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ART. XX. A REVIEW OF THE GASTEROMYCETES
(FUNGI) OF WESTERN PENNSYLVANIA

BY LEROY K. HENRY

(PLATES I-IV)

The Gasteromycetes belong to that class of basidiomycetes which bear their spores in cavities or chambers within the tissues of the plant. The peridium is the shell which encloses the spore mass. It usually consists of two layers, but may be a single layer as in the genus *Scleroderma*. This outer layer of the peridium may be thick and leathery as in the genus *Geaster*; thin and friable and bearing spines or warts as in the genus *Lycoperdon*; or thick and gelatinous as in the phalloids. A true stalk or stem is absent except in two tribes which are not represented in our region, but the base of the peridium is often contracted into a stalk-like portion in many genera.

The whole fleshy mass of soft cellular structure inside the immature fruiting-body is called the gleba. At first it is a cellular mass which, as the plant grows, develops into a tissue of minute chambers. The interior walls of these chambers are lined with a spore-bearing layer. In the *Nidulariales* the walls of the glebal chambers thicken and each chamber becomes a separate, little seed-like structure enclosing the spores, known as a peridiole.

When the fruiting-body reaches full size, the tissues of the glebal chambers deliquesce, become moist, discolored and are absorbed and disappear. Finally the moisture dries up leaving the peridium filled with a dry, dusty mass, usually consisting of slender threads, the capillitium, and of multitudes of ripe spores, the spore mass.

This review is based upon the specimens in the Herbarium of the Carnegie Museum which have been collected in Western Pennsylvania.

As the eastern boundary of Western Pennsylvania, I have arbitrarily chosen the eastern borders of Potter, Clinton, Centre, Huntingdon and Fulton Counties. The initials following the collection data are to be interpreted as follows: L.K.H.—L. K. Henry; O.E.J.—O. E. Jennings; D.R.S.—D. R. Sumstine; M.B.K.—Marie B. Knauz; H.S.W.—H. S. Wieand. The numerals following the author's initials are his field numbers.

KEY TO GASTEROMYCETES

- I. Fruiting-body usually without marked odor; gleba not apical or slimy. II.
- I. Fruiting-body usually with a strong, disagreeable odor; globose or egg-shaped when young, inclosed in a thick peridium which remains as a cup at the base; gleba slimy at maturity. *Phallales*
- II. Fruiting-body fleshy or fleshy-tough when young; subglobose to top-shaped; gleba dry and dusty or powdery at maturity.
 - Lycoperdales*
- II. Fruiting-body with or without a sterile base; gleba with or without chambers, in a few cases dividing up into minute peridioles, finally becoming a dusty or powdery mass; capillitium none or rudimentary or well developed. *Sclerodermatales*
- II. Fruiting-body globose to cup-shaped or vase-shaped, open at maturity; gleba waxy; chambers with distinct wall forming peridioles within which egg-like structures the spores are borne; capillitium wanting. *Nidulariales*

PHALLALES

- I. Fruiting—body elongated or pear-shaped. *Clathraceae*
 - A. Gleba borne on the inner surface of the three arm-like structures which are arched outward and united at their tips and attached at base to a short stalk. *Colus Schellenbergiae*
 - A. Gleba borne on the inner surface of the six, hollow arm-like structures, borne at the end of a relatively long stalk. *Anthurus borealis*
 - A. Gleba borne on the inner surface of irregularly shaped lobes, developed by breaking open of the pear-shaped fruiting-body. *Phyllogaster saccatus*
- I. Fruiting-body consisting of a hollow, spongy stem with a basal volva and an apical portion bearing the gleba externally. *Phallaceae*
 - A. Gleba borne on the outside of a cap-like structure at the end of a stem.
 - B. Stem with a more or less prominent, net-like veil and a membranous veil. *Dictyophora duplicata*
 - B. Stem with a single, membranous veil. *Ithyphallus*
 - C. Outer surface of cap strongly pitted. *I. impudicus*
 - C. Outer surface of cap minutely granular. *I. Ravenelii*
 - A. Gleba borne on the naked apex of the stem. *Mutinus*
 - B. Stem 10–17 cm. long, spore-bearing part undifferentiated. *M. Curtisii*
 - B. Stem 6–8 cm. long, spore-bearing part sharply differentiated.

M. Ravenelii

LYCOPERDALES

- I. Peridium with a distinct outer coat, falling away in flakes or wearing away slowly or splitting into rays; gleba composed of hollow chambers lined with the hymenium; spores mixed with a capillitium (slender branched or unbranched threads) and escaping usually through a definite pore *Lycoperdaceae*
 - A. Outer peridium thin, lead-color to reddish-brown, peeling off in flakes; inner peridium opening by a pore; mature plant loosened from place of growth and blown about by wind.....*Bovista*
 - B. Fruiting-body moderate to large in size, above the ground; pedicel short.....*B. pila*
 - B. Fruiting-body subterranean until exposed by the weather; pedicel long and wavy.....*B. minor*
 - A. Outer peridium thick or thin, scaling off in flakes or more or less persistent; inner peridium collapsing or breaking up as the spores ripen; mature plants normally remain attached to place of growth.
 - B. Capillitium of separate threads with slender branched fruiting-body yellowish-brown with a sterile base.....*Bovistella radicata*
 - B. Capillitium of long interwoven threads; outer peridium composed of scales, spines, warts or granules; inner peridium membranous to papery, usually opening by an apical mouth at maturity; fruiting-body less than 8 cm. in diameter.....*Lycoperdon*
 - C. Mature spore-mass with a purplish tint.
 - D. Outer peridium composed of hair-like spicules about 1 mm. in length, usually free at their apices; inner peridium furfuraceous.
L. atropurpureum
 - D. Outer peridium composed of spines, white or pale brown, 2-3 mm. long, convergent at their apices; inner peridium smooth and shining.....*L. pulcherrimum*
 - D. Outer peridium a smooth continuous layer which breaks up into thin scales and areolations at maturity.....*L. rimulatum*
 - D. Outer peridium scurfy or granular, at times mixed with fine spines.....*L. umbrinum*
 - C. Mature spore mass yellowish-brown to greenish-brown.
 - D. Sterile base prominent, occupying one-third or more of the fruiting-body.
 - E. Sterile portion white; mycelium white, cord-like; outer peridium of reddish-brown persistent granules; on rotted wood.....*L. pyriforme*
 - E. Sterile portion yellowish; outer peridium of separate spines intermingled with deciduous warts; inner peridium reticulated.....*L. gemmatum*
 - D. Sterile base small or entirely wanting.
 - E. Sterile portion occasionally large, yellowish; outer peridium of short, sharp spines which peel off in flakes at maturity; inner peridium dull and furfuraceous.....*L. marginatum*

