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Miscellanea

Further contributions to a knowledge of 'Poroid Agarics' from the tropics:

The Genera *Campanella* P. Henn. and *Dictyoploca* (Mont.) Heim

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Introduction

The genera *Campanella* P. Henn. and *Dictyoploca* (Mont.) Heim belongs to a heterogeneous group of pantropical fungi commonly referred to as 'Poroid Agarics'.

The genus *Campanella*, erected by Hennings, was recognised by LLOYD (1919) in his study of the large, all-embracing group — the *Laschias* — which had in turn been erected by PATOUILLARD (1887). SINGER (1945, 1950) conducted a thorough survey of the group and clarified relationships between *Campanella* on the one hand, and *Favolaschia* (Pat.) Henn. of the *Laschia* group, on the other.

The two genera differ mainly in the texture and thickness of their carpophores and in the nature of their hymenia. *Campanella* has thin, papery, transparent, gelatinous carpophores (HEIM, 1945; SINGER, 1945) whereas *Favolaschia* has thick, opaque, but gelatinous carpophores. The hymenial surface of *Campanella* is lamellate while that of *Favolaschia* is usually made of pentagonal or hexagonal pores.

Although OTIENO (1968) has shown that *Favolaschia* consists of species whose hymenial surface is so lamellate as to be confused with *Campanella*, the thin, papery, transparent nature of the latter should enable one to distinguish between the two.

The earliest reports of *Campanella* from Africa are the two species of P. Hennings mentioned by LLOYD (1919). HEIM (1945) described a new species of *Campanella* from Malagasy.

As far as the writer can make out from the literature, the two species of *Campanella* reported in this paper appear to be the first record of the genus from eastern Africa. Species of another poroid agaric — *Favolaschia* — from our area have already been given detailed treatments elsewhere by OTIENO (1964, 1968).

The genus *Dictyoploca* (Mont.) Heim differs from the '*Laschia*' group in having a carpophore with a central stipe and a pileus having an inferior hymenium similar to *Agaricaceae* (sensu stricto). HEIM (1945) has reported one species of *Dictyoploca* from Malagasy and described two new species from Guadeloupe. It would appear that the new species of *Dictyoploca* described in this paper represents a first record of the genus from eastern Africa.

Campanella cucullata (Pat.) P. Henn. Plate 1, Figs. A, B, C, D
Plate 2, Figs. A, B

Carpophore pure white, papery, transparent, gelatinous, 15–20 mm. wide and 10–15 mm. from the stipe to the periphery; with a short or rudimentary lateral stipe. Hymenium inferior, composed of 8–10 large lamellae which radiate from the stipe towards the edge and branching to produce second and third

rank lamellae. The radiating lamellae interconnected by low, tangential lamellae making the hymenial surface appear poroid (Plate 1, Figs. A, C).

The abhymenial surface smooth but with lines indicating insertion of lamellae in the hymenium (Plate 1, Figs. B, D).

Basidia 4-spored, $20\text{--}25\ \mu \times 5\text{--}6\ \mu$, with four, short sterigmata and forming a palisade layer in the hymenium.

Cystidia apparently present (Plate 2, Fig. B) although they appear not to have been observed by LLOYD (1919).

Basidiospores ellipsoid, with one pointed end, hyaline, nonguttulate, $4.0\text{--}4.5\ \mu \times 2.5\text{--}3.0\ \mu$.

Locality: Aberdare Mountains, South Kinangop, Kenya growing on dead, unidentified twigs. Leg. N. C. Otieno 1963.

The East African specimens of *Campanella cucullata* are similar in most respects to the specimens illustrated by LLOYD (1919). The white, transparent, laterally stipitate carpophore with lamellae radiating from the stipe towards the expanded periphery, is a common feature of the two. This similarity is further reflected in the microscopic features e.g. shape and size of spores, as well as size and nature of the basidia. We have observed small cystidia in the hymenium of our specimens which appear not to have been seen by LLOYD (1919).

This species has been found in Samoa, Java, American tropics as well as from Africa (unidentified locality). It would appear that this is the first report of *Campanella cucullata* from East Africa. There are many localities in this area with similar ecological conditions as the Aberdare range where our specimens were collected; and we suspect that with more intensive collections, *C. cucullata* might be found to have a much wider range in East Africa than the present records indicate.

