

Article XXVII. — THE NORTH AMERICAN SPECIES OF RHODITES AND THEIR GALLS.

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PLATES XLIII-XLVII.

The object of the present paper is to bring together the known North American species belonging to the genus *Rhodites* in conjunction with what has been learned by personal observation and study.

The study of some western species has presented several difficulties owing to the want of sufficient material and field notes, and with the limited information at hand, I must frankly admit that it was not possible for me to bring this paper up to the proper standard of completeness, for the following reasons: The gall of *Rhodites politus* Ashmead is identical with that of *Rhodites nebulosus* Bassett, while the descriptions of the adults of these two species do not tally, and I consider it very likely that they are the same. *Rhodites multispinosus* Gillette, when we have more knowledge of this species, may possibly prove to be the same as *Rhodites tuberculator* Cockerell, and *Rhodites arefactus* Gillette the same as *Rhodites tumidus* Bassett; on the other hand, it may be possible that *R. multispinosus*, *R. tumidus*, *R. arefactus* and *R. tuberculator* are all one and the same species. But, owing to the want of conclusive evidence, I have preferred to consider these species as being distinct, rather than to unite them. I trust that the future students, located in the western States, will collect intelligently and look up the knotty points. The species of roses upon which the western species of *Rhodites* occur are practically unknown, and I would urge that all students of this genus, as well as of other gall-producing insects, pay particular attention to the identification of the host plants before publishing any notes or descriptions of new species, and to work out the imperfectly known food-habits of such species as are already known.

All the species of *Rhodites* known at present produce galls on different kinds of roses, and it seems that the genus is strictly confined to these plants. Twenty-nine species have been described, of which twenty are from North America, eight from Europe—four of which are also found in western Asia, and one species (*R. japonicus*) is known from Japan. *Rhodites rosæ* is common to Europe, Western Asia and North America, while the remaining species are confined to their respective countries.

The genus *Rhodites* was analytically described by Hartig in 1840 as follows: "Antennæ 15-16 jointed, maxillary palpi 4-jointed, labial palpi 2-jointed." The genus was erected for three European species, *R. rosæ*, *R. eglanteriæ* and *R. centifoliæ*. Osten Sacken in 1863 gave a general description of *Rhodites* and added certain characters not mentioned by Hartig. Osten Sacken states that he has never found more than 14 joints on the antennæ in both sexes. Mayr in 1881, and Dalla Torre and Kieffer in 1902 gave excellent technical descriptions of the genus *Rhodites*. Walsh in 1864 erected the genus *Tribalia* for *T. batatorium* which is now considered to be the same as *Rhodites radicum* O. S. In 1869 Förster erected the genus *Hololexis* for *Hololexis rufipes* (n. sp.), bred from monothalamous galls on wild rose. It is closely allied to *Rhodites eglanteriæ*, which he considered a true *Hololexis*. Dr. Gustav Mayr, in 1881, united *Hololexis* with *Rhodites* with which conclusion I fully concur, because Förster's description of *Hololexis* does not differ from that of *Rhodites*. In 1902 Kieffer erected the genus *Lytorhodites*, for the following North American species: *R. arefactus*, *R. fulgens*, *R. multispinosus*, *R. nebulosus*, *R. neglectus*, and *R. tuberculosus* O. S. The genus *Lytorhodites* differs from *Rhodites* only by having the radial cell at the margin more or less open and the scutellum without foveæ at the base. I consider these characters too trivial to be used for the erection of a new genus. Ashmead (Psyche, Vol. X, 1903, p. 210) erroneously states that the genus *Tribalia* has been rechristened by Abbé Kieffer under the name *Lytorhodites*. I have omitted *Rhodites globosus* Cockerell (Entomologist, Vol. XXIII, 1890, p. 75), because it was described from the gall only. I have seen the type in the United States National Museum and it appears to me to be nothing more than a small specimen of *Rhodites politus* Ashmead.

For specimens and information I am under obligation to Messrs. C. P. Gillette, Wm. H. Ashmead, A. D. Hopkins, Wm. M. Wheeler, E. B. Southwick, Wm. T. Davis, Mel. T. Cook, T. D. A. Cockerell, H. E. Summers, M. T. Thompson, A. L. Melander and C. T. Brues.

SYNOPSIS OF THE GALLS OF RHODITES.

1.—Galls on the leaves.

Round, elongate or reniform woody galls covered with a white powder

Rhodites ignotus.

Shape similar to *ignotus*, brown or reddish, without white powder

Rhodites variabilis.

Lentil-shaped discs in the parenchyma of the leaf

{ *Rhodites rosæfolii*.
Rhodites lenticularis.

Small, globular, hollow, with weak, minute spinules . . . { *Rhodites nebulosus*.
Rhodites politus.
Subovate, hollow, flat on top, with short blunt tubercles around the edge
Rhodites gracilis.

2.—Galls on the branches or stems.

An agglomeration of hard cells around a branch, covered with long green moss-like filaments . . . *Rhodites rosæ*.

Elongate, woody swellings of the branch, tapering at each end
Rhodites dichlocerus.

Globular galls covered with long sharp prickles, usually in clusters
Rhodites bicolor.

Large, rounded, woody galls, without spines *R. tuberculator*.

Large, rounded galls, densely covered with spines . *Rhodites multispinosus*.

Small, rounded or elongate woody swellings, more or less in a row on the branch
Rhodites vernus.

Rounded, elongate, puffy, soft swellings, single or several in a row
Rhodites fusiformans.

Hard, rounded, woody, bud-like galls on a short stalk { *Rhodites arefactus*.
Rhodites tumidus.

Smooth, rounded, or reniform swellings surrounding a twig, abrupt at each end
Rhodites globuloides.

Smooth, with two or more transverse ridges, rounded or elongate swellings abrupt at each end . . . *Rhodites neglectus*.

3.—Galls on the roots.

Rounded, warty, tomato-shaped or artichoke-tuber-like, attached on a short stalk . . . *Rhodites radicum*.

Similar to *R. radicum*, but with the top and sides deeply incised, rosette-like
Rhodites utahensis.

Hard woody nodules, single or more or less coalescing . *Rhodites fulgens*.

Rhodites Hartig.

Cynips (part) LINNÉ, Syst. Nat., ed. X, 1758, Vol. I, p. 553.

Diplolepis (part) FOURCROY, Ent. Paris, Vol. II, 1785, p. 391.

Rhodites HARTIG, Zeitschr. für Ent. Germar, Vol. II, 1840, p. 186; OSTEN SACKEN, Proc. Ent. Soc. Phil., Vol. II, 1863, p. 44; MAYR, 20 Jahrb. Comm. Oberrealsch., I, Bez. Wien., 1881, pp. 4, 10, 18; PROVANCHER, Fauna Ent. Can., Vol. II, 1889, p. 159; DALLA TORRE and KIEFFER, Ins. Gen. Hymen. Fam. Cynip., 1902, pp. 44, 48 and 78; ASHMEAD, Psyche, Vol. X, 1903, p. 210.

Tribalia WALSH, Proc. Ent. Soc. Phil., Vol. II, 1864, p. 470; KIEFFER, Bull. Soc. Hist. Nat. Metz, 2d ser., Vol. X, 1902, p. 96; DALLA TORRE and KIEFFER, Gen. Insect. Hymen. Cynip., 1902, pp. 47, 76; ASHMEAD, Psyche, Vol. X, 1903, p. 210.

Hololexis FÖRSTER, Verh. Zool.-Bot. Gesell. Wien, Vol. XIX, 1869, pp. 330 and 333; MAYR, 20 Jahrb. Comm. Oberrealsch. I, Bez., Wien, 1881, p. 18; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 78.

Lytorhodites KIEFFER, Bull. Soc. Hist. Nat. Metz, 2d ser., Vol. X, 1902, p. 96; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, pp. 44, 48, 79.

Head large, broader than the thorax; maxillary palpi 4-jointed, first long, almost twice as long as the second; second and third joints of equal size and rounded at one side; fourth joint as long as the first and conical, with a few setæ. Labial palpi 2-jointed, first joint elongate, parallel, second joint as long as the first, conical, with a number of setæ. Antennæ filiform, first and second joints globose or subglobose, second joint shorter than the first, third joint longer than the two preceding, fourth joint shorter than the third, remaining joints subequal.

Pronotum much narrowed in the middle. Parapsidal grooves more or less well marked. Base of scutellum with or without two small pits. Radial cell closed or somewhat open, not long. Tarsal claws simple. Abdomen smooth, shining. Hypopygium of female plow-shaped.

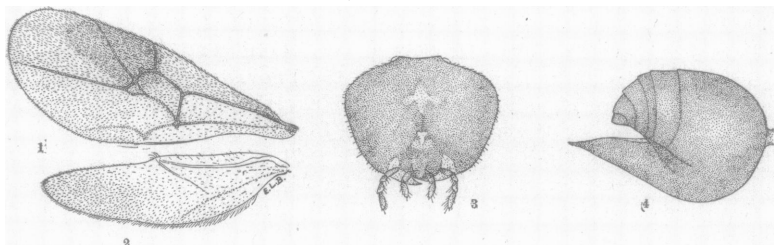
Type, Cynips rosæ Linn.