- E. Outer peridium of pinkish-brown warts or spines; inner peridium pitted; on rotted wood.....*L. subincarnatum*
- E. Outer peridium of stout spines up to 1 mm. long, rather pale, convergent (single or grouped); inner peridium smooth; spores with long, persistent pedicels.....*L. pedicellatum*
- E. Outer peridium same, but spines dark to deep brown at maturity; spores with short pedicels.....*L. eximium*
- E. Outer peridium of minute bran-like scales persistent upon the pale brown surface of the inner peridium; fruiting-body small, usually under 2 cm. thick.....*L. pusillum*
- E. Outer peridium golden yellow dotted with minute warts or nodules which during maturity become dark brown.
L. coloratum
- B. Capillitium of long interwoven threads which may break up into short pieces; outer peridium thin, usually smooth or areolated; inner peridium thin and fragile; irregularly ruptured by falling away in scales and plates; fruiting-body usually over 8 cm. in diameter.....*Calvatia*
- C. Spore mass violet to purple.
 - D. Fruiting-body 7-18 cm. in diameter; sterile base thick, cup-shaped after spore mass breaks away.....*C. cyathiformis*
- C. Spore mass yellowish-orange to greenish-brown.
 - D. Sterile base scanty or lacking; fruiting-body globose to subglobose, usually more than 15 cm. in diameter; gleba greenish-brown.....*C. maxima*
 - D. Sterile base same; fruiting-body subglobose to turbinate, usually less than 10 cm. in diameter; gleba yellowish to brownish-orange.
C. rubro-flava
 - D. Sterile base short and thick; outer peridium of thick, floccose warts or spines; capillitium threads much thicker than the spores.
C. caelata
 - D. Sterile base same; outer peridium thin, smooth; capillitium threads about as thick as the spores.....*C. craniiformis*
- A. Outer peridium thick, splitting at maturity into star-like rays from above downward and remaining attached to the inner peridium by their united bases; inner peridium with a single, apical mouth.....*Geaster*
- B. Outer peridium saccate, not hygroscopic; inner peridium sessile; mouth definite, usually surrounded by a circular area.
 - C. Fleshy layer of outer peridium thick, usually breaking circumscissally near the middle and remaining as a free margined cup at the base of the inner peridium; expanded plant measuring 8-12 cm. across.....*G. triplex*
(Specimens lacking the cup and smaller in size are considered as forms, formerly called *G. lageniformis* Morg.)
 - C. Fleshy layer of outer peridium thin, adnate, not breaking circumscissally.

- D. Outer layer of outer peridium thin, adnate, glabrous (definite circular mouth is lacking in some forms.).....*G. Saccatus*
- D. Outer layer of outer peridium thick and felted-tomentose, partially separating from the middle layer; expanded plant measuring 3-4 cm.....*G. velutinus*
- D. Outer layer of outer peridium thick and strigose-tomentose; plants caespitose, up to 2.5 cm. broad when expanded, forming mycelial mats.....*G. mirabilis*

SCLERODERMATALES

- I. Peridium thick, sessile without a distinct, separate outer layer, usually warted or scaly; gleba breaking up into solid peridioles in one genus; capillitium rudimentary or none; sterile base often present *Sclerodermataceae*
 - A. Fruiting-body globose, sessile; peridium a single layer, usually thick, tough and hard, or thin and leathery; warted, granular or nearly smooth; mouth irregular to stellate; gleba white at first, becoming greenish to purplish-brown; capillitium none or rudimentary.....*Scloderma*
 - B. Peridium yellowish, nearly smooth or areolated; spores strongly reticulated.....*S. bovista*
 - B. Peridium light-brown or yellowish-brown, very thin, covered with minute dark-brown, inherent scales.....*S. lycoperdoides*
 - B. Peridium ochraceous or brownish, thick when fresh, thinner when dry, surface cracked into distinct, inherent scales, 1-3 mm. wide, which are with or without a stout central wart.....*S. aurantium*
- II. Peridium with a distinct outer layer which at maturity splits into star-like segments, exposing the persistent inner peridium.....*Astraeaceae*
 - A. Unexpanded form embedded in the soil, depressed-globose to ovate; outer peridium thick, dark brown, composed of four layers, strongly hygroscopic, splitting radially into 7-20 acute segments which are expanded when moist and incurved over inner peridium when dry; inner peridium tough or leathery, gray or light-brown, scurfy, sessile; mouth definite but irregular; gleba reddish-brown; capillitium threads branched. *Astraeus hygrometricus*
- III. Outer peridium gelatinous, spongy or fibrous breaking up into scales at maturity; inner peridium composed of two layers enclosing the gleba; stem consisting of anastomosing, gelatinous, hyphal strands.....*Calostomataceae*
 - A. Sporebearing portion of fruiting-body globose, borne on a gelatinous stem; outer peridium composed of two layers; the outer one thick and usually gelatinous, the inner one thin and cartilaginous; inner peridium hard and cartilaginous when dry, dehiscing by means of a raised, stellately rayed, red, mouth; gleba white to yellowish-white, enclosed by a cream-colored or yellow membrane; capillitium scanty, fragile.....*Calostoma*
 - B. Outer peridium scaling off entirely, the outer layer forming a thick, soft jelly; the entire inner layer of outer peridium and the outer surface of the inner peridium bright red when fresh.....*C. cinnabarina*

- B. Outer peridium composed of a gelatinous outer layer and a pale yellow, corky, inner layer, not scaling off completely but remaining as a collar around the base of the inner peridium; red color confined to the mouth region. *C. lutescens*
- B. Outer peridium spongy but not gelatinous, its inner layer remaining as persistent scales on the surface of the inner peridium; red color confined to the mouth region. *C. ravenelii*

NIDULARIALES

- I. Fruiting-body very small, peridium composed of four layers, dehiscing stellately; gleba fleshy, forming a single peridiole-like structure which is violently ejected at maturity. *Sphaerobolaceae*

- A. Fruiting-body sessile, globose, minute, 1.5-3 mm. broad, on decayed wood, or entirely embedded in the substratum or the dense white mycelial mat (which often covers the substratum); peridium cream colored or yellowish at first brownish in age; gleba globose, peridiol-like, viscid, about 1 mm. in diameter, cream or buff-colored, becoming reddish-brown with age.

Sphaerobolus stellatus

- II. Fruiting-body cup-shaped or vase-shaped, tough and leathery; peridium consisting of one to three layers; glebal chambers here called peridioles, remaining attached or free within the outer peridium. *Nidulariaceae*

- A. Peridioles mostly attached by elastic cords to the cups; fruiting-body sessile, cup-shaped or bell-shaped, on twigs and trash in general; peridium composed of a single, thick layer, velvety-tomentose at first, becoming almost smooth in age; inside of cup covered with a thick soft veil which disappears at maturity; peridioles numerous, white, disc-like.

