

~~polygonal warts which in age may show some development of horizontal lines, finally falling away; endoperidium adhering to exoperidium as a thin lining and breaking up and falling away as part of the scale. Gleba cottony, dingy brown (an avellaneous brown, but not truly lilac or violaceous), maintaining its shape at least for a time after peridium falls away. Subgleba absent to rudimentary.~~

~~Capillitium of threads 3-8  $\mu$  diam, smooth, pale ochraceous brown in KOH and bright fulvous in Melzer's sol., walls rather thin (0.5-1.2  $\mu$ ), narrower threads unpitted, larger threads with scattered roundish pits, threads often flexuous to crooked, rarely with short aborted branches but regular branching frequent, many of the branches Y-shaped, septa moderately abundant and thread usually creased clear around at the septa (the joint not swollen but rather marked by a narrow circular depression), ultimate branches tapered to a subacute apex, the threads not breaking up into short segments readily. Spores 3.5-6.5  $\mu$ , globose to subglobose, pale ochraceous in KOH, pale yellow (bright) to pale tawny in Melzer's sol., lacking a pedicel, strongly ornamented, the hyaline sheath 0.5-1  $\mu$  thick, denser plugs extending into it, walls not conspicuously thickened (many spores long remaining collapsed in Melzer's sol.).~~

~~On prairie sod, Colorado during the summer.~~

~~*Calvatia booniana* was mistaken for this species until the original material sent to Lloyd by Shantz and Piemeisel was studied. The two are readily separated by the difference in spore ornamentation. Even young spores of *C. polygonia* are distinctly ornamented. The difference in septation of the capillitial threads may also be important. Actually, *C. polygonia* is very close to *C. cretacea* (sensu the type, not the literature). However, *C. polygonia* lacks incrusting debris on the capillitium, the threads have thinner walls, and do not break up into the short segments as seen for *C. cretacea*. One would expect the gleba to be much more powdery in the latter. The spores of *C. polygonia* lack a pedicel whereas those of *C. cretacea* often have a short stem. If a pedicel and broken pedicels are numerous in the mounts.~~

~~It is clear to me that the arctic species of *Calvatia* need to be restudied on the basis of what is now known of the species in our western states.~~

~~Material examined. Colorado: Lloyd Herb. 31786 type; 15574 (both collected by Shantz). Lloyd Herb. 31787 from New Mexico is *C. booniana*.~~

#### 14. *Calvatia booniana* Smith sp. nov.

Illustrations: Plate VII, VIII.

Fructificationes 20-60 cm latae, 7-30 cm altae, demum areolato-squamulosae; sporae 3.9-6(-6.6)  $\times$  3.3-5.5  $\mu$ , subglobosae, subleves; filamenta capillitiorum 3.3-8.8  $\mu$  crassae. Typus, Smith 65191 (MICH).

Basidiocarp 20-60 cm broad, 7-30 cm high, flattened but circular more or less in outline: exoperidium thick and white, subfloccose, soon breaking up into 4-6 sided areolate squamules or polygones or patches of them, the polygones up to 2 cm deep and finally falling away exposing a whitish then pale buff thin to thick (1-2 mm) endoperidium which is slightly punky in texture, the exposed surface unpolished and felt-like, attached to substratum by a cord-like rhizomorph, entire peridium wall 2-4 mm thick. Gleba dingy olive when mature, olive brown as dried. Subgleba absent to rudimentary.

Capillitial threads 3.3-8.8  $\mu$  in diam, twisted and interwoven, branched, the branches Y-shaped or otherwise, extremities not truly attenuated, but rather bullet-shaped to subacute, rarely thorn-like, threads septate, septa scattered to abundant, square and thread breaking readily at the septa, walls even to sinuous or tortuous, thickened up to 2  $\mu$ , yellowish in Melzer's sol. and usually bright olive-yellow in KOH; pitted very occasionally, the pits often not extending clear through the wall. Spores 3.9-6(-6.6)  $\times$  3.3-5.5  $\mu$ , globose to subglobose or broadly



PLATE VII  
*Calvatia booniana* (dried)  $\times 1\frac{1}{3}$ . Holotype.

elliptical, seemingly smooth to very finely punctate, hyaline envelope evident, usually uniguttulate, yellowish olive in Melzer's sol. and olive-brown in KOH, pedicel usually evident.

Growing on soil under sage brush or in grassy places in arid regions. It is known from Idaho, Oregon, Utah and Colorado.

Material examined: Oregon: *Smith* 65191-type. Utah: *McKnight* F998. Idaho: *Truablood* 1614, 2183, 2193, 2248 (MICH). New Mexico: Lloyd Herb. no. 31787.



