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III. A RUSSULA PROVOKING HYSTERIA IN NEW GUINEA.

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The existence of cerebral mycetisms has been shown as connected with several groups of larger fungi, particularly Agaricales, apparently mainly representatives of the section *Caerulescentes* in the genus *Psilocybe* as used in Mexico; a race of *Amanita muscaria* in Eastern Asia on and near Kamchatka; a number of species of *Panaeolus* (and perhaps closely related genera) in North America and perhaps Europe; and finally — the subject of the present communication — *Russula* in New Guinea.

According to A. L. GITLOW [4]), one of three inebriants in use among the Mount Hagen tribes, is a mushroom. It incites, according to GITLOW, "fits of frenzy and has even been known to result in death. It is taken before going out to kill an enemy, or in times of anger, sorrow or excitement". The name of the mushrooms was indicated as "nonda" by GITLOW.

More recent data have been obtained through correspondence with an Australian group of investigators — unfortunately none of them a mycologist — who refer to the phenomenon as the Wahgi River frenzies, and the mushrooms as "hysteria-producing". I do not wish to anticipate any anthropological or as the word reads "ethnomycological" data since others are undoubtedly much more competent to do so, and I shall limit myself to the mycological aspect of the material received, indirectly, from this group. May it suffice to say that the specimens came from Binj, Territory of Papua and New Guinea, and that the collector indicates as the vernacular name of Minj origin "nondorbingi" which clearly shows the relationship with the reported name "nonda", the same as "nondorbungor", the corresponding name used by the Banz people.

Russula nondorbingi SING. spec. nov. (Plate 2).

Pileo dilute griseo, pallidore marginem versus, viscido, glabro, convexo-subgloboso, dein applanato, semper leniter umbilicato, margine acuto, levi demum breviter sulcato, diametro pilei 56—72 mm. — Lamellis aut cremeis aut albis (in liquido praeservatis stramineis), aequalibus, simplicibus, confertissimis, demum confertis, attingentibus subliberisque ve ladnato-subdecurrentibus, mediocriter latis, anastomosantibus. — Stipite albido (stramineo in liquido praeservato), glabro, solido, aequali vel apicem versus attenuato, brunneo-maculato, evelato, mycelio basali sordide pallido. — Carne albida. — Sporis echinatis hyalinis vel flavidis, 10—13.5 × 8.7—12.7 μ, spinulis altis; cystidiis contentu granuloso vermiformique destitutis, numerosis, voluminosis; macrocystidiis in superficie stipitis pieleique nullis; epicute pilei ex hyphis frequenter in formationibus cystidioideis, pluriseptatis terminantibus, in massa

[4]) As quoted by WASSON, V. P. & G. R. RUSSIA, *Mushrooms and History*. 1957.

gelatinosa undulatis, tenuissimis hyalinis efformata; in tramate hymenophorali cellulis isodiametricis abundantibus; subhymenio e cellulis subglobosis minusculis constante. — Binj, Novae Guineae (Australia), Octobri mense, leg. S. H. Christian, holotypus in Herbario Universitatis Michiganesis conservatus est.

Pileus light gray, paler at margin, deeper colored in center, glabrous, with acute and smooth margin but eventually becoming short-sulcate, viscid, subglobose to convex, eventually convex to applanate, always slightly umbilicate, 56—72 mm. broad.

Lamellae cream colored (?) or possibly remaining white (pale stramineous in preserved material and whitish in dried material), equal, simple, crowded, later close, varying from attingent-subfree to adnato-subdecurrent but very narrowly attenuate at the apex of the stipe, 6.5—7.5 mm. broad (medium broad) where broadest, always distinctly anastomosing (near flesh). Color of spore print unknown.

Stipe white or whitish (light stramineous in preserving fluid), with small brown spots, glabrous, subrugulose, solid, then spongy-hollow, equal or tapering upward, 58—90 × 15—28 mm.; veil none; basal mycelium sordid-pallid. —

Context white or whitish, apparently rather firm in the pileus and becoming spongy in the stipe; odor and taste not recorded, but taste obviously not acrid.

Spores 10—13.5 × 8.7—12.7 μ, more often almost globose and yellowish in the largest spores than in smaller ones and more subglobose and hyaline in the medium sized and smaller spores, echinate with long (1.5—2 μ) isolated (ornamentation type VI) spinules.