Crucibulum vulgare

- A. Peridioles mostly attached by elastic cords to the cups; fruiting-body cylindrical, becoming bell-shaped or goblet-shaped; peridium composed of three layers; the outer shaggy, tomentose or glabrous; the middle fibrous; and the inner membranaceous, smooth or striate; veil present at first; peridioles few, disc-shaped, dark brown or black. *Cyathus*

- B. Inner layer of peridium striate. *C. striatus*

- B. Inner layer of peridium not striate; outer surface of peridium shaggy with matted woolly hairs. *C. stercoreus*

- A. Peridioles not attached by cords, but embedded when fresh in a mucus; fruiting-body globose, sessile; peridium (covering the entire fruiting-body and breaking away irregularly at maturity) fragile; cinnamon-brown, tomentose, of a single layer; veil lacking; peridioles dark to reddish-brown.

Nidularia pulvinata

ENUMERATION OF SPECIES

Anthurus borealis Burt. (Plate I)

Allegheny County: near Swissvale, Dr. Cruikshank; Middle Road, Glenshaw, Marie Luckenbacher; $\frac{1}{2}$ mi. west of Riverview Park, N.S. Pittsburgh, P. E. Raymond; near Dormont, H. W. Graham; Board of Education lawn, Pittsburgh, D.R.S.; *Somerset County*: 3 mi. west of Bakersville. C. M. Hepner. *Westmoreland County*: 7 mi. N.E. of Greensburg, R. Boggs.

Colus Shellenbergiae Sumstine

Allegheny County: Pittsburgh, D.R.S., July, 1915. One collection and only record in northern hemisphere.

Phyllogaster saccatus Morgan

Allegheny County: Sandy Creek, D.R.S.; Guyasuta Hollow near Aspinwall, D.R.S.; Vicinity of Warden Mine, L.K.H., 3359; $\frac{1}{2}$ mi. S. of Smithdale, L.K.H., 3336. *Westmoreland County*: Loyalhanna Creek, 2 mi. S. of Saltsburg, L.K.H., 4123; near Latrobe, D.R.S.

Dictyophora duplicata (Bosc.) E. Fischer (Plate II, figs 1, 2)

Allegheny County: Avalon, L.K.H., 1766; West End Park, N. McCallum; Schenley Park, O.E.J.; Ben Avon, Mrs. A. B. Lord; Turtle Creek, D.R.S.; Sandy Creek, D.R.S.; Warden Mine region opposite Sutersville, H. Roslund. *Armstrong County*: Kittanning, D.R.S. *Butler County*: near Zelienople, D.R.S. *Indiana County*: 10 mi. from Indiana, R. W. Wehrle. *McKean County*: Smithport, O.E.J. *Westmoreland County*: 6 mi. S.E. of New Florence, J. A. Shafer.

Ithyphallus impudicus (L.) Fr. (Plate II, fig 3)

Allegheny County: N. of Oakmont, O.E.J.; Glenshaw, L.K.H., 3020. *Armstrong County*: Kittanning, D.R.S. *Clarion County*: Cooksburg, D.R.S.

Ithyphallus Ravenelii (B. & C.) E. Fischer

Somerset County: Kooser State Park, D.R.S. *Potter County*: Carter Camp, 7 mi. W. of Germania, Mrs. Paul Wible. *Venango County*: near Lisbon, H.S.W. *Westmoreland County*: Kiski Campus near Saltsburg, D.R.S.

Mutinus Ravenelii (B. & C.) E. Fischer (Plate II, fig. 4)

Allegheny County: Frick Park, Pittsburgh; Ingomar district; Allegheny Cemetery, Pittsburgh; Warden Mine region opposite Sutersville; near Glenshaw; Crafton; 4 mi. E. of Monongahela. *Armstrong County*: Kittanning. *Beaver County*: Beaver Falls. *Butler County*: 4 mi. N.E. of Har-

mony. *Erie County*: Corry. *Fayette County*: Ohiopyle. *Indiana County*: Glen Campbell. *Westmoreland County*: near Rector; Shades Ravine, 2 mi. E. of Trafford; near Latrobe; along Conemaugh River across from Saltsburg; 1 mi. E. of Mount Pleasant.

Mutinus Curtisii (Berk) E. Fischer

Allegheny County: Schenley Park, Pittsburgh, D.R.S.; Mount Lebanon, Mr. Carson. *Armstrong County*: Kittanning, D.R.S. *Venango County*: along Route 38, S. of Emlenton, M.B.K.

Bovista pila B. & C. (Plate II, fig. 5)

Allegheny County: Saunders Station, E. of Trafford; near Aspinwall; Warden Mine region, opposite Sutersville; near Harmarville; 4 mi. E. of Monongahela City. *Beaver County*: 2 mi. above the mouth of Raccoon Creek. *Crawford County*: Pymatuning Swamp, Hartstown. *Lawrence County*: near New Wilmington. *Washington County*: mouth of Mingo Creek, at Riverview. *Westmoreland County*: Laurel Hill Mountain, 1 mi. N.E. of Laurel Summit; Hillside; Shades Ravine, 2 mi. E. of Trafford; Loyalhanna Creek, 2 mi. S. of Saltsburg.

Bovista minor Morgan

Westmoreland County: 6 mi. S.E. of New Florence, D.R.S.

Bovistella radicata (Mont.) Pat.

Armstrong County: Kittanning, Amy Neale. *Butler County*: Plains Church, 5 mi. S. of Evans City, O.E.J. *Somerset County*: 3 mi. W. of Bakersville, C. M. Hepner.

Calvatia cyathiformis (Bosc.) Morgan (Plate III, fig. 1)

Allegheny County: Wilksburg; Bellevue Reservoir; Oakland district, Pittsburgh; Frick Park, Pittsburgh; 4 mi. E. of Monongahela; Turtle Creek; Dormont; near Carnot; 2 mi. E. of Ambridge; Coraopolis; Tom's Run at Dixmont. *Armstrong County*: Kittanning. *Beaver County*: Legionville Hollow near Economy. *Bedford County*: Sulphur Springs. *Butler County*: 4 mi. N.E. of Harmony. *Centre County*: Game Lands No. 33, 3 mi. S.E. of Philipsburg. *Clarion County*: Cook Forest. *Fayette County*: Ohiopyle. *Indiana County*: Rochester Mills. *Mercer County*: 5½ mi. N.E. of Grove City. *Potter County*: Carter Camp, 7 mi. W. of Germania. *Washington County*: near Library. *Westmoreland County*: Idlewild Park, near Ligonier.

Calvatia craniiformis (Schw.) Fr.