Rhodites rosæ (Linn.).

Cynips rosæ LINNÉ, Syst. Nat., ed. X, 1758, p. 533.

Rhodites rosæ HARTIG, Zeitschr. für Ent. Germar, Vol. II, 1840, p. 194; OSTEN SACKEN, Proc. Ent. Soc. Phil., Vol. II, 1863, pp. 40, 45, 47; WALSH and RILEY, Am. Ent., Vol. I, 1869, p. 166; RILEY, Am. Ent., Vol. II, 1870, p. 213; RILEY, and FULLER, Am. Ent., Vol. III, 1880, p. 298; BASSETT, Proc. Am. Assoc. Adv. Sci., 1877, p. 305; MAYR, 20 Jahrb. Communal Oberrealsch., I, Bez. Wien, 1881, p. 18; PROVANCHIER, Can. Nat., Vol. XII, 1881, p. 234; WEISMANN, Beitr. Kennt. Entwick. Ins., 1882, p. 3, pl. i, and ii, figs. 1-19; ASHMEAD, Tr. Am. Ent. Soc., Vol. XII, 1885, p. 293; *ibid.*, Vol. XIV, 1887, p. 133; Bull. 1, Col. Biol. Assoc., 1890, p. 38; COCKERELL, Entomol., Vol. XXIII, 1890, p. 75; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 248; Am. Mus. Journ., Vol. IV, 1904, p. 93, fig. 6; Ins. Galls Vicin. N. Y., 1904, p. 7, fig. 6; BRIDWELL, Trans. Kan. Ac. Sci., Vol. XVI, 1899, p. 203; FYLES, Rep. Ent. Soc. Ont., 1904 (1905), p. 95.

Male and female.—Head black with microscopic hairs, finely and regularly punctate in front, less punctate behind and on the vertex, jaws piceous. Antennæ wholly black. Thorax black with microscopic hairs, finely and regularly punctate, pleuræ finely rugoso-punctate with two polished areas. The two medio-dorsal



Figs. 1-4. *Rhodites rosæ*. 1 and 2, wings; 3, underside of head, showing maxillary and labial palpi; 4, abdomen.

lines from the collar fine, narrow and reaching the middle of the thorax; the median groove from the scutellum extends forward to almost the ends of the anterior lines.

Parapsidal grooves narrow, fine, not smooth, and converging as they approach the scutellum. Scutellum finely rugoso-punctate. Abdomen red, posteriorly black, wholly black and small in the male. Legs red, femora infuscated at the base. Wings of female yellowish sub-hyaline, with a distinct radial cloud, extending beyond the veins of the cell; wings of male hyaline without the radial cloud. Length of male 2 to 2.50 mm.; of female 3 to 4 mm.

Gall (Plate XLIII, Figs. 5, 6).—Polythalamous. Composed of an agglomeration of hard cells around a branch, and it is densely covered with long, green filaments forming a moss-like mass. It measures from 25 to about 50 mm. in diameter. Occurs on the terminal twigs of sweet briar (*Rosa rubiginosa* and *Rosa blanda*).

Habitat: Europe; Western Asia; Canada; Massachusetts; Rhode Island; (New England States); New York; New Jersey; Pennsylvania; Washington, D. C.; (Middle States); Kansas; Colorado.

The gall is quite common locally and is fully grown in September. When young it is sometimes bright scarlet red. In Europe it is known as the bedu-guar of the rose. The adults emerge in May and June. An extensive bibliography of this species may be found in Dalla Torre's *Catalogus Hymenopterum*, Vol. II, 1893, pp. 128–129. Mr. M. T. Thompson has taken the galls on the European *Rosa rugosus* and *Rosa cinnamomea* found in cultivation in Massachusetts. In Europe the galls are found on ten species of roses. The type of *R. rosæ* is probably lost.

***Rhodites bicolor* (Harr.).**

Cynips bicolor HARRIS, Rep. Ins. Mass. Inj. Veget., 1841, p. 399; Treat. Ins. New Eng. Inj. Veget., 2d ed., 1852, p. 435; Treat. Ins. Inj. Veget. 3d ed., 1862, p. 548; *ibid.*, Flint ed., 1862, p. 548; *ibid.*, 1863; OSTEN SACKEN, Ent. Zeit. Stettin, Vol. XXII, 1861, p. 415.

Rhodites bicolor OSTEN SACKEN, Proc. Ent. Soc. Phil., Vol. II, 1863, pp. 43, 45, 48, RILEY, Am. Ent., Vol. II, 1870, p. 309, fig. 192; MAYR, 20 Jahrb. Communal Oberrealsch., I, Bez. Wien, 1881, p. 18; ASHMEAD, Trans. Am. Ent. Soc. Vol. XII, 1885, p. 293; *ibid.*, Vol. XIV, 1887, p. 133; Bull. 1, Col. Biol. Assoc., 1890, p. 38; PROVANCHER, Fauna Ent. Canada, Vol. II, 1889, p. 160; COCKERELL, Entomol., Vol. XXIII, 1890, p. 75, GILLETTE, Ent. News, Vol. III, 1892, p. 246; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 246, pl. ix, fig. 1; Am. Mus. Journ., Vol. IV, 1904, p. 92, fig. 1; Ins. Galls Vicin. N. Y., 1904, p. 6, fig. 1; BRIDWELL, Trans. Kan. Ac. Sc., Vol. XVI, 1899, p. 203; COOK, 29th Rep. Dept. Geol. & Nat. Hist. Ind. 1904 (1905), p. 816, fig. 10.

Rhodites spinosellus COCKERELL, Entomol., Vol. XXIII, 1890, p. 75; Ent. Student, Vol. I, 1900, p. 10.

Rhodites tumidus TOWNSEND, Psyche, Vol. VII, 1895, p. 272 (in error); *ibid.*, p. 307 (correction).

Male and female.—Head black with very short white hairs, front roughly punctate, finely punctate behind, jaws rufous. Antennæ 14-jointed, black, first and second joints piceous or almost black in the female, wholly black in the male. Thorax prominently rugoso-punctate, subopaque; two smooth, parallel, shining lines

from the collar almost extending to the middle of the thorax; median groove from the scutellum long, distinct and extending forward to almost the ends of the anterior lines. Parapsidal grooves rather deep, distinct, converging as they reach the scutellum, where they are widely separated; outside of these grooves there is sometimes a smooth line on each side; pleuræ rugoso-punctate with the usually shining area hardly apparent. Scutellum very rugose and large. Abdomen red in the female, black or piceous in the male. Legs yellowish red with very short hairs. Wings subhyaline, yellowish brown in the female; brownish cloud on radial area distinct, veins brown; in the male the wings are hyaline without the yellowish tint and radial cloud. Length of male 2.50 to 3 mm.; of female 3.25 to 4.50 mm.

Gall (Plate XLIII, Figs. 1-4).—Monothalamous. Spherical, covered with many prickly spines as long or longer, or shorter, than the diameter of the gall. Internally it is hollow with the wall about 1 to 2 mm. thick, but in specimens infested by guest-flies, it is almost entirely pithy inside. Yellowish green, sometimes tinged with red. Soft and fleshy in summer, woody and brown in winter. It is found singly or in clusters of from two to ten or more upon twigs of different kinds of wild roses (*Rosa carolina*, *R. blanda*, *R. humilis*, *R. pisocarpa*? and probably other species). It measures from 5 to 12 mm. in diameter.

Habitat: Canada; Maine; Massachusetts; Rhode Island; Connecticut; New York; New Jersey; Pennsylvania; Washington, D. C.; North Carolina; Mississippi; Wisconsin; Indiana; Colorado; Washington; New Mexico.

The gall is quite common in the latitude of New York, and reaches maturity in autumn. The number of species of wild roses upon which the galls are formed will undoubtedly increase after a careful study of its food-habits. Harris's types are probably in the Boston Society of Natural History.

***Rhodites ignotus* O. S.**

Rhodites ignota OSTEN SACKEN, Proc. Ent. Soc. Phil., Vol. II, 1863, pp. 44, 45, 49; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 246, pl. ix, fig. 2; Am. Mus. Journ., Vol. IV, 1904, p. 94, fig. 7; Ins. Galls Vicin. N. Y., 1904, p. 8, fig. 7.

Rhodites carolina ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, pp. 133, 148.

Male and female.—Head black, with microscopic hairs, rugosely punctate in front, finely punctate posteriorly. Antennæ 14-jointed, black, first and second joints rufous or piceous in the female, wholly black or piceous in the male. Thorax evenly rugoso-punctate, anterior lines, median and parapsidal grooves present, but very indistinct and hardly visible. Pleuræ rugoso-punctate, without the usual shining area. Scutellum rugoso-punctate. Abdomen red in the female, black and small in the male. Legs red in both sexes. Wings subhyaline, yellowish; veins dark brown with a distinct brown cloud on the radial veins with the disc hyaline. Wings of male hyaline with slight traces of the brown cloud on the radial veins. Length of male 1.50 to 3 mm.; of female 2.50 to 3.50 mm.