Campanella pendulosus spec. nov. Plate 1, Fig. G
 Plate 2, Figs. F, G, H

Carpophoris crateriformis, pendulis, candidus, pellucidus, 15–20 mm. latus, 10–15 mm. profundus, habens brevis stipitato centralis. Hymenium inferior, primus et venis lamelliformibus paucis consistentibus quae inter se reticulariter anastomosant. Stipite vero nullo, lateralis.

Basidiis tetrasporis, $20.3\text{--}30\ \mu \times 5.0\ \mu$. Cystidiis adsum. Sporis $3.0\text{--}3.5\ \mu \times 2.0\text{--}2.5\ \mu$, hyalinis, levibus.

Carpophore crateriform, pendulous, pure white, papery and transparent, 15–20 mm. wide across the top, 10–15 mm. deep, and suspended by a short central stipe from the woody substrate so that the hymenium points downwards.

The inferior hymenium composed of six major lamellae radiating from the centre, extending outwards and branching to produce second and third rank gills; the main lamellae interconnected by cross lamellae which may be as high as, or lower than, the radial lamellae. The whole hymenium appears made of large, irregularly shaped, deep, pores (Plate 1, Fig. G). Abhymenial surface smooth but reflecting lines of insertion of the lamellae in the hymenium.

Basidia 4-spored, $20.3\text{--}30\ \mu \times 5.0\ \mu$, with four short sterigmata (Plate 2 Fig. H), forming a palisade layer in the hymenium.

Cystidia present as large, dark staining bodies projecting slightly beyond the level of basidia. Basidiospores small, hyaline, ovoid with pointed ends $3.0\text{--}3.5\ \mu \times 2.0\text{--}2.5\ \mu$.

Type: No. PAX in Herbarium, Botany Department, Nairobi.