Allegheny County: Culmerville; Tom's Run above Dixmont; near Bakerstown; 4 mi. E. of Monongahela; Powers Run, opposite Verona; West of Imperial; Logan's Ferry; near Ingomar; Schenley Park, Pittsburgh; Glenshaw; Ben Avon; Harmarsville; near Perrysville; 1 mi. out Audubon Road from Magee Road; Stewart's Stop, on Charleroi Electric Line. *Armstrong County*: Kittanning. *Butler County*: 4 mi. N.E. of Harmony; near Culmerville; along Route 528, $\frac{1}{4}$ mi. S.E. of junction with Route 8; Little Buffalo Creek at Monroe Station. *Clarion County*: N. of New Bethlehem; Cook Forest. *Greene County*: Roberts Run, 1 mi. S. of Spraggs. *Mercer County*: near West Middlesex. *Venango County*: 1 mi. N. of Lisbon. *Washington County*: vicinity of Houston; Buffalo Creek, near junction with Buck Run; $1\frac{1}{2}$ mi. N.E. of Burgettstown; Raccoon Creek, 2 mi. above Murdocksville. *Westmoreland County*: Congruity, 4 mi. E. of Delmont on Route 22; Kiski Campus, near Saltsburg; Shades Ravine, 2 mi. N.E. of Trafford; along Conemaugh River across from Saltsburg; $2\frac{1}{2}$ mi. N. of Bolivar; Loyalhanna Creek, 2 mi. S. of Saltsburg.

Calvatia maxima (Schaeff) Morgan

Allegheny County: Schenley Park, Pittsburgh, R. J. Templeton. *Washington County*: Eastern part of County, Mrs. Coun. *Westmoreland County*: near Wild Life Lodge, New Kensington, Dr. G. J. Lamon.

Calvatia caelata (Bull.) Morgan

Allegheny County: Schenley Park, Pittsburgh, O.E.J.

Calvatia rubro-flava (Lloyd) Cragin

Armstrong County: Kittanning, Amy Neale.

Geaster saccatus Fr.

Allegheny County: 1 mi. N.E. of Ben Avon Heights, L.K.H., 3006. *Armstrong County*: Kittanning, D.R.S. *Butler County*: 4 mi. N.E. of Harmony, L.K.H., 2160. *Erie County*: Mercyhurst College, S. of Erie, Mary P. Wilbert. *Fayette County*: Ohiopyle, O.E.J. *Washington County*: Finleyville, O.E.J.; New Eagle, O.E.J.; 2 mi. above Murdocksville, along Raccoon Creek, L.K.H., 5369. *Westmoreland County*: Loyalhanna Creek, 2 mi. S. of Saltsburg, L.K.H., 4172; Shades Ravine, 2 mi. E. of Trafford, M.B.K.; Mellon Estate, 6 mi. S.E. of New Florence, O.E.J.

Geaster mirabilis Mont

Allegheny County: 4 mi. E. of Monongahela, C. M. Hepner; Warden

Mine region, opposite Sutersville, H. Roslund. *Washington County*: Distillery Stop at New Eagle, L.K.H., 5178.

***Geaster velutinus* Morgan**

Allegheny County: Warden Mine region, opposite Sutersville, H. Roslund.

***Geaster triplex* Jungh. (Plate III, fig. 2)**

Allegheny County: Warden Mine region, opposite Sutersville; Groveton; Sewickley; 4 mi. E. of Monongahela; along Bessemer R.R. at Rural Ridge; R.R. ties, along Ohio River, N.S. Pittsburgh. *Armstrong County*: West Winfield, along Buffalo Creek, Kittanning. *Beaver County*: Raccoon Creek, 4 mi. W. of Clinton on Route 30. *Butler County*: Stone House on Route 8, 2 mi. N. of Muddy Creek Crossing. *Cameron County*: along Route 872, 10 mi. N.E. of Sinnemahoning. *Clarion County*: Cook Forest. *Erie County*: Presque Isle. *Washington County*: Raccoon Creek, 2 mi. above Murdocksville; vicinity of Houston; 1¼ mi. N.E. of Burgettstown. *Westmoreland County*: Loyalhanna Creek, 2 mi. S. of Saltsburg.

***Lycoperdon coloratum* Peck**

Fayette County: Ohiopyle, L.K.H., 2801, 6/24/39.

***Lycoperdon eximium* Morgan**

Clearfield County: Game Lands No. 34, S. of Medix Run, L.K.H., 3450. *Somerset County*: near Buckstown, O.E.J.

***Lycoperdon atropurpureum* Vitt.**

Butler County: Winfield Junction, Miss Turner. *Erie County*: Presque Isle, C. K. Henlen. *McKean County*: Mt. Jewett, O.E.J. *Westmoreland County*: Hillside, O.E.J.

***Lycoperdon marginatum* Vitt. (Plate III, fig. 3)**

Allegheny County: Sandy Creek; Schenley Park, Pittsburgh; Frick Park, Pittsburgh; 4 mi. E. of Monongahela; Turtle Creek. *Armstrong County*: Kittanning. *Butler County*: 4 mi. N.E. of Harmony; near Culmerville. *Centre County*: Game Lands No. 33, 3 mi. S.E. of Philipsburg; near Rebersburg. *Clarion County*: near Clarion; 4 mi. N.E. of Parkers Landing. *Clearfield County*: Game Lands No. 34, S. of Medix Run. *Erie County*: Presque Isle. *Somerset County*: Laurel Hill near Trent. *Venango County*: near Cooperstown. *Warren County*: S.E. edge of Tamarack Swamp, 2 mi. N.W. of Pine Valley. *Westmoreland County*: Jones Mills; 6 mi. S.E. of New Florence.

***Lycoperdon gemmatum* Batsch. (Plate III, fig. 4)**

Allegheny County: North Park; along Route 910, 3 mi. S.E. of Bakers-town; Frick Park, Pittsburgh; Schenley Park, Pittsburgh; Power's Run, opposite Verona; Big Sewickley Creek, 2 mi. E. of Ambridge; Thompson Run Road, N. of Millvale; 2 mi. E. of Upper Talley Cavey; Valencia; 1 mi. out Audubon Road from Magee Road; near Verona; near Aspinwall; Fallen Timber Hollow, opposite Sutersville; Glenshaw; near Wildwood; Harmarville; 2 mi. W. of Shousetown; Black's Run, N. of Oakmont; Bellevue Reservoir. *Armstrong County*: Kittanning; near Leechburg. *Beaver County*: 1 mi. N.W. of Aliquippa. *Bedford County*: Morrison Cove region, 7 mi. N.E. of Everett. *Butler County*: near Butler; along Route 528, $\frac{1}{4}$ mi. S.E. of junction with Route 8; near Culmerville; 1 mi. S.E. of Whitestown; 4 mi. N.E. of Harmony; near Saxonburg; near Slippery Rock; Little Buffalo Creek at Monroe Station; Croll's Mills on Slippery Rock Creek, N. of West Liberty; Watson's Run, 2 mi. S. of Leasuresville; Muddy Creek Falls at junction with Slippery Rock Creek; Plains Church, S. of Evans City. *Cameron County*: along Route 120, 1 mi. W. of Sinnemahoning. *Centre County*: Pennsylvania State College Campus. *Clarion County*: New Bethlehem; Cook Forest. *Clearfield County*: along Parker Dam Road near C C C Camp; Game Lands No. 34, S. of Medix Run. *Crawford County*: near Hartstown. *Elk County*: Medix Run; near Kane. *Erie County*: near Corry; Presque Isle. *Fayette County*: Ohio pyle; Claircrest. *McKean County*: near Cyclone. *Potter County*: Carter Camp, 7 mi. W. of Germania. *Somerset County*: 3 mi. W. of Bakersville; 2 mi. E. of Berlin; $\frac{1}{2}$ mi. N.E. of Pleasant Union; Laurel Hill Mountain, near Trent. *Venango County*: 3 mi. N. of Emlenton, at Goeries Mills; 3 mi. N.E. of Emlenton; 1 mi. N. of Lisbon. *Washington County*: Finleyville; along Buffalo Creek near junction with Buck Run; Raccoon Creek, 2 mi. S. of Murdocksville; vicinity of Houston; Distillery Stop at New Eagle. *Westmoreland County*: Kiski Campus, near Saltsburg; Linn Run, 3 mi. S.E. of Rector; Loyalhanna Creek, 2 mi. S. of Saltsburg; Idlewild Park near Ligonier; Congruity, 4 mi. E. of Delmont on Route 22; 6 mi. S.E. of New Florence; 2 mi. S.E. of Laughlintown; near Waterford; 1 mi. E. of Kregar; Jones Mills; along Conemaugh River opposite Saltsburg; Shades Ravine, 2 mi. E. of Trafford; 1 mi. E. of Mount Pleasant; Hillside.

