*Berk.*) *Fr.* *Nov. Symb.* p. 66.

Kangavwe Forest, Bulimezi, *Maitland* 115; Mabira Forests, *Maitland*, on living and dead trunks.

“In Kangavwe Forest this was the most conspicuous fungus, and fairly common. It was found on dead erect trees and also on living trees, growing on the trunks at varying heights up to about 12 feet high. The scar left on the living tree when the fungus was broken off was to all appearance quite healthy, and no sign of blackening or disease was observable. The trees on which they were found had corky bark.” (T. D. M.)

F. melanoporus (*Mont.*) *Fr.* *Nov. Symb.* p. 65.

Kipayo, *Dummer* 1465; Wakigu Forest, *Maitland* 84, 94; Balisangakibugo Forest, *Maitland* 178.

Numbers 94 and 178 are resupinate forms of the species.

F. caliginosus (*Berk.*) *Cooke* in *Grevillea* XIV, 1885, p. 20.

Namutambula Forest, *Maitland* 2; Wakigu Forest, *Maitland* 108; Kipayo, *Dummer* 2156A.

F. geotropus, *Cooke* in *Grevillea* XIII, 1884, p. 32.

Nambeya Forest, *Maitland* 109.

F. hornodermus (*Mont.*) *Cooke* in *Grevillea* XIII, 1885, p. 119.

Mabira Forests, *Maitland* M 36, on a living tree, 6 feet up the trunk, but the tree apparently quite healthy.

Polystictus luteo-nitidus (*Berk.*) *Cooke* in *Grevillea* XIV, 1886, p. 77.

Among leaf-mould, or attached to roots and twigs; Victoria

Nyanza region, *Maitland* 73 (unusually large and regular forms); Nakatumba Forest, *Maitland*; Kipayo, *Dummer* 2529.

Polystictus xanthopus, *Fr.* Nov. Symb. p. 74.

Kipayo, *Dummer* 624, 1179; Victoria Nyanza region, *Maitland* 57; Mabira Forests, *Maitland*, fairly common.

P. flabelliformis (*Kl.*) *Fr.* Nov. Symb. p. 74.

Kipayo, *Dummer* 905; Victoria Nyanza region and Mabira Forests, common, *Maitland* 45; Mubendi Road Forests, Mawokota, *Maitland*.

P. sanguineus, *Fr.* Nov. Symb. p. 75.

Very common, especially on dead trunks of *Phoenix reclinata*. It occurs rather in the open, in clearings and plantations, than in the forests themselves. *Small, Maitland*, various collections.

P. mutabilis (*Berk. et Curt.*) *Cooke* in *Grevillea* XIV, 1886, p. 78.

Victoria Nyanza region, *Maitland* 75; Namutambula Forest, *Maitland* 28A; Mawokota, *Small* 158.

The Uganda forms are not quite typical. They have a thicker and more rugulose pileus than usual, and rather larger pores.

P. vernicipes (*Berk.*) *Cooke* in *Grevillea* XIV, 1886, p. 78. Namutambula Forest, *Maitland* 29A.

P. chrysites (*Berk.*) *Cooke* in *Grevillea* XIV, 1886, p. 82.

Kampala, *Small* 59.

Some very fine thick specimens. In one case a number of pilei have grown together to form a large bracket.

P. Proteus (*Berk.*) *Fr.* Nov. Symb. p. 79.

Kampala, *Small*.

P. pinsitus, *Fr.* Nov. Symb. p. 88.

Victoria Nyanza region, *Maitland* 63; Balisangakibugo Forest, *Maitland* 169.

P. versicolor (*Linn.*) *Fr.* Nov. Symb. p. 86.

Kampala, *Small* 51.

P. hirsutus, *Fr.* Nov. Symb. p. 86.

Kipayo, *Dummer* 2122; Mount Elgon, 1680 m., *Small* 175; Mabira Forests, *Maitland*.

P. obstinatus, *Cooke* in *Grevillea* XIV, 1886, p. 83.

Trametes obstinatus, *Cooke* in *Grevillea* XII, 1883, p. 17.

Namamvwe Forest, Victoria Nyanza region, *Maitland* 50; Balisangakibugo Forest, *Maitland*; Kangavwe Forest, Bulimezi, *Maitland*; Mabira Forests, very common in clearings, *Maitland*.