Gall (Plate XLIII, Figs. 7-10).—Monothalamous. Very variable in shape and size. Spherical, irregularly rounded, reniform, single or more or less confluent or two or three entirely coalesce thus forming an elongated mass of irregular shape. Clay brown, covered with a white farinaceous powder. Hard, woody, containing

a rather large larval cell in the single gall and two or more cells in the coalescent ones. They are formed on the terminal twigs, leaves or leaf-stalks, and as a rule are found in a cluster of from two to twenty. Measures from 4 to 15 mm. in diameter. On wild rose (*Rosa blanda*, *R. nitida* and *R. carolina*).

Habitat: Massachusetts; Connecticut; New York; New Jersey; Pennsylvania; Washington, D. C.; Black Mountains, North Carolina; Iowa.

The types of *R. ignotus* are in the Museum of Comparative Zoölogy, Cambridge, Mass., and one type of the gall in the American Museum of Natural History.

***Rhodites variabilis* Bass.**

Rhodites variabilis BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 61; COCKERELL, Ent. Student, Vol. I, 1900, p. 10.

Male and female.—Head large, broader than the thorax, finely punctate in front and on the vertex, and with short microscopic hairs, black, mandibles ferruginous. Antennæ 14-jointed, longer in the male than in the female, black in the male, with the first and second joints in the female ferruginous; all joints with very short hairs. Thorax black, finely rugose with microscopic hairs, two parallel, smooth median lines from the collar to nearly the middle of the thorax and a very short median line from the scutellum; parapsidal grooves not deep, finely punctate and converging as they approach the scutellum. Scutellum rugose with microscopic hairs, somewhat depressed at its junction with the mesonotum. Abdomen yellowish brown and somewhat darker toward the end in the female, small and blackish in the male. Legs yellowish brown in both sexes with very minute hairs. Wings hyaline with dark brown veins; radial area finely clouded with brown in the male, slightly more so in the female. Length of female 2.25 to 3 mm.; of male 2 to 2.25 mm.

Gall (Plate XLVI, Figs. 5-9).—Monothalamous. Variable in size and shape. Spherical, irregularly rounded, somewhat ovate or reniform, through coalescence of two or more galls. Russet brown sometimes tinged with red. Internally they are pith-like with a large larval cell in the center. In the larger galls where two or more are confluent there are several larval cells. The galls occur usually in a cluster of from two to ten on the small terminal twigs, or are attached to the leaf stems, while others grow on fully developed leaves of a wild rose (*Rosa* sp.). The rounded forms measure from about 5 to 15 mm. in diameter and the elongated forms from about 15 to 24 mm.

Habitat: Boulder, Colorado (Mrs. W. P. Cockerell); Southern Utah (A. H. Siler); Cedar Mountains, Idaho; Wenatchee, Washington; Paris, Texas; Wyoming (Bruner).

This species is closely allied to *Rhodites ignotus* both in the adults and the galls. The types are in the collections of the American Entomological Society and the American Museum of Natural History.

***Rhodites vernus* O. S.**

Cynips (*Rhodites* ?) *tuberculosa* OSTEN SACKEN, Ent. Zeit. Stettin, Vol. XXII, 1861, p. 415.

Rhodites verna OSTEN SACKEN, Proc. Ent. Soc. Phil., Vol. II, 1863, pp. 41, 45, 47; MAYR, 20 Jahrb. Communal Oberrealsch., I, Bez. Wien, 1881, p. 18; ASHMEAD, Trans. Am. Ent. Soc. Vol. XII, 1885, p. 293; *ibid.*, Vol. XIV, 1887, p. 133; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 248, pl. ix, fig. 6; Journ. Am. Mus., Vol. IV, 1904, p. 93, fig. 5; Insect Galls Vic. N. Y., 1904, p. 7, fig. 5.

Lytorhodites tuberculosus KIEFFER, Bull. Soc. Nat. Hist. Metz, 2d Ser. Vol. X, 1902, p. 97.

Male and female.—Head and antennæ black, mandibles reddish. Thorax black, finely, not densely sculptured, somewhat shining, pubescent. Parapsidal grooves, touching the humeri, moderately deep. Intermediate grooves generally appear as smooth lines, unless viewed obliquely. Scutellum rugose on the sides, more smooth in the middle. Abdomen of male black, of female red, fringed with pale yellowish hairs on the hind borders. Tip of sheath of female brown. Feet red, coxæ black, base of femora in the female black. Wings of male hyaline, of female tinged with brown and with a more or less distinct cloud on the radial area and its surroundings. In both sexes the second transverse vein has no projection within the radial area and is arcuate. Areolet moderately large in the male and larger in the female. Length of male 2.50 mm.; of female 3.75.

Gall (Plate XLIV, Fig. 1).—Polythalamous. Oblong or rounded swellings on small branches. Sometimes there is a series of three or more swellings attached to each other. Reddish, hard and woody, with several cells inside. Length about $\frac{1}{2}$ inch. On the stem of wild rose (*Rosa blanda*).

Habitat: New York; Washington, D. C.

The species, briefly described as *Cynips* (*Rhodites*?) *tuberculosa* by the late Baron von Osten Sacken, is probably the same as his *Rhodites vernus*. The description of the gall of *tuberculosa* agrees with that of *R. vernus*, but the description of the gall-fly of *tuberculosa* is too brief for recognition. Osten Sacken's description of *Cynips* (*Rhodites*?) *tuberculosa* is as follows: "Rundliche oder längliche, kaum einen halben zoll lange anschwellungen an den zweigen: *Cynips* (*Rhodites*?) *tuberculosa* n. sp. ♀, 14-gliedrige antennen; ♂ scheinbar auch 14-gliedrig, da das letzte, 15-glied, sehr kurz und undeutlich ist. Ich wage kaum diese art für *Rhodites* zu halten, da die radialzelle zwar einen verdickten, haarigen vorderrand hat, doch aber nicht für geschlossen angesehen werden darf." The following is a translation of the above. Rounded or elongate swellings hardly one half inch in length on the twigs (of rose); *Cynips* (*Rhodites*?) *tuberculosa* n. sp. ♀, antennæ 14-jointed; ♂ apparently also 14-jointed, as the last, 15th joint is very short and indistinct. I hardly venture to consider this species as a *Rhodites*, because the radial cell has a thickened, hairy costal margin, but it cannot be regarded as being closed. The types of *R. vernus* are in the Museum of Comparative Zoölogy, Cambridge, Mass., and one type of the gall is in the American Museum of Natural History, from which the figure (Plate XLIV, Fig. 1) was made.

***Rhodites dichlocerus* (Harr.).**

Cynips dichlocerus HARRIS, Rep. Ins. Mass. Inj. Veget., 1841, p. 399; Treat. Ins. New Engl. Inj. Veget., 2d ed., 1852, p. 345; Treat. Ins. Inj. Veget., 3d ed., 1862, p. 549, pl. viii, figs. 6, 7, 8; *ibid.*, Flint ed., 1862, p. 549, pl. viii, figs. 6, 7, 8; *ibid.*, 1863.

Cynips dichloceros OSTEN SACKEN, Ent. Zeit. Stettin, Vol. XXII, 1861, p. 415.

Rhodites dichlocerus OSTEN SACKEN, Proc. Ent. Soc. Phil., Vol. II, 1863, pp. 41, 45, 46; GLOVER, Ill. N. Am. Ent., 1878, pl. viii, fig. 18; MAYR, 20 Jahrb. Communal Oberrealsch, I, Bez. Wien, 1881, p. 18. ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 263; *ibid.*, Vol. XIV, 1887, pp. 133, 148; Bull. 1, Col. Biol. Assoc., 1890, p. 38; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, p. 247, pl. ix, fig. 5; Am. Mus. Journ., Vol. IV, 1904, p. 93, fig. 4. Ins. Galls Vicin. N. Y., 1904, p. 7, fig. 4; COOK, Proc. Ind. Acad. Sci., 1904, p. 225; 29th Rep. Dept. Geol. & Nat. Hist. Res. Ind., 1904 (1905), p. 819, fig. 3.

Cynips (Rhodites) dichlocerus GLOVER, Rep. U. S. Comin. Agricul., 1877 (1878), p. 95, pl. ii, fig. 21.

Rhodites spinosa ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, pp. 34, 148; WEBSTER, Can. Ent., Vol. XXVII, 1895, p. 68.

Female.—Head yellowish brown, eyes black, finely and regularly punctate in front, less punctate posteriorly. Antennæ 14-jointed, first, second and third joints reddish brown, remaining joints black. Thorax, abdomen and legs brown, sheath of ovipositor black. Thorax regularly and evenly punctate, anterior parallel lines almost extending to the middle of the thorax; median groove from the scutellum extending well forward to nearly the ends of the anterior lines. Parapsidal grooves well developed and almost parallel, widely separated at the scutellum. Pleuræ finely and regularly rugoso-punctate without any shining area. Legs yellowish red, claws black. Wings subhyaline, yellowish, veins brown and no radial cloud. Length 3 to 4 mm.