***Lycoperdon pusillum* Batsch.**

Allegheny County: the Pines on Route 19, 1 mi. N. of Perrysville, D.R.S. *Butler County*: 4 mi. N.E. of Harmony, L.K.H., 1174.

***Lycoperdon pulcherrimum* B. & C.**

Allegheny County: Frick Park, Pittsburgh, L.K.H., 158. *Beaver County*: Temple Hollow behind Aliquippa, L.K.H., 2913; Raccoon Creek, 2½ mi. S.E. of New Sheffield, L.K.H., 4552. *Westmoreland County*: Hillside, O.E.J.

***Lycoperdon pedicellatum* Peck**

Allegheny County: Powers Run, opposite Verona, O.E.J. *Bedford County*: Sulphur Springs, O.E.J. *Butler County*: Watson's Run, 2 mi. S. of Leasurville, L.K.H., 1655; woods along Route 528, ¼ mi. S.E. of Junction with Route 8; L.K.H., 4284; tributary of Crab Run, 4 mi. N.E. of Harmony, L.K.H., 4373. *Venango County*: 3 mi. N.E. of Emlenton, L.K.H., 5448. *Westmoreland County*: Idlewild Park, near Ligonier, D.R.S.; 6 mi. S.E. of Florence, D.R.S.; Linn Run, 3 mi. S.E. of Rector, O.E.J.

***Lycoperdon pyriforme* Schaeff.**

Allegheny County: Schenley Park, Pittsburgh; near Wildwood; Frick Park, Pittsburgh; Powers Run, opposite Verona; Beadling; Allison Park; near Bakerstown; Narrows Run, near Stoops Ferry; Fallen Timber Hollow, opposite Sutersville; Black's Run Ravine, N. of Oakmont; 4 mi. E. of Monongahela; 2 mi. E. of Upper Talley Cavey (on Route 8 at Wildwood Road); along Route 910, 3 mi. S.E. of Bakerstown. *Armstrong County*: Kittanning. *Beaver County*: near Beaver. *Blair County*: Tyrone. *Butler County*: Valencia; near Butler; 4 mi. N.E. of Harmony; near Zelienople; near Saxonburg; Little Buffalo Creek, near Monroe Station; 1 mi. S.E. of Whitestown. *Cambria County*: Ebensburg. *Clarion County*: Cook Forest. *Clearfield County*: State Game Lands No. 34, S. of Medix Run. *Erie County*: Corry. *Fayette County*: Ohiopyle. *Forest County*: Cook Forest. *Huntingdon County*: near Birmingham. *Indiana County*: near Indiana. *Lawrence County*: woods at mouth of Muddy Creek. *Somerset County*: Buckstown; along Route 31, 2 mi. W. of Kooser State Park. *Venango County*: 3 mi. N.E. of Emlenton. *Washington County*: Buffalo Creek near junction with Buck Run. *Westmoreland County*: Congruity, 4 mi. E. of Delmont on Route 22; Derry; Longbridge; Hillside; near Laughlintown; 1 mi. E. of Kregar; along Conemaugh River, across from Saltsburg; Shades Ravine, 2 mi. E. of Trafford.

***Lycoperdon rimulatum* Peck**

Allegheny County: 1 mi. W. of Mount Nebo, L.K.H., 2966. *Fayette County*: Ohiopyle, O.E.J. *Venango County*: 1 mi. N.E. of Lisbon, L.K.H.,

840. *Westmoreland County*: Loyalhanna Creek, 2 mi. S. of Saltsburg, L.K.H., 4137.

***Lycoperdon subincarnatum* Peck**

Allegheny County: Sandy Creek, D.R.S.; Coraopolis, O.E.J. *Butler County*: Nixon Station on Butler Short Line, Wm. Millward. *Forest County*: 1 mi. N. of Brookstown, L.K.H., 3824. *Indiana County*: near Glen Campbell, L.K.H., 2127. *Westmoreland County*: Linn Run, 3 mi. S.E. of Rector, O.E.J.

***Lycoperdon umbrinum* Pers.**

Allegheny County: Black's Run, N. of Oakmont, O.E.J. *Bedford County*: 7 mi. N.E. of Everett, Morrison Cove region, L.K.H., 206. *Butler County*: Little Buffalo Creek, near Monroe Station, L.K.H., 1555; 4 mi. N.E. of Harmony, L.K.H., 2174; near Saxonburg, D.R.S. *Clarion County*: Cook Forest, O.E.J. *Indiana County*: Crooked Creek, 2 mi. above Chambersville, O.E.J. *Mercer County*: 2 mi. N.E. of Grove City, O.E.J. *Westmoreland County*: 1 mi. W. of Laughlintown, O.E.J.; near Rector, O.E.J.; Jones Mills, D.R.S.

***Crucibulum vulgare* Tul. (Plate III, fig. 5)**

Allegheny County: Forest Hills, Pittsburgh; Schenley Park, Pittsburgh; Wilkinsburg; Power's Run, opposite Verona; 4 mi. E. of Monongahela; $\frac{1}{2}$ mi. S. of Smithdale; 1 mi. N.E. of Ben Avon Heights; Frick Park, Pittsburgh; Glenshaw; 1 mi. N.E. of Sewickley; Imperial woods at intersection of Routes 22 and 30; Carnegie; along Route 910, 3 mi. S.E. of Bakerstown. *Armstrong County*: Kittanning. *Beaver County*: along Route 151, $3\frac{1}{2}$ mi. from junction with Route 18; Raccoon Creek State Park. *Bedford County*: Sulphur Springs. *Butler County*: Little Connoquenessing Creek, 3 mi. N.E. of Harmony; Slippery Rock; along Route 528, $\frac{1}{4}$ mi. S.E. of junction with Route 8; Nixon Station on Butler Short Line; near Butler; along tributary of Crab Run, 4 mi. N.E. of Harmony. *Cambria County*: near Cresson. *Centre County*: near Woodward. *Clearfield County*: Little Medix Run, 1 mi. N. of Caledonia Pike. *Elk County*: Route 55, 2 mi. E. of Medix Run. *Erie County*: Presque Isle; near Erie; 4 mi. S. of Girard. *Fayette County*: Ohiopyle; Killarney Park, S. of Normalville. *Lawrenceville County*: Rock Point; E. of Volant, along Route 278. *Somerset County*: Haines, W. of Jennerstown; 2 mi. W. of Berlin; Kooser State Park, on Route 31. *Washington County*: Distillery Stop, near New Eagle. *Westmoreland County*: Kiski Campus near Saltsburg; Linn Run, 3 mi.

