



TRAVAUX MYCOLOGIQUES

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THE GENUS *VASCCELLUM*
(*Lycoperdaceae*)
IN THE UNITED STATES

by Alexander H. SMITH

Résumé. — Description de 4 espèces nouvelles : *Vascellum llyodianum*, *V. floridanum*, *V. texense*, *V. intermedium*.

In the course of studying materials for a manual of the higher fleshy fungi of the western United States, I have had occasion to study the species of *Vascellum* with the result that a separate communication on this genus appears desirable.

To any one who has studied the Lycoperdaceae in detail it must be evident that the genera, either as limited by previous workers or by those presently engaged in studying the group (myself included), intergrade sufficiently to cause difficulty in clearly defining them. At times one wonders if only one genus should be recognized. If one approaches the problem of defining genera on the basis of the degree of specialization of the basidiocarp for spore dispersal, an approach which appears very logical, one finds that a number of dispersal methods are evolving and some have reached a degree of specialization that makes the genera quite distinct (*Calvatia*, *Lycoperdon*, *Disciseda*). These features to some extent furnish the main characters on which genera have been recognized over the last 50 years. The problems rest mainly in the residual mass of species in which spore dispersal is still in a somewhat generalized state. Thus we have dehiscence in *Lycoperdon* by a « pore » which in some species is well defined and the pore area shows anatomical differentiation (such as the presence of thick-walled cells — mycosclerids), but in others such as the common *L. pyriforme* it is an apical hole (finally) up to one-third the diameter of the basidiocarp — to which the term *pore* is inappropriate to say the least. Or the basidiocarp may dehisce by a slit up to a centimeter long, as in collections of *L. perlatum* I made in Washington in the fall of 1972. In *Calvatia* dehiscence is by fracturing of the peridial wall — this is very characteristic in species well advanced in this type of dispersal, but there are many in which the pattern one observes has little correspondance with the information given in the generic diagnosis. Unfortunately, to date, attempts to define genera in the family on the basis

of hyphal characters have not contributed to the clarity of generic limits that most of us hoped for in Gasteromycete systematics generally. *Vascellum*, for instance, was first defined mainly on the basis of a diaphragm (a thin membrane) separating the chambered sterile base from the gleba in species having a sterile base. Kreisel has (correctly in my estimation) placed more emphasis on the preponderance of paracapillitium in the gleba and the intermediate type of dehiscence (between that of *Calvatia* and *Lycoperdon*).

The concept of *Vascellum* employed in this work is that of Kreisel, and, essentially, PONCE DE LEON (1970). For the United States we have included six species, excluding one recognized by PONCE DE LEON (*V. cruciatum*). I suspect that additional species will be found in our Southwest and in subalpine situations, since the Gasteromycete flora of these regions has not been systematically explored for these groups in the United States.

The specimens cited are preserved in the Herbarium of the University of Michigan.

Vascellum Smarda

Flora CSR, ser. B, 1 : 304. 1978.

Basidiocarps depressed-globose to turbinate, 1.5-6 cm high, 1-5 cm broad; exoperidium ornamented with white to creamy spines and scurf when young; spines often connivent at the apices, darkening in age and deciduous or irregularly worn away to expose a smooth, persistent membranous endoperidium dehiscing by a definite pore or by the apparent disintegration of the upper part of the basidiocarp; mycosclerids may be present or absent around the aperture depending on the species. Sterile base present, scant to well-developed, chambered, white when young becoming brown to purplish in age. Gleba white when young becoming brown to olive-brown in age; pseudocolumella present or absent. Paracapillitium abundant; eucapillitium absent or restricted more or less to the inner surfaces of the endoperidium and sterile base. Spores globose to ovoid, smooth to verruculose.

Type species. *Lycoperdon pratense* Persoon.