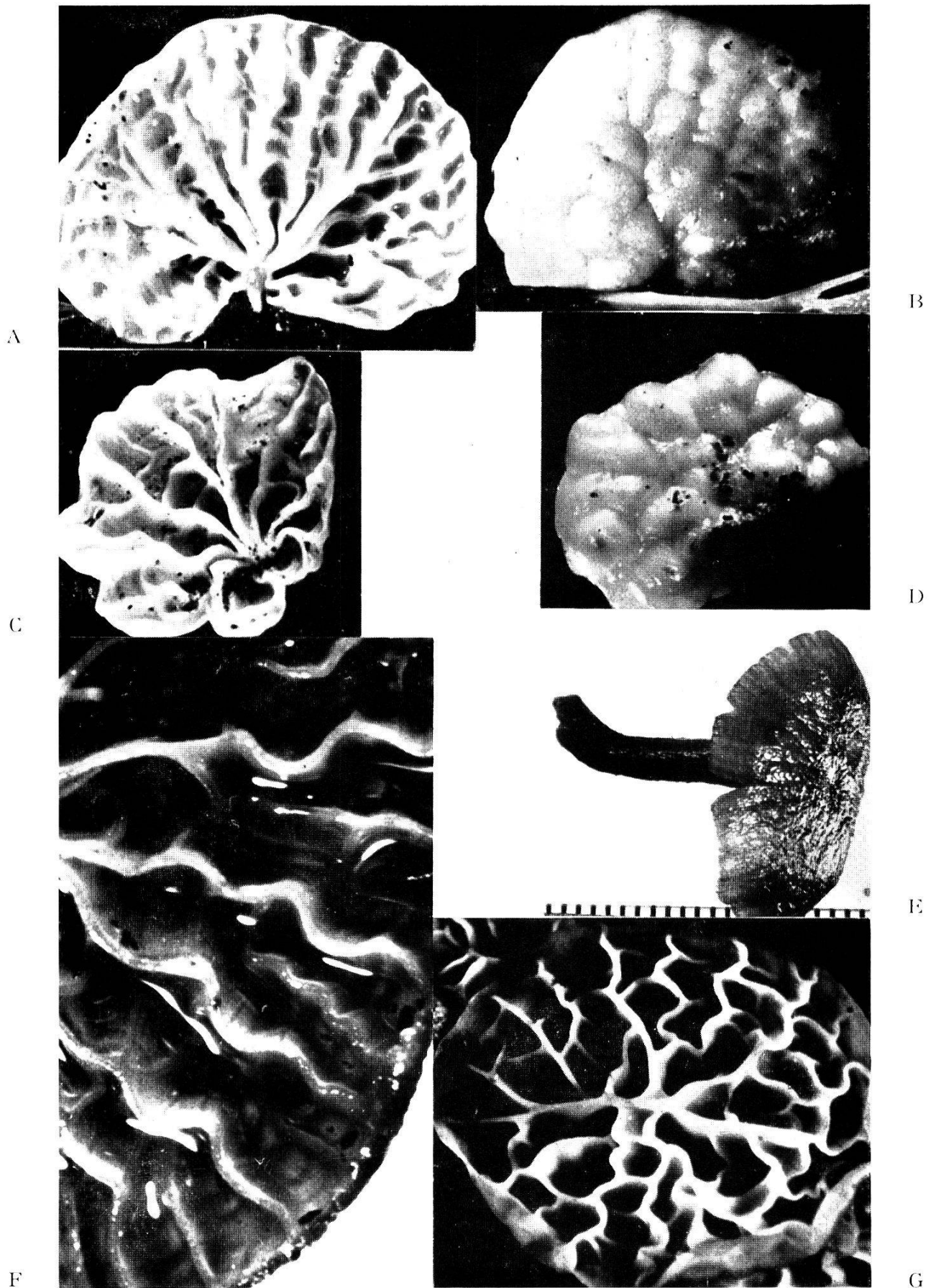


Plate 1. Carpophores of 'poroid agarics' showing: A and C: Hymenial surface of *C. cucullata*, B and D: Abhymenial surface of *C. cucullata*, E and F: *Dictyoploca duplicata*, G: *Campanella pendulosus*.

Locality: Aberdare Mountains, South Kinangop, Kenya, growing on a decaying, unidentified twig. Leg. N.C. Otieno 1962.

The specimen described above differs from *Campanella* species already reported in several respects.

It appears to be the only species whose pendulous carpophore has an almost poroid hymenial surface (Plate 1, Fig. G). No species reported by either LLOYD, SINGER or HEIM possess this characteristic. The small spores would bring it close to *Campanella* species reported by SINGER (1950); but here again, the small-spored species do not possess the cystidia which have been observed in *Campanella pendulosus*. From the size of spores and the white transparent nature of the carpophore, *Campanella pendulosus* appears similar to *Campanella cucullata*, but the pendulous nature of the carpophore as well as hymenial configuration both lead to the conclusion that they are different species.

Dictyoploca duplicata spec. nov. Plate 1, Figs. E, F
 Plate 2, Figs. C, D, E

Carpophoris stipitato centralis; pileo 12 mm. lato, Hymenium ermineus; abhymenium 'Cinnamon Brown'.

Stipes 20–30 mm. longus.

Basidiis tetrasporis $20.0\text{--}28.0\ \mu \times 4.0\text{--}5.0\ \mu$, habens longus sterigmata pseudoseptata. Cystidiis praesentiis, Sporis $3.0\ \mu \times 2.0\ \mu$, hyalinis, ovoidis.

Carpophore centrally stipitate, with a pileus up to 12 mm. in diameter; with a creamy white gelatinous hymenium and 'Cinnamon Brown' abhymenial surface. Stipe 20–30 mm. long, growing from decaying wood.

Hymenium inferior, made of large lamellae radiating from the central stipe to the periphery. Second and third rank gills also found in addition to the low-lying tangential lamellae which connect the major radial gill (i.e. gills anastomosed so as to represent shallow, poroid surface (Plate 1, Fig. F).

Basidia 4-spored, $20.0\text{--}28.0\ \mu \times 4.0\text{--}5.0\ \mu$, with long sterigmata which appear pseudoseptate (Plate 2, Fig. D). Cystidia present in the hymenium as bulbous, dark staining bodies projecting beyond the level of basidia. Basidiospores small, $3.0\ \mu \times 2.0\ \mu$, hyaline, ovoid, with pointed ends. Spore print white.