P. vittatus (*Berk.*) *Fr.* Nov. Symb. p. 86.

Kampala, on dead stumps in the open, *Maitland* 5, *Small* 52.

Polystictus vinosus (*Berk.*) Sacc. Syll. VI, p. 273.

Kampala, *Small* 66; Kipayo, *Dummer* 1130; Namutambula Forest, *Maitland* 10A; Wakigu Forest, *Maitland* 83, Namamvwe Forest, *Maitland* 189, 190.

P. occidentalis (*Kl.*) *Fr.* Nov. Symb. p. 90.

Victoria Nyanza region, *Maitland* 46, 51; Mount Elgon, 1680 m., *Small* 176; Mabira Forests, very common in clearings, *Maitland*.

P. lanatus, *Fr.* Nov. Symb. p. 90.

Kampala, *Small* 72.

P. aratus (*Berk.*) *Cooke* in *Grevillea* XIV, p. 86.

Polyporus luteo-olivaceus, *Berk. et Br.* in *Trans. Linn. Soc.*, 2 ser., I, 1880, p. 402.

Very common everywhere. Victoria Nyanza region, *Maitland* 66; Bumpenge and Namutambula Forests, *Maitland* 3A, 16A; Wakigu Forest, *Maitland* 92; Balisangakibugo Forest, *Maitland* 167A; Nakinyika Forest, *Maitland* 125A; Kangavwe Forest, Bulimezi, *Maitland* 125; Namamvwe Forest, *Maitland* 167B; Kipayo, *Dummer* 907; Kasala Forest, *Dummer* 2360; Kampala, *Small* 67, 73, 75; Mabira Forests, *Maitland*.

The species is as variable as it is common. When young the pileus is rather rigid, the pores regular, and covered with a glaucous bloom. In old specimens, however, the pileus becomes more flexible, being frequently much eaten by insects, the pores become longer and the openings irregular, while the glaucous deposit disappears, leaving the hymenium of a dark olive-brown colour. Stalked forms are not infrequent, the stalk being in some cases as much as 2 in. long.

P. caperatus (*Berk.*) *Fr.* Nov. Symb. p. 92.

Wakigu Forest, *Maitland* 91, 93, 98, 101; Bumpenge Forest, *Maitland* 107; Mabira Forests, *Maitland* M 28.

The specimens vary very greatly in size and thickness, and also in the development of the tomentum of the pileus. The following species appears to be probably only a form with larger and more irregular pores.

P. Fischeri, *P. Henn.* in *Engl. Bot. Jahrb.* 23, 1897, p. 546.

Wakigu Forest, *Maitland* 90, 100; Kipayo, *Dummer* 2117.

P. tabacinus (*Mont.*) *Fr.* Nov. Symb. p. 93.

Nabuvumba Forest, *Maitland* 148.

P. beharensis (*Berk.*) *Cooke* in *Grevillea* XIV, 1886, p. 87.

Mubendi Road, Kampala, *Maitland* 146.

Trametes corrugata (*Pers.*) *Bres.* in *Hedwigia*, vol. 51, 1912, p. 316.

Polystictus Personii, *Fr. ex Cooke* in *Grevillea* XIV, 1886, p. 85.

Victoria Nyanza region, *Maitland* 52; Mabira Forests, common

on dead stumps in the open, *Maitland*; Kampala, *Small*, *Maitland*; Nambeya Forest, *Maitland*.

It is curious that the Uganda forms are all very thick, some of them being almost hoof-shaped. They are, moreover, for the most part entirely white, though the characteristic dark red stain was observed at the base of the pileus in a few instances. The usual thin form with a well-developed, reddish pileus does not appear, however, to occur in this region.

Trametes cingulata, *Berk.* in *Hook. Journ. Bot.* 1854, p. 164. Kipayo, *Dummer* 2531.

Hexagonia Miquelii (*Mont.*) *Sacc.* *Syll.* VI, p. 361.

Victoria Nyanza region, *Maitland* 72, pro parte; Mukono Forest, rare, *Dummer* 2354; Kipayo, rare, *Dummer* 2523; Mabira Forests, sparsely distributed, *Maitland*.