Male.—Head, antennæ and thorax piceous black, sometimes rufo-piceous. Abdomen yellowish red basally, otherwise black. Legs yellowish red, claws black and sometimes also the last tarsal joint. Pleuræ with a finely punctate shining area which is sometimes rufous. Wings hyaline and without radial cloud, veins brown. Length 2 to 2.50 mm.

Gall (Plate XLIV, Figs. 9-14).—Polythalamous. Elongate, subfusiform, gradually tapering at both ends. Smooth or more or less densely covered with short spiny prickles like the gall of *Rhodites multispinosus*. Red, hard and woody with numerous cells internally. Measures from 14-54 mm. in length and from 7 to 18 mm. in width. Occurs on the branches and twigs of wild roses (*Rosa carolina*, *R. humilis*, *R. canina* and *R. nitida*).

Habitat: Massachusetts; Rhode Island; Connecticut; New York; New Jersey; Pennsylvania; Washington, D. C.; Delaware; North Carolina; Indiana; Ohio; Colorado.

The flies bred by me from the spiny galls named *Rhodites spinosus* by Dr. Ashmead are identical with the ones bred from the smooth gall of *Rhodites dichlocerus*. Harris's types are probably in the Boston Society of Natural History.

***Rhodites globuloides* sp. nov.**

OSTEN SACKEN, Proc. Ent. Soc. Phil., Vol. II, 1863, p. 62, (unnamed).

Rhodites ignota ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 293; *ibid.*, Vol. XIV, 1887, pp. 133, 148; Bull. 1, Col. Biol. Assoc., 1890, p. 38; GILLETTE, Ent. News, Vol. III, 1892, p. 246.

Rhodites globulus BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 247, pl. ix, fig. 4; Am. Mus. Journ., Vol. IV, 1904, p. 93, fig. 3; Ins. Galls Vicin. N. Y., 1904, p. 7, fig. 3; Cook, 29th Rep. Dept. Geol. & Nat. Hist. Res. Ind., 1904 (1905), p. 818, fig. 12.

Female.—Head black, finely and evenly punctate, with microscopic hairs. Antennæ black, first and second joints rufous, third joint piceous. Thorax evenly rugose, subopaque. Anterior lines wanting. Median groove from the scutellum scarcely visible. Parapsidal grooves very obsolete, slightly evident posteriorly. Pleuræ rugose, subopaque, somewhat shining beneath the wings. Scutellum very rugose, black. Abdomen and legs rufous. Wings subhyaline, yellowish; radial cell heavily clouded with brown on the veins with the disc hyaline, the brown shade extends beyond the veins. Length 3 mm.

Gall (Plate XLIV, Figs. 2-6).—Polythalamous. Smooth, rounded or oblong, arising at each end abruptly from the branch. Green and fleshy when fresh; and brown, soft and corky when dry. Measures from about 10 to about 22 mm. in width and 35 mm. in length.

Habitat: Massachusetts; Rhode Island; New York; New Jersey; Connecticut; Indiana; North Carolina; Florida; Michigan.

Described from a single female gall-fly. The type of the adult and galls are in the American Museum of Natural History.

The insect described by me as *Rhodites globulus* is a guest-fly, synonymous with *Periclistis pirata* O. S., consequently a new name must be used for the true gall maker. I propose for it *Rhodites globuloides*. Dr. William Ashmead erroneously refers to this species as *Rhodites ignota* in his various papers on Cynipidæ. The gall of *Rhodites globuloides* occurs on the branches of *Rosa carolina* and is quite common locally in certain localities. I have collected over a hundred specimens of the galls from which I reared hundreds of its guest-fly *Periclistis pirata*, but only a single specimen of the true gall maker.

***Rhodites neglectus* Gill.**

Rhodites neglecta GILLETTE, Can. Ent., Vol. XXVI, 1894, p. 158; COCKERELL, Ent. Student, Vol. I, 1900, p. 10.

Lytorhodites neglectus KIEFFER, Bull. Soc. Nat. Hist. Metz, 2d Ser., Vol. X, 1902, p. 97;

Female.—"Head black, except a little rufous upon the vertex and clypeus; face rather coarsely rugose, vertex and occiput finely rugose; antennæ entirely black, 14-jointed. Thorax entirely black, parapsidal grooves well defined and broadened anteriorly, median groove traceable but a short distance from the scutellum. Surface of the mesothorax shining, but under a low power of the microscope is seen to

have a fine network of impressed lines and numerous shallow punctures over the entire surface; from each puncture arises a small yellowish hair. Scutellum black, slightly rufous on the middle of the disc, coarsely rugose about the margin, less coarsely on the central portion. Pleuræ and mesothorax black and coarsely to finely rugose, most finely on the central portion of the mesopleuræ beneath the fore wings. Abdomen black, except sides of second segment near the base, the seventh segment and the anterior portion of the venter. All the surface of the abdomen is covered with a network of microscopic impressed lines. Wings slightly smoky, radial area not at all closed along the costal margin. Feet rufous, except coxæ, which are blackish. Length 2.50 to 3 mm.

"Described from two bred females.

"*Male*.—Except feet, entirely black; length 2.50 mm.; otherwise like female" (C. P. Gillette).

Gall. (Plate XLIV, Figs. 7, 8).—Polythalamous. Rounded or oval, usually longer than broad. Abrupt at each end and sometimes depressed at each side. Externally it is smooth with one or more ridges which do not encircle the gall. Internally it is corky and contains numerous larval cells. Length, 14 to 18 mm.; width 11 to 15 mm. Occurs on the branches of wild rose (*Rosa* sp.).

Habitat: Manitou, and Fort Collins, Colorado (Gillette); Colorado Springs, Colorado (Cockerell); Pullman, Washington (Agricul. College).

A single female and gall of this species I received from Professor T. D. A. Cockerell. The gall agrees exactly with the type of *Rhodites neglectus*, but the flies differ slightly from the original description by Professor Gillette. In my specimen the anterior parallel lines are narrow, distinct and not punctate and almost reach the middle of the thorax. These lines were not mentioned by Professor Gillette, otherwise my specimen agrees with his *R. neglectus*, except that it wants the rufous mark on the scutellum. The types are with Prof. C. P. Gillette.

***Rhodites tumidus* Bass.**

Rhodites tumidus BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 60; COCKERELL, Ent. Student, Vol. I, 1900, p. 10.

Female.—Head black, evenly and rugosely punctate in front. Antennæ in the female black, first and second joints rufous or wholly black; in the male always black. Thorax black finely and rugosely punctate, rather dull; anterior parallel lines short, median groove from the scutellum extending almost to the middle of the thorax. Parapsidal grooves distinct, fine, punctate and well separated at the scutellum. Pleuræ rugose with a finely punctate shining area. Scutellum rugose, black or with a rufous patch. Abdomen dark reddish brown in the female sometimes approaching black, wholly black or sometimes dark rufous in the male. Legs reddish brown. Wings with a yellowish tinge in the female with the veins of the radial area clouded with brown. Areolet large; veins brown; the wings of the male are without the yellowish tinge and the cloud on the radial veins, and the areolet is smaller. Length of male 1.50 to 3 mm.; of female 2.50 to 3.25 mm.

Gall (Plate XLV, Figs. 5-7).—Polythalamous. Red or reddish brown. Glob-

ular or irregularly rounded, smooth when fresh, but wrinkled when dry. Terminal part somewhat of form of a half-opened rose or miniature cabbage, the lines on the surface being the outlines of the leaves. Upper half of some specimens have a thin white papery epidermis, which is usually torn and curled. Internally the gall is of a soft, cellular pithy consistence, with traces of the stems of the leaves. They grow on the end of a woody stem, or are in some cases nearly sessile. Measures from 16 to 30 mm. in diameter.

Habitat: Southern Utah.

One male and two female type specimens of the gall-flies and several galls are in the collection of the American Museum of Natural History. The figures of the galls on plate XLV, (Figs. 5, 6, 7), were made from the types. Bassett's types are in the collections of the American Entomological Society and the American Museum of Natural History.

***Rhodites arefactus* Gill.**

Rhodites arefactus GILLETTE, Can. Ent., Vol. XXVI, 1894, p. 157; COCKERELL, Ent. Student, Vol. I, 1900, p. 10.

Rhodites similis ASHMEAD, Proc. U. S. Nat. Mus., Vol. XIX, 1897, p. 136; COCKERELL, Ent. Student, Vol. I, 1900, p. 10.

Lytorhodites arefactus KIEFFER, Bull. Soc. Nat. Hist. Metz, 2d Ser., Vol. X, 1902, p. 97.