Key to Species

1. Spores 3.5-4.5 x 3-3.5 μ , ellipsoid to ovoid .. *Vascellum floridanum*
1. Spores globose 2
2. Exoperidial ornamentation sloughing off in plates or sheets or in blocks of groups of spines .. *Vascellum intermedium*
2. Exoperidial ornamentation not sloughing off as in above choice .. 3

- 3. Basidiocarps dehiscing by a large apical opening (reminiscent of *Calvatia tatrensis*) 4
- 3. Basidiocarps dehiscing by a pore (which may finally enlarge considerably) 5
- 4. Lower portion (toward sterile base) of endoperidium with numerous hyphae with thick, colored walls, some of which extend into gleba as eucapillitial threads *Vascellum lloydianum*
- 4. Lower portion of endoperidium with rare hyphae with thick, colored walls *Vascellum pratense*
- 5. No brown-walled capillitial threads present in or near the endoperidium *Vascellum texense*
- 5. Brown, thick-walled hyphae fairly numerous in the area next to the endoperidium *Vascellum curtisii*

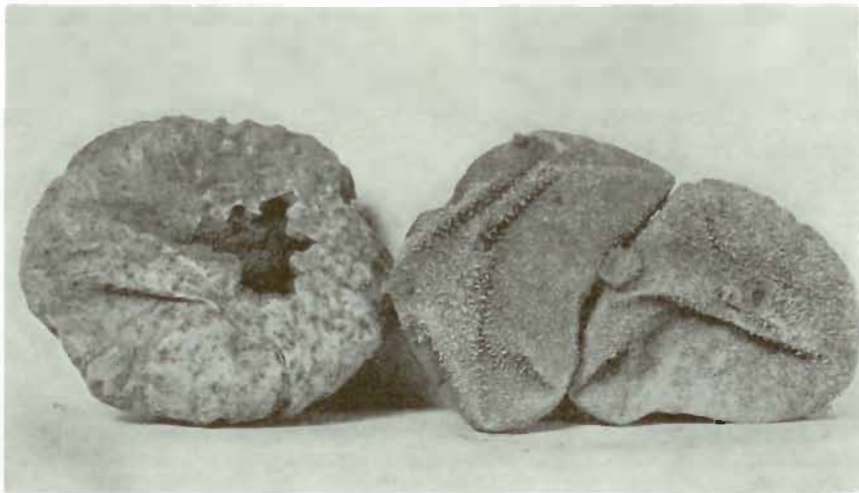


Fig. 1. *Vascellum pratense* × 1, Smith 80607.

Vascellum pratense (Pers.) Kreisel, Feddes Repert. Spec. Nov. Regni Veg. Beih. 64 : 159. 1962. Fig. 1.

Lycoperdon pratense Persoon, Synop. Fung. 142. 1801.

Basidiocarps 3-6 cm broad, 2.5-5 cm high, obconic with upper surface ± flattened, dehiscing by a large ragged opening; *exoperidium* in the form of long delicate spines connivent in groups at the apex much as in *Bovistella*

radicata, the long spines soon breaking away leaving the scurf and short spines but finally these too \pm disappearing; *endoperidium* papery and delicate, breaking up over apex but persistent on sides. *Gleba* near Saccardo's umber at maturity, powdery; pseudocolumella weakly developed to absent. *Sterile base* in section roughly one-third of basidiocarp, chambered, violaceous brown at maturity; diaphragm very distinct.

Spores 4-4.5 μ , globose, punctate to minutely warty, thin-walled, olive-ochraceous in KOH, pale cinnamon and with a globule in Melzer's reagent; apedicellate or rarely with a stump of a pedicel. *Paracapillitium* abundant, of thin-walled hyaline hyphae with hyaline adhering material, 4-8 μ wide, septate, branching frequently with the tips obtuse; walls undulating in some or with occasional «bumps», content not distinctive; *eucapillitium* scant, of scattered thick-walled narrow (3-5 μ) capillitial threads with undulating walls and tapered to a subacute apex (as in *Lycoperdon*), the walls ochraceous to brownish in KOH. *Exoperidial ornamentation* of groups of inflated cells in heaps or cones, wall thin to thickened, hyaline in KOH, interior to this is a narrow zone of pseudoparenchyma which collapses in age; *endoperidium* of matted hyaline tubular narrow to broad (2.5-6 μ) thick-walled hyphae (lumen nearly closed), scattered «typical» capillitial hyphae with ochraceous to brownish walls present in area adjacent to endoperidium. No mycosclerids observed.

Habit, habitat and distribution : Scattered to gregarious on grassy areas; Asia, Europe, possibly rarely in eastern North America.