S.E. of Rector; 2½ mi. N. of Bolivar; Idlewild Park near Ligonier; Latrobe; Derry; Jones Mills; along Loyalhanna Creek, 2 mi. S. of Saltsburg; Shades Ravine, 2 mi. E. of Trafford; Waterford.

Nidularia pulvinata (Schw.) Fr.

Armstrong County: Kittanning, D.R.S. *Cambria County*: 1½ mi. E. of Patton, R. Little.

Cyathus stercoreus (Schw.) DeToni (Plate IV, fig. 1)

Allegheny County: Highland Park, Pittsburgh; Edgewood Park, Pittsburgh; Frick Park, Pittsburgh; Glenshaw; Schenley Park, Pittsburgh; Brighton Road, N.S. Pittsburgh; Wilkinsburg; Rosedale; Avalon. *Armstrong County*: Kittanning, D.R.S. *Butler County*: 4 mi. N.E. of Harmony, L.K.H., 4474. *Erie County*: W. of Erie, O.E.J. *Indiana County*: Homer City, D.R.S. *Somerset County*: Laurel Hill Mountain, near Trent, C. M. Hepner. *Westmoreland County*: Shades Ravine, 2 mi. E. of Trafford, H.S.W.; Congruity, 4 mi. E. of Delmont on Route 22, L.K.H., 4750.

Cyathus striatus Willd.

Allegheny County: Thorn Hill, N. of Warrendale; Frick Park, Pittsburgh; 4 mi. E. of Monongahela; Schenley Park, Pittsburgh; Tom's Run ravine, above Dixmont; Warden Mine region, opposite Sutersville; near Warrendale; Power's Run, opposite Verona; Middle Road near Glenshaw; near Verona; 2 mi. N.E. of Emsworth, along Route 856. *Armstrong County*: Kittanning. *Beaver County*: Raccoon Creek, near Patton Point; Temple Hollow, 1 mi. N.W. of Aliquippa; along Raccoon Creek, S. tip of County. *Bedford County*: Morrison Cove region, 7 mi. N.E. of Everett. *Butler County*: Stone House on Route 8, 2 mi. N. of Muddy Creek crossing; Slippery Rock. *Cambria County*: near Cresson. *Centre County*: near Woodward. *Fayette County*: Ohiopyle. *Lawrence County*: Rock Point. *Somerset County*: Laurel Hill Mountain, near Trent. *Venango County*: 1 mi. N.E. of Lisbon. *Washington County*: Raccoon Creek at Potato Garden Run. *Westmoreland County*: Kiski Campus near Saltsburg; Latrobe; Linn Run, 3 mi. S.E. of Rector; Shades Ravine, 2 mi. E. of Trafford.

Scleroderma lycoperdoides

Allegheny County: Frick Park, Pittsburgh, D.R.S.; 1 mi. N.E. of Ben Avon Heights, L.K.H., 5403; North Park, L.K.H., 4686; Flaugherty Run at crossing of Route 51, 1½ mi. N.W. of Carnot, L.K.H., 4896; Schenley Park, Pittsburgh, D.R.S.; Warden Mine region, opposite Sutersville,

H. Roslund. *Armstrong County*: Kittanning, D.R.S. *Beaver County*: Intersection of Beaver and Ambridge Roads, L.K.H., 4635. *Butler County*: 4 mi. N.E. of Harmony, L.K.H., 5503; 1 mi. S.E. of Whitestown, L.K.H., 4316. *Centre County*: Penn State College Campus; L.K.H., 5336; Woodward, D.R.S. *Fayette County*: Ohiopyle, O.E.J. *Washington County*: Distillery Stop near New Eagle; L.K.H., 5177; Raccoon Creek, 2 mi. above Murdocksville, L.K.H., 5371. *Westmoreland County*: Waterford, D.R.S.; Rock Run, 3 mi. S.E. of Rector, O.E.J.

***Scleroderma bovista* Fr. *sensu* Hollos**

Bedford County: Sulphur Springs, D.R.S. *Erie County*: Weiss Library Woods, 8 mi. S.W. of Erie, O.E.J.; Presque Isle, O.E.J. *Mercer County*: near West Middlesex, C. M. Hepner. *Westmoreland County*: near Saltsburg, D.R.S.

***Scleroderma aurantium* (Vaill) Pers. (Plate IV, fig. 2)**

Allegheny County: Frick Park, Pittsburgh; near Sandy Creek; Darlington Hollow, near Aspinwall; 1 mi. N.E. of Ben Avon Heights; near Wildwood; near Imperial; North Park; Glenshaw; Powers Run opposite Verona; 1 mi. W. of Mt. Nebo; Bellevue; Verona, near Sewickley; Black's Run, N. of Oakmont; Big Sewickley Creek, 2 mi. E. of Ambridge; 1½ mi. N.E. of Allison Park; along Montour Run, 2 mi. W. of Gibsonia. *Armstrong County*: Kittanning, D.R.S. *Beaver County*: Raccoon Creek, 2½ mi. S.E. of New Sheffield; Intersection of Beaver and Ambridge Roads; near Beaver. *Bedford County*: Sulphur Springs; near Everett; near Reels Corners. *Blair County*: Yellow Springs, off Route 22 beyond Altoona, D.R.S. *Butler County*: 4 mi. N.E. of Harmony; Little Buffalo Creek near Monroe Station; Nixon Stop on Butler Short Line; Watson's Run, 2 mi. S. of Leasuresville; Slippery Rock; Buffalo Creek, 3 mi. N. of Freeport. *Cambria County*: Gallitzin; Cresson; near Belsano. *Cameron County*: along Route 872, 10 mi. N.E. of Sinnamahoning, L.K.H. *Centre County*: Woodward; Headwaters of Black Moshannon Lake; State Game Lands No. 33, 3 mi. S.E. of Philipsburg; Penn State College Campus. *Clarion County*: Cook Forest; near Clarion; Redbank; near Leeper; 4 mi. N.E. of Parkers Landing. *Clearfield County*: State Game Lands No. 34, S. of Medix Run; along Dent's Branch of Little Medix Run. *Clinton County*: along Route 220 at Lamar, L.K.H. *Crawford County*: Conneaut Lake, J. A. Shafer. *Elk County*: Ridgeway, O.E.J. *Erie County*: Wintergreen Gulch, 3 mi. S.E. of Erie; Presque Isle; Weiss Library Woods, 8 mi. S.W. of Erie. *Fayette County*: Ohiopyle; Killarney Park, S. of Normalville; near Normalville.