Type: PAY in the Herbarium, Botany Department, University College, Nairobi.

Locality: Castle Forest on south-eastern slopes of Mt. Kenya near Kamweti River at 5800 ft. Leg. W. A. Rodgers. 16/11/1964.

Dictyoploca duplicata is similar macroscopically to other species already reported by HEIM (1945). The pileus size is, however, smaller than those from Guadeloupe but larger than that of *Dictyoploca myrmecophila* from Malagasy. Furthermore, the extremely small size of spores when compared with other species of *Dictyoploca* already described leaves us in no doubt that the East African record is a new species. Preliminary collecting in similar conditions in the Aberdare, Usambara and Kilimanjaro mountains has not been fruitful so far; nevertheless, its occurrence in only one locality still leaves us with the feeling that much more work needs to be done before we can make any valid statements about the distribution of *Dictyoploca duplicata* in East Africa.

Discussion

The present paper represents a continuing attempt on our part to increase our knowledge about the mycological flora of tropical Africa which is still fragmentary and in very early stages of being worked out.

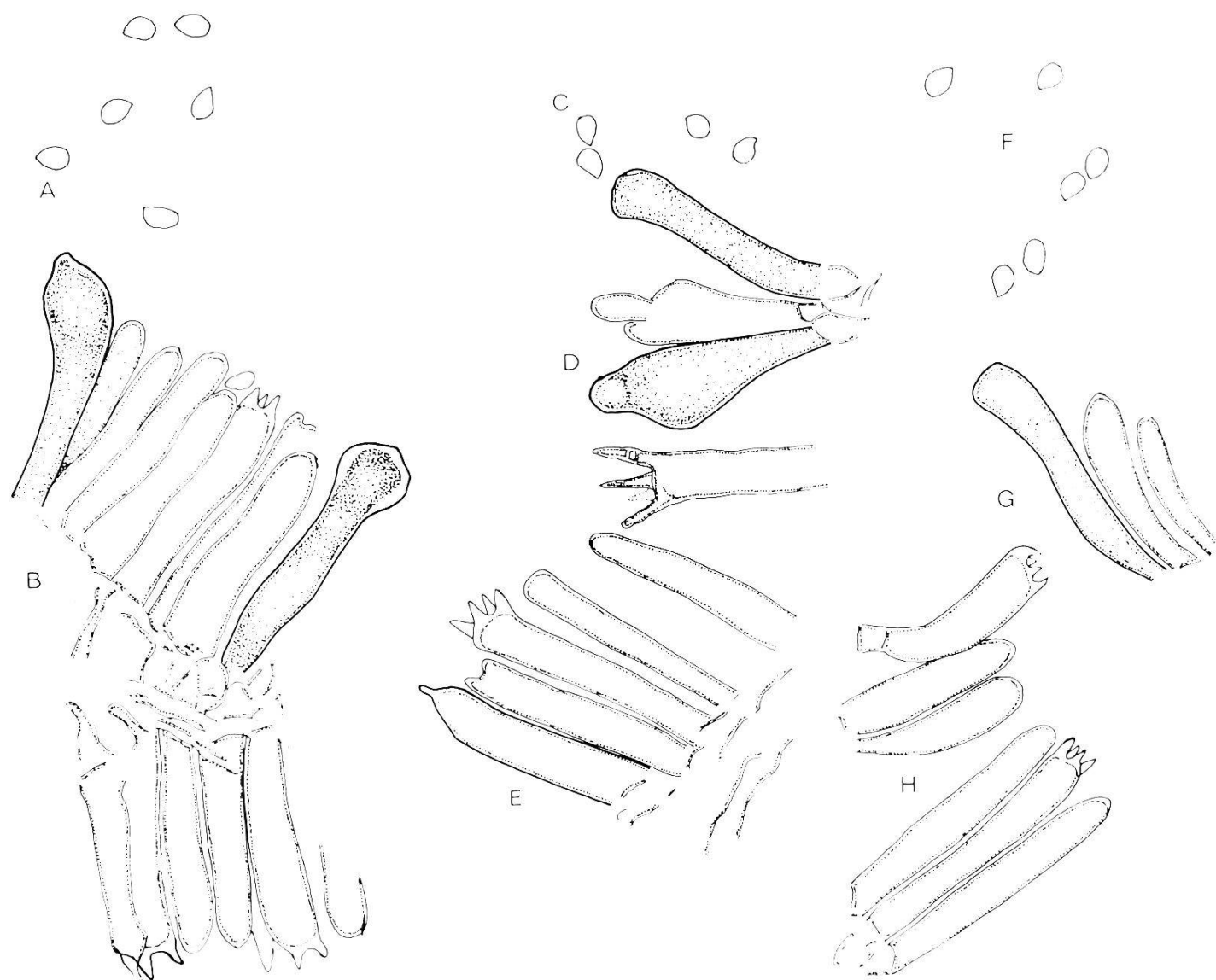


Plate 2. Microscopic structures of 'poroid agarics' showing: A and B: Basidio-spores, basidia and cystidia of *Campanella cucullata*, C, D and E: Spores, cystidia and basidia of *Dictyoploca duplicata*. F, G and H: Spores, cystidia and basidia of *Campanella pendulosus*.

Poroid agarics (sensu HEIM: 1945) which are mainly tropical, represent special problems since too few samples have been collected to enable more scholars to study and get to know the group. OTIENO (1964, 1968) has endeavoured to put together as much information as possible about the genus *Favolaschia* in a world-wide context by bringing together all that was previously known about the genus and by reporting several new species from eastern Africa.

The genus *Campanella* poses special difficulties in that very few specimens have been collected to date; and works by LLOYD (1919), SINGER (1945, 1950) and HEIM (1945) are all the records we can go by with respect to this very interesting genus. It is therefore not yet possible to attempt to produce a comprehensive report on *Campanella* as we have done for *Favolaschia*.

One new species of *Campanella* is reported in this paper from East Africa including *Campanella cucullata* which is a new record for our area. The distribution of the genus in Samoa, Java, East Africa, West Africa, Cuba,