Basidia 49—52 × 14—17.3 μ, in some carpophores also smaller mature basidia present but mostly large and broad, mostly 4-spored, some 2-spored; sterigmata 6—10 μ long, straight, spinulose ("gastroid"), others half-sickle-shaped, the latter type prevalent.

Cystidia 70—115 × 7.5—20 μ, cylindric to fusoid-ventricose or similarly shaped (like macrocystidia, but "empty"), without any banded or granular contents and without protoplasmatic opacity and not staining brown in sulfoformol, with rounded attenuate or acute apex, and either with or without an appendage (which is up to 7 × 1.5 μ), hyaline, with rather thick wall, not metachromatic in cresyl blue mounts, sometimes some incrusted, more numerous on edges than on sides but striking and numerous in both locations, often with a central secondary septum, projecting beyond the basidia, the septate cystidia much like primordial hyphae, with rounded ends, but in this form observed only on and near edges; aside from these cystidia there are also differentiated cheilocystidia which never occur away from the edge, resembling closely the terminal cells of the epicutis (see below), these as well as the other cystidia occurring on the edge slightly smaller on an average than those of the sides and those on the epicutis, edge cystidia intermixed with a few

basidia, often ending in phantastically distorted tips and irregular appendages.

Hyphae: Subhymenium well developed, cellular; hymenopodium well developed, consisting of parallel hyphae running towards the edge, forming a rather thick layer; hymenophoral trama proper consisting mainly of spherocysts but with some filamentous hyphae intermixed; epicutis of pileus consisting of hyaline hyphae imbedded in a hyaline mucilaginous mass, loosely and irregularly arranged, wavy, very thin, smooth, simple, some ending in characteristic cystidioid terminal members, septate, mostly looking somewhat like primordial hyphae, mostly acute or subacute, rarely with rounded tips, rarely somewhat granularly incrusted, usually smooth, sometimes with a beak-like appendage (2 μ diameter), hyaline or some somewhat yellowish, thin-walled, the cells between the secondary septa varying considerably in diameter, 5—12 μ thick, 15—30 μ long, without contents, arranged in form of an ixotrichodermium, total length of cystidioid body (regardless of septa) 50—150 μ. Underneath the epicutis a nongelatinized cutis of filamentous (1—3.3 μ) hyphae — the hypodermium. Surface layer of stipe consisting mainly of filamentous hyphae, some ending in the same kind of cystidioid terminal members as those of the epicutis. Context composed of nests of spherocysts and some filamentous hyphae; oleiferous hyphae rare; laticiferous vessels none. All hyphae without clamp connections.

Obviously on earth in some type of tropical forest (no data available on the accompanying vegetation). Binj, New Guinea, formalin material collected by S. H. Christian, comm. R. W. G. Dennis (MICH, K). The formalin material preserved at MICH is the holotype.

This *Russula* is not actually close to any *Russula* we know, yet it is a typical representative of that genus and might be put in section *Elephantinae*. The long and isolated spinules on the spores, the content-less cystidia and the color of the pileus are characteristic.

It cannot be claimed that this *Russula* is the only species producing hysteria in that region. The original assembly of fungus fragments, containing also a *Russula*, contained on top of it some other agarics and at least one polypore. The most remarkable and outstanding specimen was an agaric, difficult to place under the circumstances, especially lacking better material and field notes, but in view of the interest such species have in folklore and possibly some day in applied fields of science, we shall describe it as well as possible:

Agaricales, spec.

Pileus blackish or blackened in part, brown in other parts, described as black but probably blackened during handling or drying, apparently glabrous, about 20 mm. broad. — Lamellae moderately broad or narrow, color of those of *Psilocybe*, close. — Stipe longer than diameter of pileus, now about 2 mm. thick.

Spores 10.5—12 × (5)—7.7—8 μ, similar to those of *Porphyrellus subflavidus* and *Boletellus betula*, *Ganoderma applanatum* and other *Ganoderma* species, *Setchelliogaster tenuipes*, *Tubaria thermophila*, *Metraria insignis* etc. since they have an ornamentation consisting of imbedded thin-cylindrical spinules, colored deeper than the imbedded exosporial and perisporial material, in this case deep purple brown or porphyrous-fuscous, perisporium hyaline, exo-, epi- and endosporium dull stramineousmelleous, apical modified (without ornamentation) and showing what is rather a callus than a germ pore, ellipsoid to ovoid-ellipsoid, or fusoid-ellipsoid, slightly inequilateral, more convex on outside than on inside, axially asymmetric, with attenuate but nearly obtuse apex, not truncate, without a suprahilar plage, applanation, or depression. Basidia not seen individually and entire; sterigmata four. Cystidia yellow and refringent, some thick-walled, numerous, lower half broadly ventricose upper half more or less cylindric and narrow (3—5.7 μ) or subcapitate (capitulum 4—6.5 μ diam.), amlullaceous, sometimes with short lateral excrescencies, 42—50 × 12—30 μ; epicutis of pileus not well preserved; hymenophoral trama apparently regular, more yellow towards hymenium, hyphae broader and more hyaline in mediostratum; all hyphae with clamp connections.