Forest County: 1 mi. N.W. of Brookston; western part of Allegheny National Forest. *Indiana County*: Crooked Creek, 2 mi. above Chambersville; near Glen Campbell. *Lawrence County*: Muddy Creek falls at mouth of Muddy Creek, L.K.H. *McKean County*: Mt. Jewett; Tionesta Tract near Brookston; near Kane. *Mercer County*: 2 mi. S.W. of Mercer; Houston Junction near Mercer. *Potter County*: 7 mi. N.E. of Austin, along Route 872; near Odin. *Somerset County*: Kooser State Park, D.R.S.; Laurel Hill Mountains, near Trent; Haines, W. of Jennerstown; $\frac{1}{2}$ mi. N.E. of Pleasant Union. *Venango County*: 1 mi. N. of Lisbon; 3 mi. N.E. of Emlenton; Little Scrubgrass Creek, N.E. of Sutton's Mills. *Warren County*: Tionesta Tract near Brookston, L.K.H. *Washington County*: near Finleyville, O.E.J. *Westmoreland County*: Linn Run, Forbes Forest, 3 mi. S.E. of Rector; Kiski Campus near Saltsburg; South Greensburg; Shades Ravine, 2 mi. E. of Trafford; Seward; Jones Mills; Loyalhanna Creek, 2 mi. S. of Saltsburg; Derry; Hillside; Laurel Hill, along Route 271, 4 mi. E. of Waterford; Laurel Ridge near Kregar; Mellon Estate, 6 mi. S.E. of New Florence; 2 mi. above Kingston, Loyalhanna Gorge.

***Astraeus hygrometricus* (Pers.) Morgan** (Plate IV, fig. 3)

Allegheny County: near Sewickley; Wildwood; Sandy Creek; 4 mi. E. of Monongahala. *Butler County*: 4 mi. N.E. of Harmony; Plains Church, S.E. of Evans City. *Clarion County*: Cook Forest, O.E.J. *Erie County*: Presque Isle; Wintergreen Gulch, 3 mi. S.E. of Erie. *Fayette County*: Ohiopyle, O.E.J. *Somerset County*: 3 mi. W. of Bakersville, C. M. Hepner. *Westmoreland County*: Hillside; $\frac{1}{2}$ mi. N.E. of Trafford; Mellon Estate, 6 mi. S.E. of New Florence.

***Sphaerobolus stellatus* Tode**

Allegheny County: Frick Park; Pittsburgh, D.R.S.; Warden Mine region, opposite Sutersville, H. Roslund. *Armstrong County*: Kittanning, D.R.S. *Butler County*: near Slippery Rock, D.R.S. *Cambridge County*: near Cresson, D.R.S. *Westmoreland County*: Latrobe, D.R.S.

***Calostoma cinnabarina* Desv.** (Plate IV, fig. 4)

Centre County: S.E. part of State Game Lands No. 33, Rush Township, L.K.H., 5053. *Clearfield County*: State Game Lands No. 34, S. of Medix Run, L.K.H., 4951. *Fayette County*: Ohiopyle, O.E.J.; Wympe's Gap, near Humberston, R. Little. *Potter County*: Carter Camp, Mrs. Paul Wible. *Somerset County*: near Jennerstown, D.R.S.; near Somerset, L. Roenpage. *Westmoreland County*: Mellon Estate, 6 mi. S.E. of New Florence, O.E.J.;

Laurel Hill Mountain, 1 mi. from Laurel Summit, O.E.J.; Derry, D.R.S.; Forbes Forest, 3 mi. S.E. of Rector, O.E.J.

Calostoma lutescens (Schw.) Burnap

Allegheny County: Coraopolis, D.R.S. *Armstrong County*: Templeton, D.R.S. *Fayette County*: Ohiopyle, H.S.W.

Calostoma Ravenelii (Berk.) Mass.

Fayette County: Ohiopyle, M.B.K. *Westmoreland County*: Hillside, O.E.J.

SUMMARY

A key to the forty-four species of Gasteromycetes has been provided. Our collection of *Colus Schellenbegiae* is the only record of this species in the northern hemisphere.

Bovista minor, *Calvatia rubro-flava*, *Geaster velutinus*, *Lycoperdon coloratum* and *Lycoperdon eximium* are represented by one collection of each.

Lycoperdon pusillum, *Nidularia pulvinata*, and *Calostoma Ravenelii* were each collected in two different localities.

Bovistella radicata, *Calvatia maxima*, *Geaster mirabilis*, and *Calostoma lutescens* were obtained at three separate localities.

All species collected from more than three localities and yet not plentiful enough to be considered as common, have been designated by including the collector's name or initials after the locality.

Additional collecting in certain sections will be necessary in order to complete the knowledge of the distribution of the Gasteromycetes in our area.

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EXPLANATION OF PLATE I

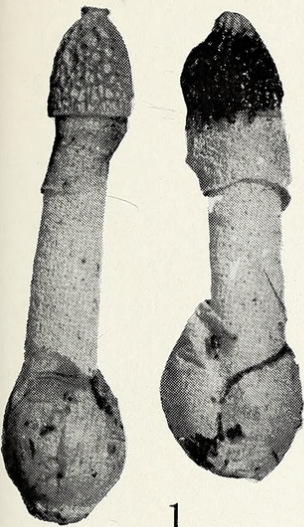
Anthurus borealis Burt. $\times 0.8$.

(Photograph, courtesy of D. R. Sumstine)



EXPLANATION OF PLATE II

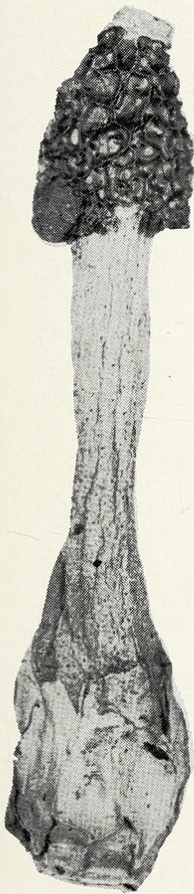
- FIG. 1. *Dictyophora duplicata* (Bosc.) E. Fischer $\times 0.34$.
FIG. 2. Eggs or volvae of *Dictyophora duplicata*. $\times 0.4$.
FIG. 3. *Ithyphallus impudicus* (L.) Fries $\times 0.7$.
FIG. 4. *Mutinus Ravenelii* (B. & C.) E. Fischer $\times 0.9$.
FIG. 5. *Bovista pila* B. & C. $\times 0.6$.