R. arefactus, female.—“General color cinnamon-rufous; head entirely rufous, except a blackish area between either compound eye and the mouth; under a power of sixty diameters the lower face appears rather coarsely wrinkled, the wrinkles converging towards the mouth, the upper face, vertex and occiput very finely rugose, the face sparsely set with a short gray pubescence; antennæ short, the first (two) joints, and sometimes the basal third, rufous, remaining joints black; number of joints, fourteen. Thorax rufous above, with a black suture separating the mesothorax and scutellum, parapsidal grooves entire, broad, moderately deep, well separated at the scutellum, and with numerous elevated lines crossing them; median groove distinct and extending well forward. The surface of the thorax is finely rugose, and, in the proper light, shows numerous punctures, each puncture bearing a short yellowish hair. Scutellum coarsely wrinkled near the margin, and less coarsely wrinkled on the central portion, which is considerably elevated, transverse groove at base, color rufous. Mesopleura, except spot just beneath the wings, rufous, sutures, metathorax and sternum black or blackish; entire pleura rugose. Abdomen rufous, with venter and posterior half of dorsum blackish, all abdominal segments covered with a microscopic network of impressed lines, most prominent on the terminal segments. Wings but little smoky, radial area not at all closed along the costal margin, areolet distinct and rather small. Feet, including the coxæ, entirely rufous, the claws only being black. Length, from 3.25 to 4.50 mm.

“*Male.*—3 to 3.50 mm. in length, black, feet more reddish in color than in the female, bases of the coxæ black, antennæ black throughout; otherwise like the female.

“Described from forty-two bred specimens. There is one male among those reared that has the rufous markings of the female on head, antennæ and thorax” (C. P. Gillette).

Gall (Plate XLV, Fig. 1).—“Dense, corky enlargements of small shoots, usually close to the stem from which the shoots arise, and the shoot is usually dead beyond the gall when the latter is mature. The galls are irregular in shape, vary from one half to seven-eighths of an inch in diameter, and are polythalamous. The surface is of a rusty color, is finely wrinkled and reminds one of a dried fruit. The surface appears dry and hard, but it is easily dented with the finger-nail and is always free from spines.

“Described from eighteen galls collected in March in the vicinity of Fort Collins, Colorado. Galls brought into the laboratory March 7th began giving flies March 23d ” (*C. P. Gillette*).

R. similis, female.—In stature and color, this species is very near *dichlocerus* Harr., but the surface of the thorax is much smoother, shining, the head and the lateral lobes of the mesothorax are darker, almost black, the median and parapsidal grooves more distinct, broader, the disk of the mesopleura smoother, veins darker, while the vein at base of marginal cell is arcuate.

“The male is entirely black, except the basal antennal joints, spots on vertex above base of antennæ, and the legs, which are red, the middle and posterior coxæ being black basally.

“*Habitat*: Point of Rocks, Wyoming (Bruner).”

Gall (Plate XLV, Figs. 2-4).—“An irregular, rounded, brown or brownish yellow, pithy gall on the smaller stems of an unknown wild rose. They vary greatly in size and shape, from a small pea-like form to a more or less globular or oblong shape, some of them being an inch or more in length. There is no consistency in their shape; some are perfectly round, oblong, or of various irregular shapes” (*W. H. Ashmead*).

The above are copies of the original descriptions of the gall-flies and galls of *Rhodites arefactus* Gillette and *Rhodites similis* Ashmead. One male and one female, type, with a specimen of the gall of *Rhodites arefactus* were kindly sent to me by Prof. C. P. Gillette and two female cotypes, together with several galls of *Rhodites similis* were given to me by Dr. William H. Ashmead. The flies of *Rhodites similis* are the same as *Rhodites arefactus*. The galls of both these are also exactly similar. Figure 1, Plate XLV, was made from the type of the gall of *R. arefactus* and figures 2, 3, 4 (Plate XLV) were made from cotypes of *R. similis*. Figure 13 (Plate XLV), was received from California by Dr. Mel. T. Cook. I am of the opinion that *R. arefactus* will ultimately prove to be a color variety of *R. tumidus*. The types of *R. arefactus* are with Prof. C. P. Gillette, and one male and female with gall are in the collection of the American Museum of Natural History. Ashmead's types of *R. similis* are in the United States National Museum.

***Rhodites tuberculator* Chll.**

Rhodites tuberculator COCKERELL, West Am. Sci., Vol. IV, 1888, p. 60; Entomol., Vol. XXIII, 1890, p. 75; Ent. Student, Vol. I, 1900, p. 10; ASHMEAD, Bull. 1, Col. Biol. Assoc., 1890, p. 38; GILLETTE, Ent. News, Vol. III, 1892, p. 247.

Female.— Head piceous in front with a rufous mark along the middle, sides and posterior portion piceous, vertex rufous; finely punctate. Antennæ black, first three joints rufous. Thorax rufo-piceous finely and sparsely punctate. Anterior lines very fine and scarcely visible. Parapsidal grooves distinct, moderately deep and widely separated at the scutellum. Median groove from the scutellum extending well forward, distinct but not prominent. Pleuræ piceous rugoso-punctate, with a shining black or rufous area beneath the base of the wings. Scutellum rugose, with a rufous spot. Abdomen yellowish, sometimes blackish above and at the tip. Legs rufous. Wing yellowish hyaline and without radial cloud. Length 3 mm.

Male.— Entirely black. Legs rufous. Length, 1.50 to 2.75 mm.

Gall (Plate XLV, Figs, 8, 9, 10).— Polythalamous. Spherical or elongate rounded. Surface shining or corrugated. Reddish yellow varying to pink and dull purplish. It grows surrounding a twig of a species of wild rose, so that it projects beyond and from the middle of the gall at each end. Sometimes it grows at the tip of a twig; the apex of the gall is then bud-like. Internally it is of a soft, white, pithy, cellular structure, containing many larval cells. Measures from about 25 to 38 mm. in diameter.

Habitat: West Cliff, Custer Co., Colorado (T. D. A. Cockerell); Utah (H. K. Morrison); Colorado (Gillette).

The figures (Plate XLV, Figs. 8–10) were made from specimens given to me by Prof. A. D. Hopkins. The types are supposed to be in the United States National Museum.

***Rhodites multispinosus* Gill.**

Rhodites spinosissima GILLETTE, Bull. 7, Iowa, Agricul. Exp. Sta., 1889, p. 244, fig. 28 (name preoccupied).

Rhodites multispinosa GILLETTE, Ent. Amer., Vol. VI, 1890, p. 25, fig. 2; Proc. Iowa Acad. Sci., Vol. I, pl. ii, 1892, p. 110.

Lytorhodites multispinosus KIEFFER, Bull. Soc. Nat. Hist. Metz, Ser. 2, Vol. X, 1902, p. 97.

Female.— Head rufous, almost black beneath the eyes, finely rugose and covered with gray pubescence. A little black shading on the vertex surrounds the ocelli. Thorax rufous, punctured, parapsidal grooves broad, but not deep, and extend to the scutellum. Two naked parallel lines extend a little more than one third the distance from the collar to the scutellum between the parapsidal grooves. Thorax, like the head, thinly set with short hairs. Scutellum more coarsely rugose than the other parts of the thorax and without foveæ. Abdomen dark rufous, polished and very finely rugose. Ventral valve black. Antennæ 14-jointed, the first three joints rufous, the others black. Wings subhyaline, areolet large, marginal cell open. Length 4.3 mm.

Male.— Entirely black, except the legs and a little rufous coloring about the ocelli. Legs reddish brown. Antennæ 14-jointed, and nearly or quite as long as the body. Length 3.5 mm. Otherwise like the female."

Gall (Plates XLV, Figs. 11, 12 and XLVI, Fig. 1).—Round, knot-like, hard and woody, especially so when dry. Reddish brown and more or less densely covered

with rather sharp, stout spines. It measures from about 20 to 32 mm. in diameter. Occurs on the terminal stems or shoots of wild roses (*Rosa* sp.)." (C. P. Gillette.)

Habitat: Minnesota (Gillette); Milwaukee, Wisconsin; Pullman, Washington; Ontario, Canada (Brodie).

The types of the gall-flies, one male and two females, and one gall of *Rhodites multispinosus*, are in the collection of the Agricultural College at Ames, Iowa, and were kindly sent to me for examination by Professor Henry E. Summers. In the adults the parapsidal grooves are distinct and widely separated at the scutellum. The median groove from the scutellum is distinct and extends forward to almost the ends of the anterior lines. The thorax is finely and evenly punctate and the scutellum is rugose. The wings of the female are yellowish hyaline and without a dark radial cloud. The wings of the male are somewhat paler and the abdomen at the extreme base is rufous. Otherwise the specimens agree with Prof. Gillette's description given above.