Observations : Smith 80607 from Ross Links, Northumberland, England, has scattered ochraceous-walled to brown-walled capillitial hyphae adjacent to the endoperidium and the same type of capillitial element was found in a collection by KREISEL, Prov. Mecklenberg, Germany (6. VIII. 1961) so it is clear that this type of element is present in *V. pratense* in Europe as DEMOULIN (1971) has stated. The differences between the American and European collections are discussed under *V. lloydianum*.

Vascellum lloydianum nov sp. (Fig. 2-3)

Fructificationes 2-4(6) cm altae, 1.5-5 cm crassae, subglobosae vel turbinatae, spinulosae demum glaber; spinulae 1-3 mm longae; gleba olivaceo-brunnea, pulverulenta; subgleba conspicua, alveolata; sporae 3.5-4.5 (5) μ , globosae, leves vel minute punctatae, saepe pedicellatae (\pm 5 μ longae); *eucapillitium* adsunt, hyphis 3-5 μ latis, crassotunicatis, ochraceobrunneis; *paracapillitium* adsunt, hyphis hyalinis, 2-6.6 μ latis,

tenui-tunicatis; *diaphragma desunt vel inconspicua*. *Typus* : Smith 83267 (MICH); *legit prope Randle, Washington, 29 oct. 1972*.

Basidiocarps 2-4(6) cm high, 1.5-5 cm broad, depressed globose to bowl-shaped or turbinate at maturity, attached by a small pad of dirt and mycelium or by a rhizomorph; *exoperidium* in the form of soft spines often united at the apex in groups of 3-5 (as in *Bovistella radicata*), with smaller spines and granules in the spaces between groups, all of this falling away by late maturity; *endoperidium* smooth, grayish, rather shiny in appearance and with a wide, often lobed, apical opening. *Gleba* white and soft when young, becoming yellow-olivaceous then changing to light brownish olive and becoming powdery at maturity. *Sterile base* in section prominent, of large chambers, white when young but brownish to purplish at maturity, often occupying the lower half of the basidiocarp, in age separated from the gleba by a line (an apparent diaphragm), no diaphragm evident in basidiocarps just reaching maturity.



Fig. 2. *Vascellum Lloydianum* $\times 1$, Smith 83101.

Spores 3.5-4.5 (5) μ , globose or nearly so, smooth in optical section but surface minutely verruculose under oil; pale tan to olivaceous or finally argillaceous in KOH, tawny in Melzer's reagent; often with a stub of a pedicel up to 5 μ long. *Eucapillitium* scant, threads 3-5 μ wide, present in the area adjacent to the endoperidium and arising from it, walls undulating to parallel, slightly thickened, ochraceous to brown in KOH, unpitted, tapered to acute apices, the tapered portion often crooked as in *Lycoperdon*; *paracapillitium* abundant, threads 2-6.6 μ wide, hyaline, thin-walled, septate, branched sparingly, seldom fragmented, smooth or with some

adhering debris. *Exoperidium* of hyaline pseudoparenchyma giving rise to heaps and cones of similar hyphae or cones formed of hyphal fascicles with the cells globose to versiform, but the hyphal structure typically obscure; *endoperidium* of thick-walled tubular hyphae matted into a layer and many of the hyphae developing colored walls, hyphae 2-7 μ thick, lumen often narrow or obscured; no mycosclerids observed.

Habit, habitat and distribution : In grassy areas west of the Great Plains, especially in the Pacific Northwest. Type : In the lawn of the Cispus Environmental Center, Randle, Washington, 29 Oct. 1972, A. H. Smith 83267.