Apparently under trees on soil. Wahgi Valley, N. G. (R.E.P. Dwyer 1726) (MICH).

The accompanying notes say "2 specimens, both fragments only, caps and stems black".

It is impossible to guess, with any degree of probability, what genus this is. In many ways this reminds one of *Melanomphalia*, but the cystidia seem to indicate a significant difference, and it is probable that this is a new, hitherto unknown genus of Agaricales. The spore characters will make it easy to reidentify it whenever it should show up in the future, among carefully prepared botanical specimens of hysteria-producing mushrooms from New Guinea.

I have not seen the polypores or other basidiomycetous material, but it may well be that in Dwyer's dried samples the "nonda" or "nondorbingi" was combined with medicinal fungi (also mentioned in earlier reports).

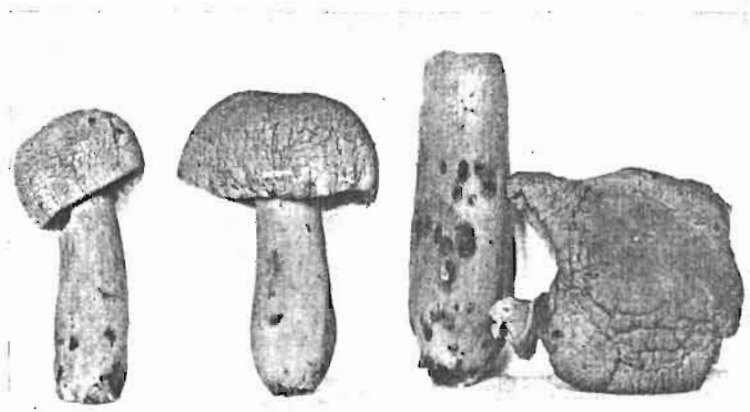

Plate II. *Russula nondorbingi* SING., type specimen, part preserved in liquid, slightly more than ½ natural size. Phot. Dr. ALEXANDER H. SMITH.

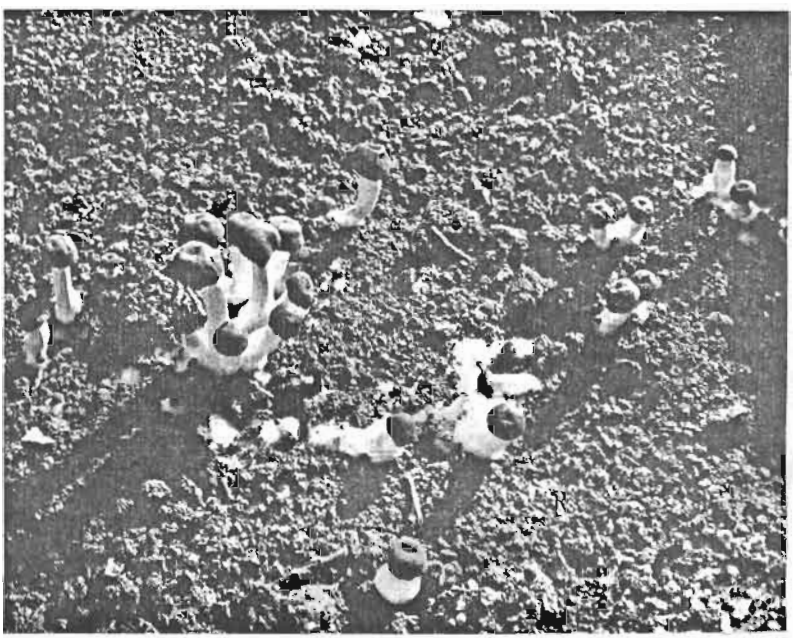

Plate III. *Panaeolus subbalteatus* (BERK. & BR.) SACC. as grown in greenhouse about ½ natural size. Photographic Service Penn. State Univ. B 1071.3, courtesy of Dr. L. R. KNEEBONE.