H. discopoda, *Pat. et Har.* in *Bull. Soc. Myc. Fr.* IX, 1893, p. 209.

Kampala, *Small* 74; Kipayo, *Dummer* 1142; Victoria Nyanza region, *Maitland* 74A; Mount Elgon, 1525 m., *Small* 162; Mabira Forests, sparsely distributed, *Maitland*.

The species is not aptly named, for it is more frequently sessile than stipitate. It is common in tropical Africa, and easily recognised by the dark reddish stain at the base of the pileus.

H. velutina, *Pat. et Har.* in *Bull. Soc. Myc. Fr.* IX, 1893, p. 209.

Kipayo, *Dummer* 904; Mabira Forests, common on dead tree trunks and stumps, *Maitland*.

H. atro-sanguinea, *P. Henn.* in *Engl. Bot. Jahrb.* 23, 1897, p. 545.

Nabaziza Forest, *Maitland* 25A; Kipayo, *Dummer* 2367.

Favolus brasiliensis, *Fr.* *Elench.* I, p. 44.

Victoria Nyanza region, *Maitland* 36; Mount Elgon, 1370 m., on the dead wood of a bridge, *Small* 177; Kabulamuliro, Singo, on dead branches of *Phoenix reclinata* in the open, *Maitland* 121.

Laschia Volkensii, *Bres.* apud *Henn.* in *Engler, Pflanzenwelt Ostafrikas, Teil C*, p. 58.

Victoria Nyanza region, *Maitland* 79; Mawokota, *Small* 156, 255; Bumpenge Forest, *Maitland* 32A; Kangavwe Forest, Bulimezi, *Maitland*; Mabira Forests, common, *Maitland*.

HYDNACEAE.

Hydnum reniforme, *Berk. et Curt.* in *Journ. Linn. Soc.* X, 1869, p. 325.

Wakigu Forest, *Maitland* 105.

Hydnum glabrescens, *Berk. et Rav.* in *Grevillea*, I, 1873, p. 97, and in *Journ. Linn. Soc.* XIV, 1873, p. 59.

Victoria Nyanza region, *Maitland* 77; Mubendi road Forests, *Maitland*.

H. cinnabarinum (*Schw.*) *Fr.*, *Elench.* p. 137.

Kipayo, *Dummer* 622.

This may be only a state of *Polystictus sanguineus*, but the form is quite worthy of record. The habit is exactly that of a resupinate *Hydnum* (*Acia*).

Irpex durescens (*Cooke*) *Sacc.* *Syll.* VI, p. 485.

Wakigu Forest, *Maitland* 85; Nabaziza Forest, *Maitland* 209; Kijude, *Dummer* 2522.

I. flavus, *Kl.* in *Linnaea* VIII, 1833, p. 488.

Kipayo, *Dummer* 2139.

Grandinia rosea, *P. Henn.* in *Engl. Bot. Jahrb.* 38, 1905, p. 108.

Wakigu Forest, *Maitland* 89.

Caldesiella Duemmeri, *Wakefield*, in *Kew Bull.* No. 3, 1916, p. 73.

Kipayo, *Dummer* 635.

Mucronella calva, *Fr.* *Hym. Eur.* p. 629.

Kipayo, *Dummer* 1172.

THELEPHORACEAE.

Cladoderris infundibuliformis (*Kl.*) *Fr.* *Fung. Natal.* p. 141.

Namutambula Forest, on a decayed stump of *Phoenix reclinata*, *Maitland* 1; Nabaziza Forest, *Maitland* 30A; Kipayo, *Dummer* 2108; Mabira Forests, not very abundant, usually on thick fallen branches, *Maitland*.

Cyphella fulvo-disca, *Cooke et Mass.* in *Grevillea* XVIII, 1890, p. 50, and in *Hedwigia* 29, 1890, p. 67.

Kipayo, *Dummer* 1157.

Stereum elegans (*Mey.*) *Fr.* *Epicr.* p. 545.

Kipayo, *Dummer* 2300; Mawokota, *Small* 253; Mabira Forests, on a dead stump which had rotted to the ground level, *Maitland* M2.

S. affine, *Lév.* in *Ann. sci. nat. sér.* 3, 2, 1844, p. 210.

Mawokota, *Small* 257; Kipayo, *Dummer* 626.

S. nitidulum, *Berk.* in *Hook. Journ. Bot.* 1843, p. 638.

Victoria Nyanza region, *Maitland* 80.

Stereum involutum, *Kl. ex Fr.* Epicr. p. 546.