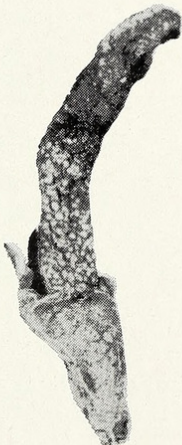
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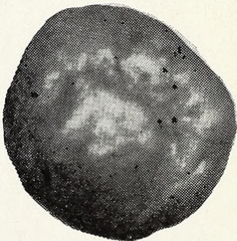
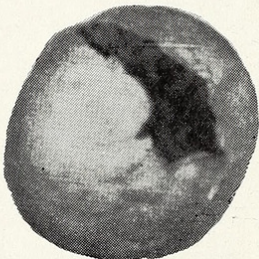
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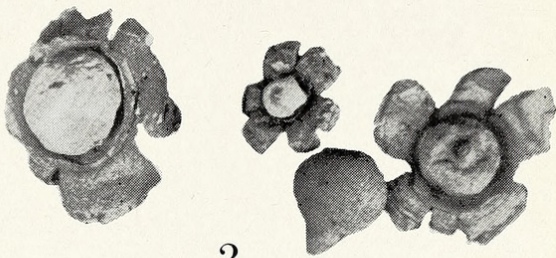
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EXPLANATION OF PLATE III

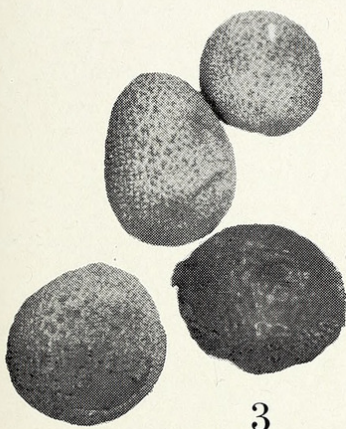
- FIG. 1. *Calvatia cyathiformis* (Bosc.) Morgan $\times 0.38$.
FIG. 2. *Geaster triplex* Jungh. $\times 0.6$.
FIG. 3. *Lycoperdon marginatum* Vitt. $\times 0.6$.
FIG. 4. *Lycoperdon gemmatum* Batsch. $\times 0.5$.
FIG. 5. *Crucibulum vulgare* Tul. $\times 0.75$.



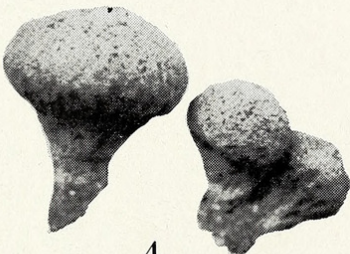
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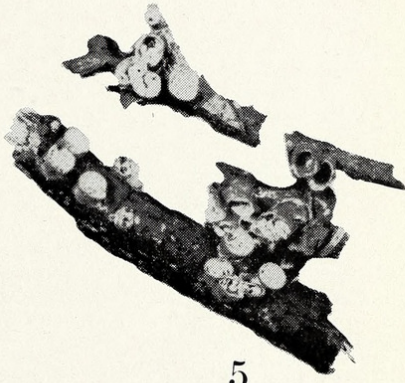
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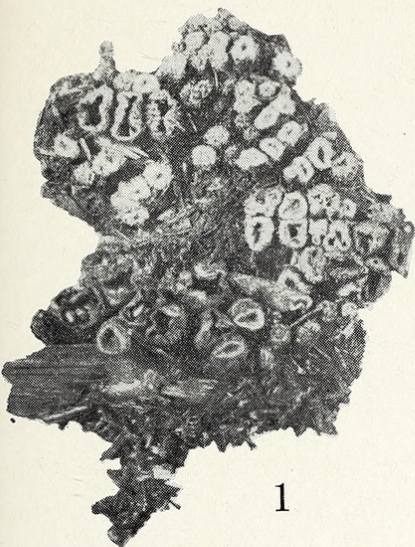
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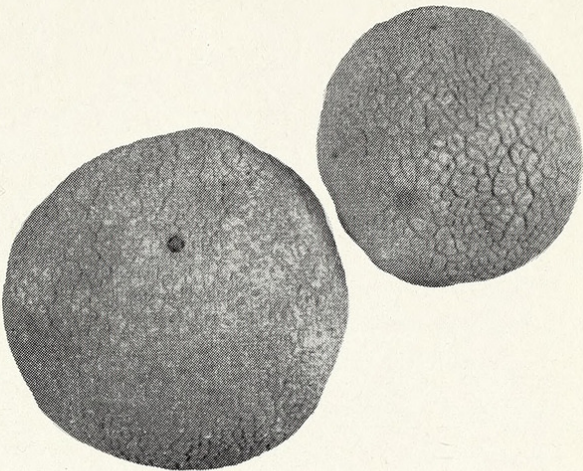
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EXPLANATION OF PLATE IV

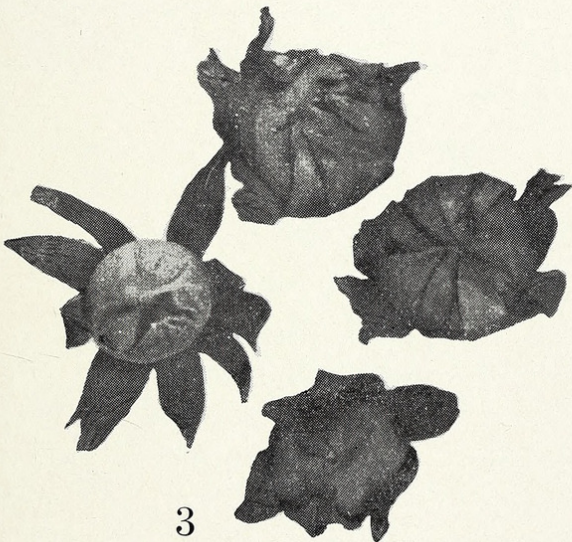
- FIG. 1. *Cyathus stercoreus* (Schw.) De Toni $\times 1$.
FIG. 2. *Scleroderma aurantium* (Vaill.) Pers. $\times 0.7$.
FIG. 3. *Astraeus hygrometricus* (Pers.) Morgan $\times 1$.
FIG. 4. *Calostoma cinnabarina* Desv. $\times 0.8$.



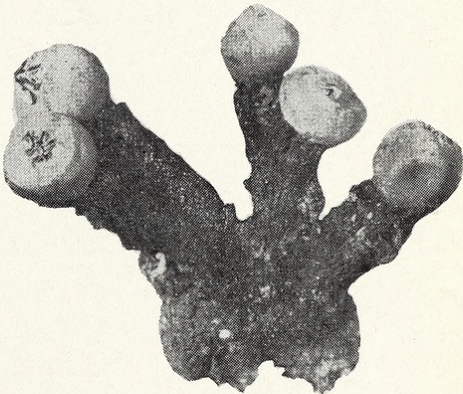
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