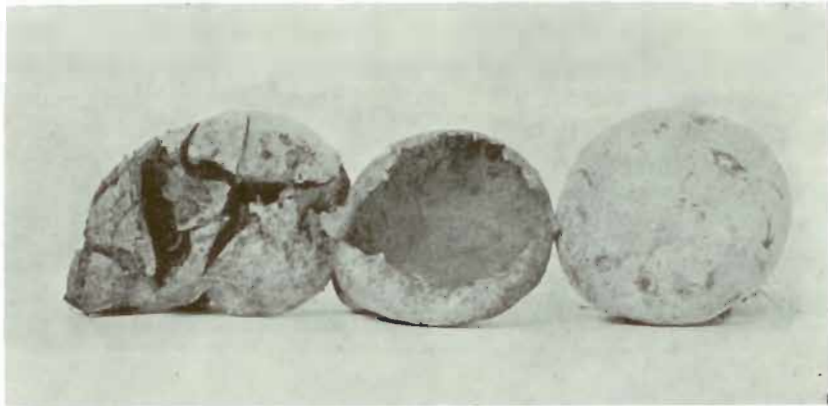


Fig. 3. *Vascellum lloydianum* $\times 1$, Smith 83101.

Observations : The diagnostic features of the species are the presence of « true » capillitium along with paracapillitium, subsmooth spores, and a poorly developed to absent diaphragm. Since the development of the « true » capillitium has been mentioned frequently in the literature, this subject was studied in a large fruiting of the species (Smith numbers : 83229, 83230, 83232, 83235, 83236, 83242, 83264, 83265, 83267, 83272, 83444) from the lawn of the Cispus Environmental Center south of Randle, Washington in the Gifford Pinchot National Forest. All stages from basidiocarps about 0.5-1 cm in diameter up to 5.5 cm were observed. The following observations were made : In the peridium of immature specimens, progressing from the gleba outward, there is observed a poorly delimited zone of thin-walled, hyaline hyphae with (frequently) inflated cells and very few intercellular spaces. This grades into a zone of hyaline predominantly inflated cells of variable orientation. To the exterior of this, the hyphae are arranged more or less perpendicular to the peridial surface and

aggregate to form the spines and other ornamentation; the cells are typically somewhat inflated. No mycosclerids were observed. Near maturity, the inflated cells in the zone of variable orientation collapse and the hyphal elements are more conspicuous. Progressing from the area that will be involved in dehiscence, (the top of basidiocarp) and occurring in increasing numbers as one progresses toward the sterile base, there are interwoven straight to flexuous hyphae with parallel walls up to $\pm 1.5 \mu$ thick, which are umber brown to ochraceous (in KOH). These are sufficiently numerous to give rigidity to the wall of the basidiocarp and they also (on the area facing the gleba) project into the gleba as « true » capillitial threads. The outer layer of spines wears or falls away as the cellular layer beneath it collapses. In the area that will form the aperture there occur thin-walled hyaline septate hyphae $3.5-4.5 \mu$ wide, and in these the cells apparently tend to disarticulate. No mycosclerids were observed in this region. In age the endoperidium consists mainly of interwoven hyphae $3-4.5 \mu$ wide which are paler in color (yellowish in KOH) near the aperture and darker colored (brown) progressively away from the aperture toward the sterile base.

I have not had sufficient developmental stages of *V. pratense* to make a critical study of it. It is now apparent, however, from a comparison of mature basidiocarps of each species, that a good taxonomic distinction can be made between the two on the amount of true capillitium present. It is consistently scarce in the predominantly European *V. pratense* and relatively abundant (as described) in the characteristically western American populations (*V. lloydianum*). In addition, the latter has smoother spores and a more reduced (or less developed) diaphragm.

PONCE DE LEON (1970) apparently recognized the species, described here as *V. lloydianum*, under the name *V. subpratense* (Lloyd) Ponce de Leon. However, he designated collection 51437 of the Lloyd collections as lectotype for *Lycoperdon subpratense* Lloyd. DEMOULIN (1971) has pointed out that the specimen in question is an immature *Lycoperdon calvescens* Berk. & Curtis. The « brown sphaerocysts between the endoperidium and the pseudoparenchymatous layer » as described for it by DEMOULIN (l. c.) clearly indicate that the collection is not *V. lloydianum*. DEMOULIN (l. c.) identified collection 51437 as *Lycoperdon calvescens*! I agree with DEMOULIN that the name *L. subpratense* Lloyd should be rejected.

As to the presence of a diaphragm, one is evident on Smith 80607 from Ross Links, England, a collection which contains basidiocarps just beginning to dehisce. In the material of *V. lloydianum* at roughly the same stage, no diaphragm (membrane) was present. In old material a « pseudo-diaphragm » may be apparent but is produced by the collapsing of the

chambers of the sterile base adjacent to the gleba. In both, a pseudoparenchymatous layer is visible in the peridium of immature basidiocarps, but in the European specimens studied to date, there are more clavate to cystioid cells in the exoperidial ornamentation.