Bumpenge Forest, on dead branches in an open part of the forest, *Maitland* 33A.

S. australe, *Lloyd*, Letter No. 48, 1913, p. 10.

Wakigu Forest, *Maitland* 151; Kipayo, *Dummer* 906.

S. bicolor (*Pers.*) *Fr.* Epicr. p. 549.

Kampala, *Small* 57; Victoria Nyanza region, *Maitland* 37, 44, 82.

S. lobatum, *Fr.* Epicr. p. 547.

Kampala, *Small* 76; Victoria Nyanza region, *Maitland* 62; Kipayo, *Dummer* 624 (pro parte), 2310; Mubendi Road Forests, *Maitland* (very large specimens); Mabira Forests, common on thick dead branches, *Maitland*.

S. rimosum, *Berk.* in *Hook. Journ. Bot.* 1851, p. 169.

Nabaziza Forest, *Maitland* 19A.

S. Schomburgkii, *Berk.* in *Journ. Linn. Soc.* XIII, 1873, p. 168.

Kipayo, *Dummer* 945, 1133; Bumpenge Forest, *Maitland* 34A; Mubendi Road Forests, *Maitland*; Kangavwe Forest, Bulimezi, *Maitland*; Mabira Forests, *Maitland*.

S. annosum, *Berk. et Br.* in *Journ. Linn. Soc.* XIV, 1873, p. 67.

Nakinyika Forest, *Maitland* 127; Balisangakibugo Forest, *Maitland* 186.

This species is very closely allied to *S. frustulosum*, and might be considered as a variety of that plant, differing chiefly in the pileate habit. The best developed specimens are broadly effused, with a distinct reflexed pileus up to 2 cm. in width. The cystidia are like those of *S. frustulosum*, and the species differs from *S. subpileatum* in this character, as well as in the smooth pileus. The effect on the wood is similar to that of *S. frustulosum* and *S. subpileatum*.*

S. albo-cinctum, *Berk. et Br.* in *Journ. Linn. Soc.* XIV, 1873, p. 66.

Kipayo, *Dummer* 2114.

The species is near to *S. induratum*, *Berk.*, but is entirely resupinate, whereas the type specimen of that species is pileate. Both *S. induratum* and *S. albo-cinctum* are distinguished from *S. duriusculum* by the thick, cinnamon-brown flesh.

S. umbrinum, *Berk. et Curt.* in *Grevillea* I, 1873, p. 164.

For synonymy see *Kew Bull.* No. 8, 1915, p. 369.

Kipayo, on *Sapium Mannianum*, *Dummer* 1159; Ntongo, Busiro, on a dead erect stump of *Phoenix reclinata*, *Maitland* 194, (a pale form).

* Cfr. Long in *Journ. Agr. Res.* v. 1915, p. 421.

Hymenochaete luteo-badia (*Fr.*) *Wakefield*, comb. nov.
Stereum luteo-badium, *Fr. Epicr.* p. 547. *Thelephora Kunzeii*,
Hook. in Bot. Misc. II, 1831, p. 163. *Hymenochaete Kunzeii*,
Mass. in Journ. Linn. Soc. XXVII, 1890, p. 100.

Victoria Nyanza region, *Maitland* 71; Kipayo, *Dummer* 1452;
 Mabira Forests, *Maitland* M17.

H. cervina, *Berk. et Curt.* in *Grevillea I*, 1873, p. 165.
 Mount Elgon, 1220 m., *Small* 227.

H. tristicula (*Berk. et Br.*) *Mass.* in *Journ. Linn. Soc. XXVII*,
 1890, p. 111.

For synonymy see *Kew Bull.* No. 3, 1916, p. 73.

Very common on fallen twigs and branches. Victoria Nyanza
 region, *Maitland* 25; Kangavwe Forest, *Maitland* 119; Nakinyika
 Forest. *Maitland* 138; Mwendigizanyagi Forest, Mawokota, *Mait-*
land 202; Mabira Forests, *Maitland* M30.

Peniophora cinerea (*Fr.*) *Cooke* in *Grevillea VIII*, 1879, p. 20.
 Kampala, on the bark of *Acacia* sp., *Maitland* 198.

P. occidentalis, *Ell. et Ev.* in *Bull. Torr. Bot. Cl. XXIV*,
 1897, p. 277.

Kangavwe Forest, Bulimezi, *Maitland* 114.