PLATE VIII

*Calvatia booniana* (fresh)  $\times \frac{1}{4}$ . Photo by Mrs. Ellen Trueblood.

This species has been misidentified for the last fifty years as *C. gigantea*, no doubt because of its large size. Dr. Wm. Judson Boone, the first president of the College of Idaho, who was keenly interested in the central Rocky Mountain mushroom flora, had some beautiful specimens which I saw in 1935. Hence, I take pleasure in dedicating this species to him. The smooth or practically smooth spores at once distinguish the species from *C. polygonia*, but there are many slight differences in addition, such as the size of the exoperidial warts, occasional short thorns on the capillitial threads reminding one of the capillitium of *Mycenastrum*, and the more tortuous outline of the threads, often appearing as a series of stretched out S-curves. In KOH the capillitium is often bright olive-yellow to nearly lemon color and some of this pigment may diffuse into the mounting medium.

15. *CALVATIA LEPIDOPHORA* (E. & E.) Coker and Couch, *Gastromycetes of Eastern United States and Canada*, p. 60. 1928.

*Lycoperdon lepidophorum* Ellis & Everhardt, *Journ. Myc.* 1: 88. 1885.

*Hypoblema lepidophorum* (E. & E.) Lloyd, *Myc. Writ.* 1: 140. 1903.

Basidiocarps large, 15 cm high, 20 cm broad, subglobose to obovate, stramineous to brownish; peridium very thick, duplex; exoperidium with a thin glazed rind inseparable from an almost corky brown layer 2 mm thick when dry, surface glossy but areolate or marked with inherent patches or rounded bosses which are darker and duller than the glazed surface, the whole separable from the endoperidium; endoperidium papery thin, dark brown. Gleba dull olive-brown, pulverulent.

Capillitial threads 2.2-5.5  $\mu$  in diam, elongate, slightly interwoven, branched, the branches forked or at right angles and rather common, attenuated to slender pointed tips, septate; the septa abundant, square or joint-like; the walls even and thickened to some extent, often breaking at septa, thickened at septa and forming anteriorly directed walls up to 1  $\mu$  thick, not pitted to any degree, yellowish in Melzer's sol. and KOH; where pits are present they are minute and widest to the interior and round. Spores (1.5)5.5-6.5  $\times$  (5)-5.5-6  $\mu$ , subglobose to very broadly elliptical or broadly ovate, densely verruculose, the verrucae about 0.5  $\mu$  high, a definite hyaline envelope present, usually uniguttulate, olive-brown in KOH and ochraceous tawny in Melzer's sol., pedicel absent to inconspicuous.

Growing in prairie country, South Dakota. Lloyd listed it from Indiana and Ohio.

The strongly ornamented spores, thick peridium and relatively smooth outer surface appear to be the important diagnostic features. The distinctly ornamented spores separate it from *C. booniana*.

16. *CALVATIA GIGANTEA* (Batsch ex Pers.) Lloyd, *Myc. Writ.* 1: Note 269, p. 166. 1904.

*Lycoperdon giganteum* Batsch ex Pers., *Syn. Fung.* p. 140. 1801.

*Bovista gigantea* (Batsch ex Pers.) Bigeard et Guillemin, *Fl. Champ. super. de France* 1: 167. 1909.

*Lycoperdon bovista* Fries, *Syst. Myc.* 3: 29. 1829 (non Persoon).

*Langermannia gigantea* (Batsch ex Pers.) Rostk. in Sturm, *Deuts. Fl.* 41. Abt. 3 (5 vol): 23. 1844.

*Globaria gigantea* (Batsch ex Pers.) Quélet, *Champ. Jura et Vosges* p. 362 (370). 1873.

*Calvatia maxima* Morgan, *Journ. Cine. Soc. Nat. Hist.* 12: 166. 1890.

*Calvatia bovista* (Fries) MacBride, *Lab. Nat. Hist. Univ. Iowa Bull.* 4: 41. 1896.

*Lasiosphaera fenzlii* Reichardt, *Novare expedit.* p. 135. 1870 (?).

*Eriosphaera fenzlii* (Reichardt) Saccardo, *Syll. Fung.* 7: 96. 1888.

Illustration: Plate IX.

Basidiocarps very large, 20-50 cm in diam, subglobose, depressed-globose or obovate, with a thick cord-like root; exoperidium white or grayish but changing to yellowish and becoming olivaceous, at first subtomentose, smooth like a kid glove, very thin (about 1 mm when dry), fragile, ultimately breaking up and falling away in pieces from the inner layer; endoperidium thin fragile, after maturity