Vascellum curtisii (Berk.) Kreisel, Feddes Repert. Spec. Nov. Regni Veg. Beih. 68 : 86. 1963.

Lycoperdon curtisii Berk., Grevillea 2 : 50. 1873.

Basidiocarps small, 0.5-2 cm wide, globose to subglobose when young but often angular from mutual pressure, attached by a pad of dirt and mycelium; *exoperidium* of crowded spines united by their tips into stellate groups, fine granular material present between the spines, spines and scurf falling away at maturity over small areas around the apex initially but finally from all the exposed surfaces of the basidiocarp, the granular material remaining longest as a powdery coating; *endoperidium* when exposed smooth, pale brown, dehiscing by a simple pore which may enlarge to a mouth 2-4 mm wide or an elongated slit. *Gleba* white at first, powdery and olivaceous at maturity; *pseudocolumella* weakly developed. *Sterile base* in section poorly developed to scant, of small chambers at the base of the gleba adjacent to the point of attachment to the substratum, whitish when young to brownish purple by maturity; diaphragm lacking or very inconspicuous.

Spores 3-3.5 μ , globose, ornamented with small spines, ochraceous to light yellow-brown in KOH; pedicel absent to inconspicuous. *Paracapillitium* abundant, threads 3-7 μ wide, incrustated with hyaline debris, frequently septate, sparingly branched, the extremities rounded; walls parallel, hyaline, thin, unpitted; *eucapillitium* scant, of threads to 4.5 μ wide with thickened, brownish, unpitted walls, unbranched, more numerous near the endoperidium. *Exoperidial spines* composed of fascicles of \pm erect hyphae with thin-walled, clavate to lemon-shaped hyaline cells, arising from a layer of thinner-walled, hyaline almost pseudoparenchymatous tissue (the cell outlines less distinct because of being more translucent) merging with the *endoperidium* which consists of hyaline to pale ochraceous \pm tubular matted to interwoven thick-walled elements except near the pore where versiform *mycosclerids* are present (these are scattered, narrow, thick-walled elements regularly associated with the inner surface of the endoperidium).

Habit, habitat and distribution : Gregarious to cespitose in pastures and open areas in the fall in North America.

Observations : KREISEL (1963) reported a diaphragm in this species and I have also demonstrated one in some collections but the character appears to be related to the degree of development of the sterile base. In some basidiocarps when sectioned in half longitudinally, one finds a weak pseudocolumella with the chambered structure of the sterile base forming its base and the diaphragm (such as it is) extending as a thin line from this structure to the peridium. In other words, if a membrane is in reality present, it does not cover the entire upper surface of the sterile base. I do not regard the presence or absence of a diaphragm in this species as a valid character for subdividing it into infrasepecific taxa, but rather prefer to emphasize the characters which Kreisel has used — the paracapillitium and the intermediate type of dehiscence. In addition, the encrusted capillitial hyphae are considered important — especially when the incrustation is compared to that on the capillitium of immature fruit bodies of *Morganella subincarnata*.

Vascellum floridanum nov sp.

Fructificationes 6-18 mm latae, subglobosae, spinulosae, tarde glaber vel granulosa, fragilissimae; gleba sordide luteo-brunnea, pulverulenta; diaphragmata desunt vel inconspicua; spores 3.5-4.5 x 3-3.5 μ , ellipsoideae vel ovoideae, subleves; eucapillitium desunt; paracapillitium adsunt. Typus : B. Isaacs, Alachua County, Florida; June 1964 (MICH).

Basidiocarps 6-18 mm broad, globose to subglobose or depressed-globose, dehiscing by an apical pore; *exoperidium* soon breaking up into a dense layer of minute spines in groups of 3-5 and connivent at the apices, these drying down and inconspicuous at maturity and wearing away individually to expose the dull endoperidium, or the latter appearing faintly granulate, drying cream color to buff; *endoperidium* papery thin, dingy buff to brownish, dehiscing by a pore which soon becomes considerably enlarged. *Gleba* dingy snuff-brown, somewhat powdery; *pseudocolumella* absent to weakly developed. *Sterile base* in section rudimentary, offwhite to pale buff, chambered, lacking a distinct diaphragm.