Cystidia large, thick-walled, pointed, encrusted with crystals
 in the upper part, sunken or emerging, up to 175 μ long,
 20-30 μ wide. Spores cylindrical, 13-14 \times 6 μ .

P. radicata (*P. Henn.*) *v. Hoehn. et Litsch.* in *Sitzber. k.*
Akad. d. Wissensch. Wien, CXVII, 1, 1908, p. 1092.

Kipayo, *Dummer* 636.

Asterostromella sp.

Nakatumba Forest, *Maitland* 205.

The species is near to *A. investiens*, but darker in colour. The
 specimens are unfortunately sterile.

CLAVARIACEAE.

Pterula importata, *P. Henn.* in *Verh. Bot. Ver. Prov. Bran-*
denb. XL, 1898, p. 121.

Kipayo, *Dummer* 1185.

Lachnocladium Zenkeri, *P. Henn.* in *Engl. Bot. Jahrb.*
XXX, 1901, p. 42.

Kipayo, *Dummer* 929, 2146; Balisangakibugo Forest, *Mait-*
land 176.

The plant is white when young, but turns to a fleshy colour
 when old. It is common in most forests and at most times of the
 year (*Maitland*).

TREMELLACEAE.

Auricularia tremellosa (*Fr.*) *Petch* in *Ann. Roy. Bot. Gard.*
Peradeniya, Vol. IV. 1910, p. 414. Cfr. also *Patouillard* in
Journ. de Bot. I, 1887, p. 226.

Mount Elgon, 1220 m., *Small* 145.

Hirneola ampla (*Pers.*) *Fr.* *Fung. Nat.* p. 146.

Mubendi, 1220 m. *Small* 321.

This species is thinner, paler, and less woolly on the surface of the pileus than *H. polytricha*. The specimens are preserved in spirit and in that medium appear almost whitish.

H. polytricha (*Mont.*) *Fr.* *Fung. Nat.* p. 146.

Kipayo *Dummer* 1131; Victoria Nyanza region, *Maitland* 34; Mount Elgon, *Small* 146, 150, 157.

H. Auricula-Judae (*Linn.*) *Berk.* *Outl.* 1860, p. 289.

Kipayo, *Dummer* 613.

Tremella fuciformis, *Berk.* in *Hook. Journ. Bot.* 1856, p. 277.

Kipayo, *Dummer* 930.

T. mesenterica, *Retz.* in *Vet. Akad. Handl.* 1769, p. 249.

Mount Elgon, 1370 m. *Small* 144.

Guepinia spathularia (*Schw.*) *Fr.* *Elench. II.* p. 32.

Kipayo, *Dummer* 640; Kampala, on dead wood of *Phoenix reclinata*, *Small* 297, 301.

Calocera furcata, *Fr.* *Syst. Myc. I.* p. 486.

Kipayo, on dead stems of *Phoenix reclinata*, *Dummer* 1177.

GASTEROMYCETACEAE.

Dictyophora indusiata, *Fischer* in *Sarasin et Roux, Nova Caledonia*, Vol. I, part 1, 1914, p. 3.

Nabuvumba Forest, the "egg" stage only, on a well-decayed stump in a very dark position, *Maitland* 153.

Cyathus limbatus, *Tul.* in *Ann. sci. nat. sér. 3*, vol. 1, 1844, p. 78.

Kipayo, *Dummer* 614.

C. Poeppigii, *Tul.* in *Ann. sci. nat. sér. 3*, vol. 1, 1844, p. 77.

Mount Elgon, 1370 m., *Small* 143; Kipayo, *Dummer* 2112.

Geaster mirabilis, *Mont.* in *Ann. sci. nat. sér. 4*, vol. 3, 1855, p. 139.

Kipayo, *Dummer* 1462.

G. velutinus, *Morg.* in *Journ. Cinc. Nat. Hist. Soc. XVIII*, 1895, p. 38.

Namamvwe Forest, *Maitland* 81; Kipayo, *Dummer* 1419, 1424.

Calvatia lilacina (*Mont. et Berk.*) *Lloyd*, *Lycoperdaceae of Australia*, 1905, p. 35.

Mabira Forests, *Maitland M* 38.

SPHAERIACEAE.