A number of gall-flies which were bred from a gall exactly similar to that of *Rhodites multispinosus* were sent to me by Mr. A. L. Melander, from Pullman, Washington. In these specimens the females vary in color from rufous to almost entirely black, while the males are the same as the type of *R. multispinosus*, proving that the female gall-flies of this species are subject to considerable variation. The figure (Plate XLVI, Fig. 1) was made from the type gall of *R. multispinosus* and the figures (Plate XLV, Figs. 11, 12) were made from specimens collected at Milwaukee, Wisconsin, and sent to me by Mr. C. T. Brues. I am of the opinion that *R. multispinosus* may prove to be the same as *R. tuberculator* Cockerell.

***Rhodites fusiformans* Ashm.**

Rhodites fusiformans ASHMEAD, Bull. 1, Col. Biol. Assoc., 1890, pp. 14, 38; COCKERELL, Entomol., Vol. XXIII, 1890, p. 75; Ent. Student, Vol. I, 1900, p. 10; GILLETTE, Ent. News, Vol. III, 1892, p. 246.

Male and female.—Head black with microscopic hairs, coarsely-punctate in front, finely and closely punctate on the vertex and occiput, jaws rufous. Antennæ 14-jointed, first and second joints rufous in the female, remaining joints black, wholly black in the male. Thorax somewhat shining, very minutely and closely punctate, parapsidal grooves distinct, converging as they approach the scutellum; two short distinct lines from the collar, not extending to the middle of the thorax; a distinct median groove from the scutellum not extending to the middle of the thorax. Pleuræ finely rugoso-punctate with a smooth shining area. Scutellum very rugose, black. Abdomen red becoming piceous posteriorly in the female, wholly black in the male. Legs reddish yellow in the female, somewhat darker in the male. Wings hyaline, radial area brown in the female, veins brown, areolet indicated by a brown dot. In the male the brown radial cloud is wanting. Length of male 1.50 to 2 mm.; of female 2 to 2.50 mm.

Gall (Plate XLV, Figs. 10-12).—Polythalamous. Irregularly rounded or elongated puffy swellings situated on one side or completely encircling a branch or stalk. It occurs singly, or a number of the galls are strung along the branch in more or less close proximity, or they are more or less confluent. Internally it is soft, porous, sponge-like. The outer skin is rather brittle, especially when dry, with numerous longitudinal fissures. It measures from about 4 to 12 mm. in length and 4 to 9 mm. in width. On a species of wild rose (*Rosa* sp.).

Habitat: West Cliff, Custer Co., and Colorado Springs, Colorado (T. D. A. Cockerell); abundant in the foot hills in north and south Colorado (C. P. Gillette).

Ashmead's types are in the United States National Museum.

***Rhodites nebulosus* Bass.**

Rhodites nebulosus BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 63.

Lytorhodites nebulosus KIEFFER, Bull. Soc. Nat. Hist. Metz, 2 Ser., Vol. X, 1902, p. 97.

Female.—Head black, very broad, front from the eyes and including the base of the antennæ perfectly flat; ocelli prominent, and included in a smooth, shining space bounded by a distinctly impressed line, outside of this space the vertex is hairy and finely reticulated; antennæ 14-jointed; joints one and two deep brownish yellow, remaining joints black, third as long as the first and second together. Thorax black, covered with fine short hairs, evenly punctate, parallel lines distinct and reaching half way to the scutellum; parapsidal grooves distinct and reaching three-fourths of the way to the collar; lines over the base of the wings distinct and closely approaching the parapsides anteriorly; scutellum rugose and with fine short hairs; no foveæ, but a straight, prominent, transverse ridge separates the scutellum from the pronotum. Abdomen clear, semitranslucent brown, but evenly shaded. Legs pale brown, almost yellow. Wings yellowish hyaline, radial area heavily clouded, with a small clear spot in the middle; veins heavy, dark brown, almost black; areolet large distinct; radial area open, or but partly closed. Length, 2.75 mm.

Gall (Plate XLVII, Figs. 1-3).—Monothalamous. Green, globular, hollow, thin shelled, almost smooth or with very short, fine, weak spines. They occur singly on the leaves or in clusters, or in a large mass containing numerous galls. Measure from 5 to 6 mm. in diameter. On wild roses (*Rosa blanda*, *R. rubiginosa*, and probably *R. carolina* and *humilis*).

Habitat: Waterbury, Connecticut (Bassett); Bronx, New York City (W. B.); Guelph Canada (Jarvis).

When dry the gall becomes brittle and may be easily crushed. The type is a single imperfect specimen. I have taken *nebulosus* in abundance in the Borough of the Bronx, but did not succeed in obtaining the adults. The fly is known only by a single female in the collection of the American Entomological Society. It was erroneously described by H. F. Bassett as a male.

***Rhodites politus* Ashm.**

Rhodites polita ASHMEAD, Bull. 1, Col. Biol. Assoc., 1890, pp. 14, 38; GILLETTE, Ent. News, Vol. III, 1892, p. 246. COCKERELL, Ent. Student, Vol. I, 1900, p. 10,

Male and female.—"Length variable, from 2-4 mm. Entirely black with red legs. The head and thorax are finely confluent punctate, with some coarser scattered punctures over the surface. Antennæ 14-jointed in both sexes, black, the third joint being fully twice the length of the fourth. The mesopleuræ are usually smooth and polished. Scutellum convex, much longer than wide. The highly polished black abdomen in the female is slightly longer than the head and thorax together, compressed below, the ventral valve large, projecting, and acutely pointed. Wings hyaline, veins stout, black, the basal vein of the closed marginal cell a little angulated, the cubital cell closed, the areolet large, distinct" (*W. H. Ashmead*).

Three male specimens of *R. politus* are before me and they may be described as follows:

Male.—Head black, finely punctate, with microscopic hairs, mandibles rufous. Antennæ black, 14-jointed. Thorax black, shining, very finely and sparsely punctate; each puncture with a short hair. The parallel anterior lines very fine and narrow, but distinct. Parapsidal grooves very narrow, converging as they approach the scutellum, where they are widely separated. Pleuræ finely rugoso-punctate with a large polished area. Scutellum rugoso-punctate. Abdomen black, piceous basally. Legs yellowish. Wings hyaline, veins dark brown without brown radial cloud. Length 2 mm.

Gall.—Globular, sometimes coalescing. Thin walled and hollow inside. Externally it is beset with weak spinules. It occurs on the leaves of wild rose (*Rosa californica*).

Habitat: Los Angeles, California; Dakota; Colorado (Cockerell); Manitou, Colorado (Gillette).

The gall of *Rhodites politus* is the same as that of *Rhodites nebulosus*, and when we have more knowledge of these two species they may be found to be identical, and if so *R. nebulosus* will have precedence over *R. politus*. The types are in the United States National Museum.

Rhodites gracilis Ashm.

Rhodites gracilis ASHMEAD, Proc. U. S. Nat. Mus., Vol. XIX, 1897, p. 135.

Male and female.—Length 2.2 to 3 mm. In the male the two basal antennal joints and legs are red; in the female the whole abdomen is red; rest of the insect black. Head finely, closely punctate, the vertex almost smooth, thorax, scutellum and pleuræ rugose, parapsidal grooves distinct posteriorly, somewhat obliterated by the sculpture anteriorly, the middle lobe with a central longitudinal depression. Antennæ 14-jointed, the third joint very long, more than twice as long as fourth. Wings hyaline, veins brown, the areolet large, cubital cell almost closed; in the female the basal veins of the closed radial cell and radius is surrounded with a dusky cloud, which is wanting in the male.

Gall (Plate XLVII, Fig. 4).—An irregular, inflated, rounded gall, with the top broadened and somewhat flattened, the edges surrounded with short, blunt tubercles which are the apices of the elevated ribs at the sides. Inside it is hollow with the wall about 1 mm. thick. It measures about 5 mm. in diameter.

Habitat; Unknown.

The above are Dr. W. H. Ashmead's descriptions of the gall-flies and galls of *Rhodites gracilis*. They were described from four specimens, one female and three males, reared May 17, 1870, from several specimens of the galls. The name of the rose on which the gall occurs is unknown. Dr. Ashmead states that according to C. V. Riley in his note book: "A small gall, bearing a general resemblance to a mangel-wurzel seed or large beet seed, occurring on rose trees, and especially on the single rose. The galls were first noticed in September." My figures of the gall were made from a specimen kindly given to me by Dr. Ashmead, and it is very different in shape from all the other known species of *Rhodites* galls.

The types of the gall-flies and galls are in the collection of the United States National Museum.

Rhodites rosæfolii Ckll.

Rhodites rosæfolii COCKERELL, Ent. Month. Mag., Vol. XXV, 1889, pp. 324, 363; Ent. Student, Vol. I, 1900, p. 10; ASHMEAD, Bull. 1, Col. Biol. Assoc., 1890, pp. 13, 38; GILLETTE, Ent. News, Vol. III, 1892, p. 247.

Rhodites rosæfoliæ COCKERELL, Entomol., Vol. XXIII, 1890, p. 74.

Rhodites lenticularis BASSETT, Tr. Am. Ent. Soc., Vol. XXVII, 1890, p. 59; BEUTENMÜLLER, Am. Mus. Journ., Vol. IV, 1904, p. 94, fig. 8; Ins. Galls Vicin. N. Y., 1904, p. 8, fig. 8.