Spores 3.5-4.5 x 3-3.5 μ , ellipsoid to ovoid, nearly smooth (very minutely warty), thin-walled, light ochraceous tan in KOH; pedicel (a hyaline stub 1-2 μ long) present on many spores. *Paracapillitium* abundant, of threads 3-6 μ wide, walls \pm parallel, thin, no pitting observed, hyaline, some with adhering debris, unbranched (as far as observed), septate, content not distinctive; no *eucapillitium* observed even adjacent to the endoperidium. *Exoperidial ornamentation* of conic fascicles of hyphae (the fasciculate hyphal nature best observed in mid portion of the cone, cells near

base globose to subglobose and weakly ochraceous, arising from a broader area of larger subglobose cells, the layer featuring numerous intercellular spaces (not a well-developed pseudoparenchyma). *Endoperidium*; of refractive pale ochraceous thickwalled elements, tubular in the area away from pore but near the pore they enlarge and form versiform mycosclerids.

Habit, habitat and distribution : Fruiting in the spring and summer in Florida, one collection closely gregarious on a sandy lawn, Largo, Pinellas Co., Florida, April 24-27, 1951, V. Potter 10764 and one (Type) from Alachua Co., Florida, June 1964, B. Isaacs.

Observations : The lack of a diaphragm, the mostly broadly ellipsoid spores, lack of colored capillitial elements near the endoperidium, and the polygone-like pattern of the nearly mature exoperidium are distinctive. The latter layer does not separate in sheets.



Fig. 4. *Vascellum texense* × E. A. Smith 1208.

***Vascellum texense* nov. sp.** (Fig. 4)

Fructificationes 5-20 mm *crassae, globosae vel subglobosae, spinulosae, tarde glaber, fragilissimae; gleba griseo-brunnea vel sordide luteo-brunnea; subgleba alveolata; diaphragma inconspicua; sporae* 3-3.5 (4) μ , *globosae, minute echinulatae; eucapillitium desunt; paracapillitium adsunt, hyphis* 3-7 (8) μ *crassis, tenui-tunicatis. Typus* : E. A. Smith 1208 (MICH), legit prope Cisco, Eastland Co., Texas, July 1938.

Basidiocarps 5-20 mm broad, globose to subglobose to pyriform, attachment basal and often with an adhering pad of dirt; *exoperidium* composed of a thin to dense coating of minute delicate spines easily eroded

away, finally leaving only a dull thin papery endoperidium visible over upper half, in age the *endoperidium* whitish to grayish and exoperidial remains pale tan to clay-color; dehiscing by a pore which may finally enlarge somewhat, but upper portion of endoperidium often fracturing into pieces (reminding one of the dehiscence pattern of *Calvatia craniformis*); the dried peridium exceedingly fragile and readily breaking along the edge of the sterile base circumscissily. *Gleba* grayish brown to «snuff brown» and cottony, with a well developed *pseudocolumella*. *Sterile base* in section typically well developed, convex, distinctly chambered, whitish at first, violaceous in age; diaphragm poorly formed.

Spores minute, 3-3.5(4) μ , globose, very minutely echinulate, yellowish to yellow-brownish in KOH; pedicel lacking. *Paracapillitium* abundant, threads 3-7(8) μ wide, hyaline, walls thin, parallel, unpitted, content not distinctive, septate, branching, lightly incrustated with hyaline debris; *eucapillitium* not observed. *Exoperidial ornamentation* as heaps of thin-walled inflated cells with hyaline or pale ochraceous walls; interior to this is a zone of thin-walled, hyaline pseudoparenchyma which may collapse in age; *endoperidium* of matted to interwoven thick-walled pale ochraceous hyphae 3-5 μ wide except near the pore where mycosclerids occur. They are versiform with thick hyaline walls.

Habit, habitat and distribution : Gregarious on soil in semiarid regions, summer and fall, Arizona and Texas. Type : on wet soil in woods, Cisco, Eastland Co., Texas; July 1938, E. A. Smith 1208 (MICH).