Gibbera guaranitica, *Speg.* Fung. guaran., Pug. 1, 1883, p. 91.

Mubendi Road Forests, *Maitland* 213; Kipayo, on dead stems of *Phoenix reclinata*, *Dummer* 2152.

Rosellinia emergens (*Berk. et Br.*) *Sacc.* Syll. I, p. 257.

Kampala, *Small* 62, 313; Mawokota, *Small* 164; Wakigu Forest, *Maitland* 208.

R. subiculata (*Schw.*) *Sacc.* Syll. I, p. 255.

Kampala, *Small* 78.

The spores are slightly smaller than in the type.

Xylaria polymorpha (*Pers.*) *Grev.* Flor. Edin. p. 35.

Victoria Nyanza region, *Maitland* 69; Mubendi Road Forests, Mawokota, *Maitland*; Kampala, *Small* 140, 308.

X. nigripes (*Kl.*) *Sacc.* Syll. IX, p. 527.

Kirerema, in a termite nest, sclerotia only, *Maitland* M 37.

X. grammica, *Mont.* in Ann. sci. nat. sér. 2, vol. 13, 1840, p. 341.

Victoria Nyanza region, *Maitland* 64, 67; Mawokota, *Small*, 159, 160, 161; Nabaziza Forest, *Maitland*; Mabira Forests, common, *Maitland*.

X. plebeja, *Ces.* Mycet. Born. 1879, p. 16.

Victoria Nyanza region, *Maitland* 27; Mawokota, *Small* 262.

X. anisopleura, *Mont.* in Ann. sci. nat. sér. 2, vol. 13, 1840, p. 348.

Kampala, *Small* 289; Kipayo, *Dummer* 1438.

X. involuta, *Kl. ex Cooke* in *Grevillea* XI, 1883, p. 82.

Kipayo, *Dummer* 2153; Mubendi Road Forests, *Maitland* 175.

X. Thwaitesii, *Berk. et Cooke* in *Grevillea* XII, 1883, p. 1.

Mabira Forests, *Maitland* M 21.

X. rhopaloides, *Mont.* in Ann. sci. nat. sér. 4, vol. 3, 1855, p. 99.

Victoria Nyanza region, *Maitland*, 33; Mawokota, *Small* 260.

X. pallida, *Berk. et Cooke* in Journ. Linn. Soc. XV, 1876, p. 395.

Nakinyika Forest, *Maitland* 135.

X. corniformis, *Fr.* Summ. Veg. Scand. p. 381.

Namamvwe Forest, *Maitland* 193.

X. Hypoxylon, *Grev.* Flor. Edin. p. 355.

Victoria Nyanza region, *Maitland* 32; Mubendi Road Forests, *Maitland* 119.

These specimens have slightly smaller spores than usual.

Xylaria Hypoxylon, forma tropica, *Theiss.* Xylariaceae
Austro-brasil. 1909, p. 8.

Namamvwe Forest, *Maitland* 191.

X. flabelliformis (*Schw.*) *Berk. et Curt.* in Journ. Linn. Soc.
X, 1869, p. 381.

Mawokota, *Small* 254; Kipayo, *Dummer* 2365.

X. arbuscula, *Sacc.* in *Michelia* I, 1878, p. 249.

Nagunga, *Dummer* 1439.

X. ianthino-velutina, *Mont.* in Ann. sci. nat. sér. 2, vol. 13,
1840, p. 348.

Nambeya Forest, *Maitland* 117, 118; Nakinyika Forest, *Maitland* 117A; Nakatumba Forest, *Maitland* 200; Mabira Forests, *Maitland* M 29.

The species is common in most of the forests visited, and always occurs on fallen seed-vessels.

X. Kurziana, *Currey* in Trans. Linn. Soc. ser. 2, 1, 1876, p. 129.

Victoria Nyanza region, *Maitland* 28.

Thamnomycetes Chamissonis, *Ehrenb.* in Horae Physic. Berol. 1820, p. 79.

Victoria Nyanza region, *Maitland* 76; Kipayo, *Dummer* 2368; Mabira Forests, sparsely distributed, *Maitland*.

Camillea africana, *Wakefield* in Kew Bull. No. 3, 1916, p. 74.
Kampala, *Small* 137; Kipayo, *Dummer* 2364.

Ustulina zonata (*Lév.*) *Sacc.* Syll. I, p. 352.