Guadeloupe and Argentina would confirm the view that it is pantropical and that, with further field work, present gaps in its distribution might be closed. Within eastern Africa, we postulate that its range would be wider than our present records show if painstaking and systematic collecting was carried out in localities with similar ecological conditions as the Aberdare range.

Hymenial configuration in *Campanella pendulosus* and *Campanella cucullata* represents a point of evolutionary and phylogenetic interest among the higher fungi. Hymenomycetes were originally classified according to the nature of the hymenial configuration e.g. whether lamellate (Agaricaceae), toothed (Hydnaceae), poroid (Polyporaceae), smooth (Thelephoraceae), etc. In *Campanella cucullata*, we have a species which would be grouped together with *Agarics*, especially with some members of the *Tricholomataceae*, on the basis of hymenial configuration. In *Campanella pendulosus*, on the other hand, we have an intermediate stage of hymenial configuration which tends towards the *polyporoid* structure.

OTIENO (1968) has further shown that in another genus of poroid agarics — *Favolaschia* — there is a continuum in hymenial configuration from poroid, through pseudolamellate to lamellate condition ending with *Agarics* on the one hand; and from the poroid nature through gradual decrease in gelatinisation with corresponding hardening of the carpophore accompanied by delimitation of discrete tubes ending in *Polyporaceae* on the other. This raises the point that the original basis of the classification of Hymenomycetes based on hymenial configuration has serious limitations not only among the Hymenomycetes as a whole, but also among single genera of the Hymenomycetes, and especially among the 'Poroid Agarics'.

It would appear, therefore, that 'Poroid Agarics' occupy a pivotal position in the evolution and phylogeny of the Hymenomycetes. In this position, the two species of *Campanella* and the one species of *Dictyoploca* reported from East Africa would be placed.

If more of these interesting fungi could be found and further work done on them, we have reason to believe that phylogeny amongst the higher fungi and, subsequently, their classification, would become more clearly understood than at present.

Colour descriptions in this paper are based on Color Nomenclature and Standards, Ridway 1912.

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