Observations : We tried to recognize a taxon with spores up to 4.5 μ in diameter but gave it up. In immature material or prematurely ripened basidiocarps the spores are often 3.5-4.5 μ but in naturally ripened individuals the spores measure as indicated in the description. The extremely fragile nature of the basidiocarps is a distinctive feature. Frequently the peridium breaks up as in *Calvatia* before the pore forms, but this is not typical. In age, if the peridium above the edge of the sterile base disappears entirely, one finds a convex sterile base with a flange around its edge as all that remains of the basidiocarps. The very fine spore ornamentation, the lack of brown-walled capillitial elements near the inner peridium and the reduced exoperidial ornamentation distinguish this species from *V. curtisii*.

Vascellum intermedium nov. sp. (Fig. 5)

Fructificationes 7-35 mm *crassae, globosae vel subglobosae vel pyriformis, spinulosae demum glaber; gleba griseo-brunnea, pulverulenta; subgleba alveolata; sporae* (3) 3.5-4.5 μ , *globosae vel subglobosae, punctatae vel*

subleves ; *eucapillitium* desunt ; *paracapillitium* adsunt. *Typus* : E. A. Smith 1225 b (MICH) ; legit Cisco, Texas, Aug. 1938.

Basidiocarps 7-35 mm broad, globose to subglobose or broadly pyriform ; attached by a patch of mycelium or this extended into a short pseudorhiza ; *exoperidium* in the form of minute short conic warts composed of 2-4 fused « spines », whitish or buff to brownish as dried, these soon blocked out into small groups which (over apical area) soon slough off leaving the dull buff to tan unpolished endoperidium visible, more scurfy than warty over lower half of basidiocarp (the sloughing off of the exoperidial warts over upper part somewhat reminiscent of *Lycoperdon marginatum*) ; *endoperidium* a thin dimpled to wrinkled papery membrane, buff to pale tan and dehiscing by a small simple pore. *Gleba* avellaneous to hair brown or grayer, rather powdery ; *pseudocolumella* present. *Sterile base* in section well developed and convex, chambered, whitish to violaceous brown ; a distinct diaphragm present.



Fig. 5. *Vascellum intermedium* $\times 1$, E. A. Smith 1225 b.

Spores (3) 3.5-4.5 μ , subglobose to globose, subsmooth to minutely verruculose (punctate), weakly brownish-ochraceous in KOH ; apedicellate. *Paracapillitium* abundant, threads 3-4.5 (6) μ wide ; walls predominantly parallel, thin, hyaline with some adhering hyaline debris ; septate ; sparsely branched ; no *eucapillitium* observed. *Exoperidial ornamentation* of chains of inflated cells and hyphae with enlarged cells of irregular shape intermixed (hyphal nature clearly evident and the cells seldom subglobose or clavate, mostly somewhat angular), arising from a narrow zone of hyaline pseudoparenchyma ; *endoperidium* of thick-walled matted to interwoven pale yellow

threads 3-7 μ wide, tubular; mycosclerids present and conspicuous near the pore, mostly elongate.

Habit, habitat and distribution : On soil in fields, Cisco, Eastland Co., Texas, August 1938, E. A. Smith 1225 b (Type). Four additional collections were sorted out from Smith's material : E. A. Smith 30 Aug. 1933, 1205, 1220, 1223.

Observations : A careful search for brown-walled eucapillitium was made but none was found. This species differs from *Vascellum texense* in its firmer consistency and the tendency for the exoperidial ornamentation to slough off as in *Lycoperdon marginatum* leaving a dimpled endoperidium. When the coarse spines fall away early, they leave white spots on the basidiocarp much as in *Lycoperdon perlatum*. The prominent sterile base and shorter, more conic wart-like exoperidial remnants distinguish it from *V. curtisii*. *Vascellum cruciatum* in the sense of PONCE DE LEON (1970) has both colored and hyaline capillitium. DEMOULIN (Doctoral dissertation, 1971-1972) considered *Lycoperdon cruciatum* a synonym of *L. marginatum* and describes paracapillitium as absent. E. A. Smith 1225 b can not be regarded as conspecific with *Lycoperdon cruciatum* and so is here described as a distinct species.

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