Mount Elgon, *Small* 136, 215; Namamvwe Forest, *Maitland* 192; Kipayo, *Dummer* 1453.

Sarcoxydon aurantiacum, *Pat.* in Bull. Soc. Myc. Fr. 27, 1911, p. 331.

Balisangakibugo Forest, *Maitland* 195; Kipayo, *Dummer* 1443.

Daldinia concentrica, *Ces. et De Not.* in Comm. Soc. Critt. It. No. 4, 1863, p. 198.

Kampala, *Small* 55.

D. Eschscholtzii (*Ehrenb.*) *Rehm* in Ann. Myc. II, 1904, p. 175.

D. concentrica, var. *microspora* (*Starb.*) *Theiss.* in Ann. Myc. VII, 1907, p. 3.

Bumpenge Forest, *Maitland* 23A; Kipayo, *Dummer* 1442; Mabira Forests, common, *Maitland* M23.

The constant association of small spores with the conspicuous copper-coloured or purplish incrustation on the surface, and very light weight, appears to be a distinction worthy of specific rank.

Hypoxylon annulatum (*Schw.*) *Mont.* in *Gay, Hist. de Chile, Bot. VII, 1850, p. 445.*

Kangavwe Forest, Bulimezi, *Maitland 112.*

H. anthochroum, *Berk. et Br.* in *Journ. Linn. Soc. XIV, 1873, p. 122.*

Mubendi Road Forests, *Maitland 145.*

H. anthracodes (*Fr.*) *Sacc.* *Syll. I, p. 365.*

Nakinyika Forest, *Maitland 124.*

H. Malleolus, *Berk. et Rav.* in *Grevillea IV, 1875, p. 49.*

Wakigu Forest, *Maitland 96*; Kampala, *Small 61*; Mubendi Road Forests, *Maitland 130.*

H. microcarpum, *Penz. et Sacc.* in *Malpighia XI, 1897, p. 492.*

Nakinyika Forest, *Maitland 126.*

H. multiforme, *Fr.* *Summ. Veg. Scand., p. 384.*

Balisangakibugo Forest, *Maitland 172*; Mabira Forests, *Maitland M 33.*

H. quisquiliare, *Mont.* in *Ann. sci. nat. sér. 2, vol. 14, 1840, p. 2, 321.*

Kipayo, *Dummer 2155.*

H. rubiginosum, *Fr.* *Summ. Veg. Scand., p. 384.*

Kampala, *Small 60*; Kangavwe Forest, *Maitland 113*; Kipayo, *Dummer 1449*; Mabira Forests, *Maitland.*

H. stigmoideum, *Ces.* *Mycet. Born. 1879, p. 17.*

Victoria Nyanza region, *Maitland 72 (pro parte).*

Kretzschmaria cetrarioides (*Welw. et Curr.*) *Sacc.* *Syll. IX, p. 567.*

Mawokota, *Small 163.*

K. coenopus (*Mont.*) *Sacc.* *Syll. IX, p. 565.*

Kampala, *Small 81*; Victoria Nyanza region, *Maitland 68.*

HYPOCREACEÆ.

Nectria ochroleuca (*Schw.*) *Berk.* in *Grevillea IV, 1875, p. 16.*
Kipayo, on decaying *Piptadenia africana*, *Dummer 1431.*

N. episphaeria (*Tode*) *Fr.* *Summ. Veg. Scand. p. 388.*

Mabira Forests, *Maitland M 34.*

N. Rickii, *Rehm*, in *Hedwigia XLIV, 1904, p. 2.*

Kipayo, *Dummer 629*, on *Ustilina zonata.*

This is a form with slightly longer spores, $7.5-8 \times 4 \mu$. The same form, and on the same host, was collected by von Höhnelt in Java. The species differs from *N. episphaeria* in the pale-coloured spores, with rough walls.

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Nectria haematococca, *Berk. et Br.* in Journ. Linn. Soc. XIV, 1873, p. 116.

Mount Elgon, *Small* 134.

Hypocrea subcitrina, *Kalchbr. et Cooke* in *Grevillea* IX, 1880, p. 26.

Mubendi Road Forests, *Maitland* 143.

H. insignis, *Berk. et Curt.* in Journ. Linn. Soc. X, 1869, p. 376.

Mabira Forests, *Maitland* M 22.