R. rosæfolii "Female.—Length 2 mm. Black, sparsely pubescent and somewhat coarsely irregularly punctate. Mandibles red with black tips. Antennæ entirely black, 14-jointed, the two basal joints short, nearly equal; the third, the longest joint, less than twice the length of the fourth; the joints beyond the fourth very slightly subequal to the last, the last being slightly longer than the penultimate. Face closely and distinctly punctate. Parapsidal grooves rather broad, distinct, but not sharply defined and with a delicate median groove between, extending the whole length of the mesonotum. Scutellum convex elevated. Legs reddish yellow, slightly dusky basally. Abdomen red basally, beyond the second segment black, the ventral valve sharp plow-shaped. Wings fusco-hyaline, the venation dark brown, the areolet distinct, triangular. Described from one specimen received from Mr. Cockerell and named in MS. *rosæfolii*" (W. H. Ashmead).

R. lenticularis: Male and female.—Head black, front finely punctate, posterior portion minutely punctate. Antennæ 14-jointed, black, first and second joints rufopiceous, wholly black in the male. Thorax black with microscopic hairs. The parallel anterior lines from the collar very indistinct and scarcely evident. Parapsidal grooves distinct, but not prominent, converging as they approach the scutellum. Median groove at scutellum short. Scutellum rugose with minute hairs. Abdomen reddish brown shining in the female and wholly black in the male. Legs yellowish brown. Wings hyaline with a more or less distinct radial cloud in the female, and wanting in the male. Length of male 1.25 mm.; of female 2 mm.

Gall (Plate XLVI, Fig. 5).—Monothalamous. Lentile-shaped in the parenchyma of the leaves, showing on both the upper and under side. Occur single or in numbers upon the same leaf. Sometimes they are confluent and of irregular outline. It

measures from 2.50 to 3 mm. in horizontal and 1 to 2 mm. in vertical diameter. It occurs on the leaves of wild roses (*Rosa lucida*, *R. blanda* and *R. arkansana*).

Habitat: Eastern Massachusetts (Miss Cora H. Clark); Bronx, New York City (W. B.); Custer Co., Colorado (Cockerell); Manitou and Fort Collins, Colorado (Gillette).

I am unable to separate the galls of *Rhodites lenticularis* (Plate XLVII, Fig. 5) from *Rhodites rosæfolii* (Plate XLVI, Fig. 13). A male gall-fly of *R. rosæfolii* which was given to me by Dr. Ashmead also agrees with the type of *R. lenticularis*. Prof. T. D. A. Cockerell has taken *R. rosæfolii* on *Rosa macounii*.

Rhodites fulgens Gill.

Rhodites fulgens GILLETTE, Can. Ent., Vol. XXVI, 1894, p. 159; COCKERELL, Ent. Student, Vol. I, 1900, p. 10.

Lytorhodites fulgens KIEFFER, Bull. Soc. Nat. Hist. Metz, 2nd Ser., Vol. X, 1902, p. 97.

Male.—Head black, rarely with a small rufous spot on the clypeus, and with microscopic hairs; coarsely and regularly rugoso-punctate, subopaque. Antennæ 14-jointed, black, first and second joints inclined to be piceous in some specimens, first joint oblong, short, second joint globose, smaller than the first, third joint long and about twice as long as the two preceding, the remaining joints shorter than the third and subequal. Thorax black, very shining, smooth with scattered pit-like punctures each bearing a short hair, pleuræ rugoso-punctate, with a small, shining, and finely punctate area. The two parallel anterior lines from the collar very short or hardly perceptible, median groove from the scutellum deep, well defined and extending forward to almost the collar. Parapsidal grooves broad and deep with large pit-like punctures, slightly or gradually converging as they approach the scutellum where they are rather widely separated from the median groove. Scutellum coarsely rugose making it subopaque. Abdomen black, shining. Legs rufous, with very short hairs, tips of tarsi black. Wings hyaline, very slightly infuscated, veins dark brown and without brown radial cloud. Length 2 to 2.75 mm.

Female.—Head variable in color. Rufous, with the front at the eyes and occiput piceous, or with the vertex only black; entirely piceous, the clypeus and cheeks rufous or with more or less rufous in front; rugoso-punctate, with microscopic hairs. Antennæ 14-jointed, first, second and sometimes part of the third rufous. Thorax with the punctures and grooves as in the male, wholly rufous with the pleuræ black with a rufous area; piceous with a rufous patch at the middle anteriorly or entirely rufo-piceous. Scutellum black with a large rufous mark. Abdomen rufo-piceous, sheath black or blackish with the basal part rufous. Legs rufous. Wings yellowish hyaline and with a faint darker radial cloud. Length 2.50 to 3.75 mm.

Gall (Plate XLVI, Figs. 2-4).—Monothalamous when single, polythalamous when confluent. Spherical, hard, woody, nodules on the roots beneath the ground or on the stalk very close to the ground. Sometimes they are single or in clusters, or two or more are coalescent, forming an irregularly rounded mass. Sometimes they grow on one side of the root or stalk or completely around them. The individual nodules measure about 4 to 6 mm. in diameter and the coalescent ones from about 10 to 30 mm. in diameter. On sweet briar (*Rosa rubiginosa*).

Habitat: Bronx, New York City; Pullman, Washington; South Dakota.

This species was heretofore known from the gall-flies only. It was described by Gillette from seventeen flies sent to him by Professor J. M. Aldrich, from South Dakota, and eleven specimens bred in his laboratory. The galls were in both cases lost or confused with others. The above descriptions of the gall-flies and galls were made from specimens collected by me in the Borough of the Bronx, New York City. Some of the flies which were bred are identical with one of the female types of *Rhodites fulgens* sent to me by Professor Gillette. I have also received the gall and two female flies from Mr. A. L. Melander, from Pullman, Washington, and galls from E. B. Southwick, collected on Staten Island, New York City.

The types are with Prof. C. P. Gillette, and one female is in the collection of the American Museum of Natural History.

Rhodites radicum O. S.

Cynips semipiceus HARRIS, Rep. Ins. Mass. Inj. Veget., 1841, p. 400; Treat. Ins. New Engl. Inj. Veget., 2d ed., 1852, p. 436; Treat. Ins. Inj. Veget., 3d ed., 1862, p. 549; *ibid.*, Flint ed., 1862, p. 549; *ibid.*, 1863, p. 549; OSTEN SACKEN, Ent. Zeit. Stettin, Vol. XXIII, 1861, p. 415.

Rhodites radicum OSTEN SACKEN, Proc. Ent. Soc. Phil., Vol. II, 1863, pp. 42, 45, 46; MAYR, 20 Jahrb. Communal Oberrealsch., I, Bez. Wien, 1881, p. 18; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 293; *ibid.*, Vol. XIV, 1887, p. 134; Bull. 1, Col. Biol. Assoc., 1890, p. 38; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 246, pl. ix, fig. 3; Am. Mus. Journ., Vol. IV, 1904, p. 92, fig. 2; Ins. Galls Vicin. N. Y., 1904, p. 6, fig. 2; GILLETTE, Ent. News, Vol. III, 1892, p. 247; WEBSTER, Bull. 45, Ohio Agricul. Exp. Sta., 1893, p. 156; COCKERELL, Ent. Student, Vol. I, 1900, p. 10; COOK, Proc. Ind. Acad. Sci., 1904, p. 225; 29th Rep. Dept. Geol. & Nat. Hist. Res. Indiana, 1904 (1905), p. 817, fig. 11.

Tribalia batatorum WALSH, Proc. Ent. Soc. Phil., Vol. II, 1864, p. 470; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 294; *ibid.*, Vol. XIV, 1887, p. 134; Proc. Ent. Soc. Wash., Vol. V, 1903, p. 222; Psyche, Vol. X, 1903, p. 210; KIEFFER, Bull. Soc. Nat. Hist. Metz, 2d Ser., Vol. X, 1902, p. 96.

Male and female.—Head black, with microscopic hairs, front rugose, finely and densely punctate posteriorly. Antennæ black, 14-jointed, first and second joints rufous in the female, wholly black in the male. Thorax black, densely, but very finely and uniformly rugose, subopaque. From the collar are two lines which scarcely extend to the middle of the thorax. A fine, narrow, distinct, median groove from the scutellum to the two parallel anterior lines. Parapsidal grooves broad, distinct with large pit-like punctures and gradually converging as they reach the scutellum; at this point they are almost contiguous and separated only by the median groove. Pleuræ rugose with a large shining area. Scutellum very rugose. Abdomen black or piceous in both sexes, shining, smooth. Legs rufous with the hind femora infuscated. Wings subhyaline, yellowish, radial area clouded in both sexes. Length of male 2.50 to 3 mm.; of female 3 to 4 mm.