The spores are minute, hyaline, oblong or subglobose, $2\ \mu$ diam., or $2-2\frac{1}{2} \times 1\frac{1}{2}-2\ \mu$. A few asci with similar spores have been found in the type.

H. gelatinosa (*Tode*) *Fr.* Summ. Veg. Scand., p. 383.

Mabira Forests, *Maitland* M 4.

HYSTERIACEAE.

Tryblidiella rufula (*Spreng.*) *Sacc.*, Syll. II, p. 757.

Kipayo, on *Eugenia*, sp., *Dummer*, 1138.

DISCOMYCETES.

Cookeina Colensoi (*Berk.*) *Seaver* in *Mycologia* V, 1913, p. 191.

Sarcoscypha Colensoi, *Sacc.* Syll. VIII, p. 157.

Geopyxis aluticolor, *Sacc.* Syll. VIII, p. 64.

Nakinyika Forest, *Maitland* 142.

Ciliaria scutellata (*Linn.*) *Boud.* in Bull. Soc. Myc. Fr. I, 1885, p. 105.

Kipayo, *Dummer* 1134.

Orbilbia xanthostigma, *Fr.* Summ. Veg. Scand., p. 357.

Kipayo, *Dummer* 1136.

HYPHOMYCETES.

Trichoderma lignorum (*Tode*) *Harz* in Bull. Soc. Imper. Moscou, XLIV, 1871, part 1, p. 116.

Kampala, *Small* 131.

Trichothecium roseum (*Pers.*) *Link.* Observat. I, p. 18.

Kipayo, *Dummer* 1198.

Rhinotrichum Curtisii, *Berk.* in *Grevillea* III, 1875, p. 108.
Kasala Forest, *Dummer* 1418.

Helminthosporium gigasporum, *Berk. et Br.* in Journ. Linn. Soc. ~~XLV~~, 1873, p. 98.

Mabira Forests, *Maitland* M 18.

Isaria Sphingum, Schw. Syn. Fung. Carol. 1822, p. 100.
Kipayo, on a moth, *Dummer* 1137.

I. congesta, Berk. et Br. in Journ. Linn. Soc. XIV, 1873,
p. 96.

Kipayo, *Dummer* 1173; Mount Elgon, *Small* 240.

I. acervata, Masee in *Kew Bull.* 1901, p. 167.

Kipayo, *Dummer* 1175, 1429.

II.—SEED SELECTION IN THE CULTIVATION OF HEVEA BRASILIENSIS.

CLAYTON BEADLE and HENRY P. STEVENS.

Our attention was recently drawn by the Director of the Royal Botanic Gardens, Kew, to the probable importance of seed selection in the cultivation of *Hevea brasiliensis*. He pointed out the large increase in the yield of alkaloids from cinchona bark which has been obtained as the result of seed selection, and suggested that important results might similarly be obtained in the cultivation of *Hevea brasiliensis*.

In June last we addressed a letter on this subject to the Rubber Grobark Association, which has been submitted to Messrs. Morgan, Marsden and Reeve, the Association's resident scientific officers in the East. We give below the substance of our original letter, together with a digest of their views:—

In the cultivation of cinchona the yield of quinine from the bark has been raised from about 3 per cent. to 7 per cent. or more as the result of planting from the seed of trees whose bark yielded a high percentage of alkaloids. Can a similar method of seed selection be applied to increase the yield of rubber?

The matter, however, is not so simple in the case of Para rubber as in the case of cinchona. In the latter, the analysis of the bark reveals the percentage of alkaloids, but in the case of Para rubber it would be necessary to keep daily records of the yields of individual trees over some considerable period before it could be said with certainty whether the trees were good or poor milkers. Work of this nature would have to be undertaken as a preliminary to seed selection, as there seems to be some doubt as to how far trees fluctuate in their yields over relatively long periods. We were informed by one planter of experience that a tree which was yielding poorly might be yielding well in a few months' time and, similarly, trees which appeared to be yielding large quantities of latex might, in the course of a few months, be found to be yielding quite small quantities. We have not had an opportunity of obtaining figures over a sufficiently long period.

Having ascertained definitely that trees vary in yield, it will then be necessary to devise means for selecting seeds from good milkers and avoiding those from poor milkers. This matter is more difficult in the case of a rubber tree than in the case of

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