Gall (Plate XLVII, Figs. 7, 8).—Polythalamous. Very variable in shape and

size. Irregularly rounded, tomato-shaped or shaped somewhat like an artichoke tuber. It is smooth, reddish brown and more or less irregularly grooved and depressed. At the place of attachment is a very deep impression. Internally it is pithy and contains many larval cells. It occurs at or on the roots of wild rose (*Rosa carolina*) and is attached on a short stalk. Measures about 35 to 60 mm. in diameter.

Habitat: Canada; Massachusetts; Connecticut; New York; New Jersey; Pennsylvania; Washington, D. C.; Ohio; Indiana; North Carolina; Illinois.

This species is quite common locally in swampy places in the vicinity of New York City. It undoubtedly will be found everywhere in the range of distribution of its host plant (*Rosa carolina*). This plant is found, according to Britton and Brown, from Ontario, Canada, to Minnesota, south to Florida and Mississippi. The records of *Rhodites radicum* from Colorado by Ashmead, Cockerell and Gillette probably belong to *Rhodites utahensis*.

Walsh's description of the gall-fly of *Tribalia batatorium* agrees fairly well with *Rhodites radicum*, and it is undoubtedly the same. The description of *T. batatorium* was made from an undeveloped female obtained from an irregular mass of several dozen egg-shaped cells with a very smooth internal surface, connected by fleshy, potato-like matter, and about .17 or .18 inches long. The whole, as Walsh learned from a reliable source, was attached, apparently by a wooden peduncle, to a common potato, many other such galls having been found on other potatoes. Dr. William H. Ashmead informed me some time ago that he had investigated this matter and was in possession of conclusive evidence that Walsh's galls were the same as those of *Rhodites radicum* and that Walsh received his specimen from a farmer, who found them while plowing his potato-patch and sent them to the "State Entomologist" as being "potato-galls" owing to their resemblance to a potato. The types of *R. radicum* are in the Museum of Comparative Zoölogy, Cambridge, Mass. The types of *T. batatorium* have been destroyed.

***Rhodites utahensis* Bass.**

Rhodites utahensis BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1890, p. 62; COCKERELL, Ent. Student, Vol. I, 1900, p. 10.

Male and female.—Head black, front roughly punctate, posterior portion very finely punctate with a number of widely separated pit-like depressions and microscopic hairs, jaws rufous. Antennæ 14-jointed, black, first and second joints in the female rufous, wholly black in the male. Thorax very glossy, microscopically punctate with scattered pit-like depressions each bearing a short hair. Pleuræ rugose. From the collar to the middle of the thorax are two parallel lines and a fine narrow median groove from the scutellum almost reaching forward to the middle of the thorax. Parapsidal grooves deep and strongly punctate, and suddenly converging as they approach the scutellum, where they are widely separated. Scutel-

lum very rugose, subopaque. Abdomen shining black or piceous. Legs rufous with short hairs. Wings subhyaline, yellowish, veins brown without radial cloud. Length of male 2.33 mm.; of female 3 to 4 mm.

Gall (Plate XLVII, Fig. 6).—Polythalamous. Bright red, smooth. Irregular in shape, warty, with the sides and top very deeply incised as though it had been grooved out with a knife in a rosette-like fashion. It is soft when fresh and pithy internally with numerous larval cells. On the under side is a deep impression where it is attached by a short stalk to the lower part of the plant or roots. It occurs on different species of wild roses (*Rosa pisocarpa* and probably *R. woodsii*).

Habitat: Southern Utah; Topaz Butte near Florissant, Colorado (W. M. Wheeler); Pullman, Washington.

Allied to *Rhodites radicum*, but the gall-flies may be readily distinguished by having the thorax on top very glossy, minutely punctate with scattered pit-like depressions, each bearing a short hair. The parapsidal grooves suddenly converge at the scutellum and are more widely separated at this point than in *R. radicum*. The gall is somewhat similar to that of *R. radicum* but may be distinguished readily by the deeply rosette-like incisions on the upper parts. The types of *R. utahensis* cannot be found in the Bassett collection.

EXPLANATION OF PLATES.

PLATE XLIII.

- Figs. 1-4. *Rhodites bicolor* (Harris).
 Figs. 5-6. *Rhodites rosæ* (Linn.).
 Figs. 7-10. *Rhodites ignotus* Osten Sacken.

PLATE XLIV.

- Fig. 1. *Rhodites vernus* Osten Sacken (type).
 Figs. 2-6. *Rhodites globuloides* sp. nov.
 Figs. 7-8. *Rhodites neglectus* Gillette (type).
 Figs. 9-12. *Rhodites dichlocerus* (Harris) (smooth form).
 Figs. 13-14.—*Rhodites dichlocerus* (Harris) (spiny form).

PLATE XLV.

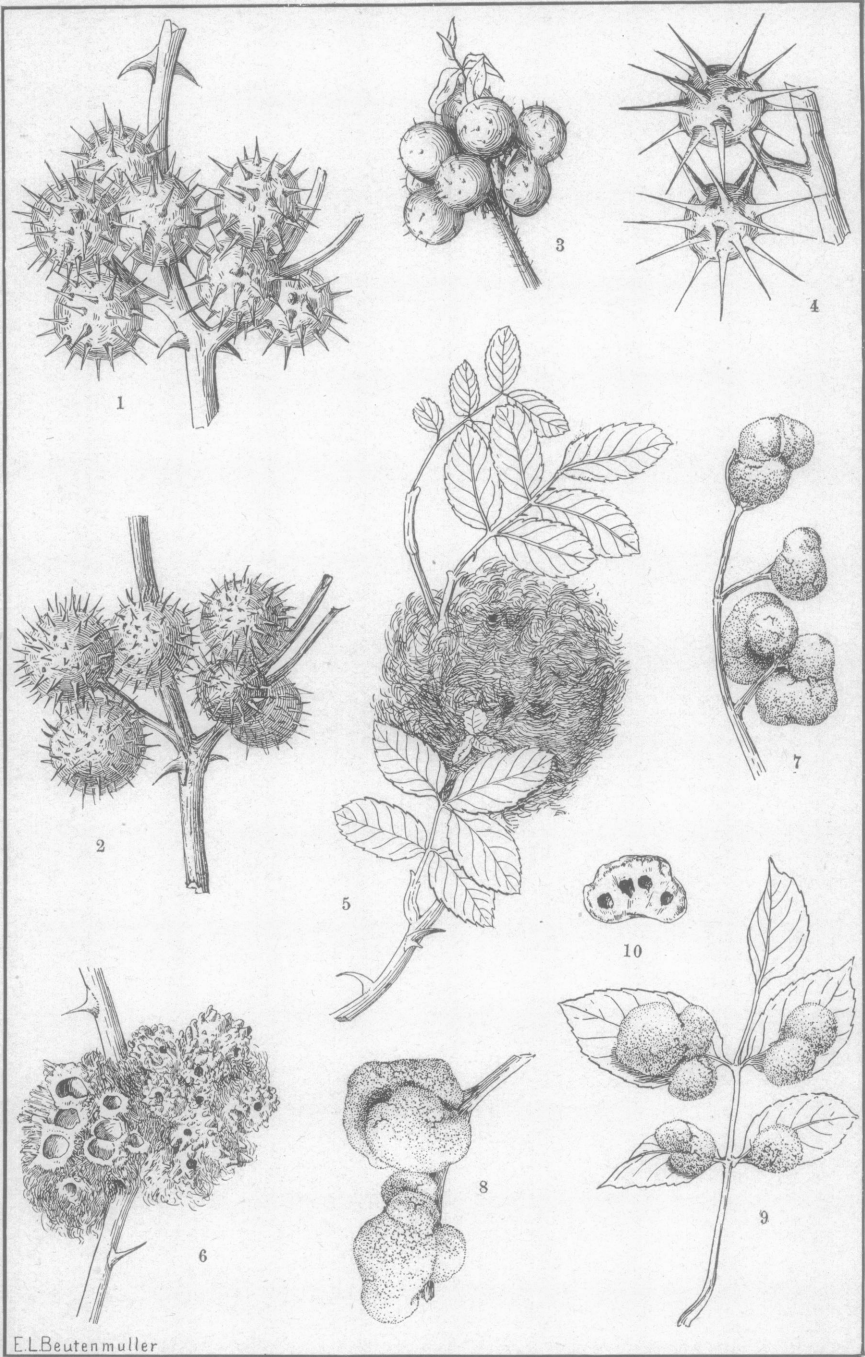
- Fig. 1. *Rhodites arefactus* Gillette (type).
 Figs. 2-4. *Rhodites similis* Ash. (= *R. arefactus*) (cotypes).
 Figs. 5-7. *Rhodites tumidus* Bassett (types).
 Fig. 8. *Rhodites tuberculator* Cockerell.
 Fig. 9. *Rhodites tuberculator* Cockerell.
 Fig. 10. *Rhodites tuberculator* Cockerell.
 Figs. 11-12. *Rhodites multispinosus* Gillette.
 Fig. 13. *Rhodites arefactus* Gillette.

PLATE XLVI.

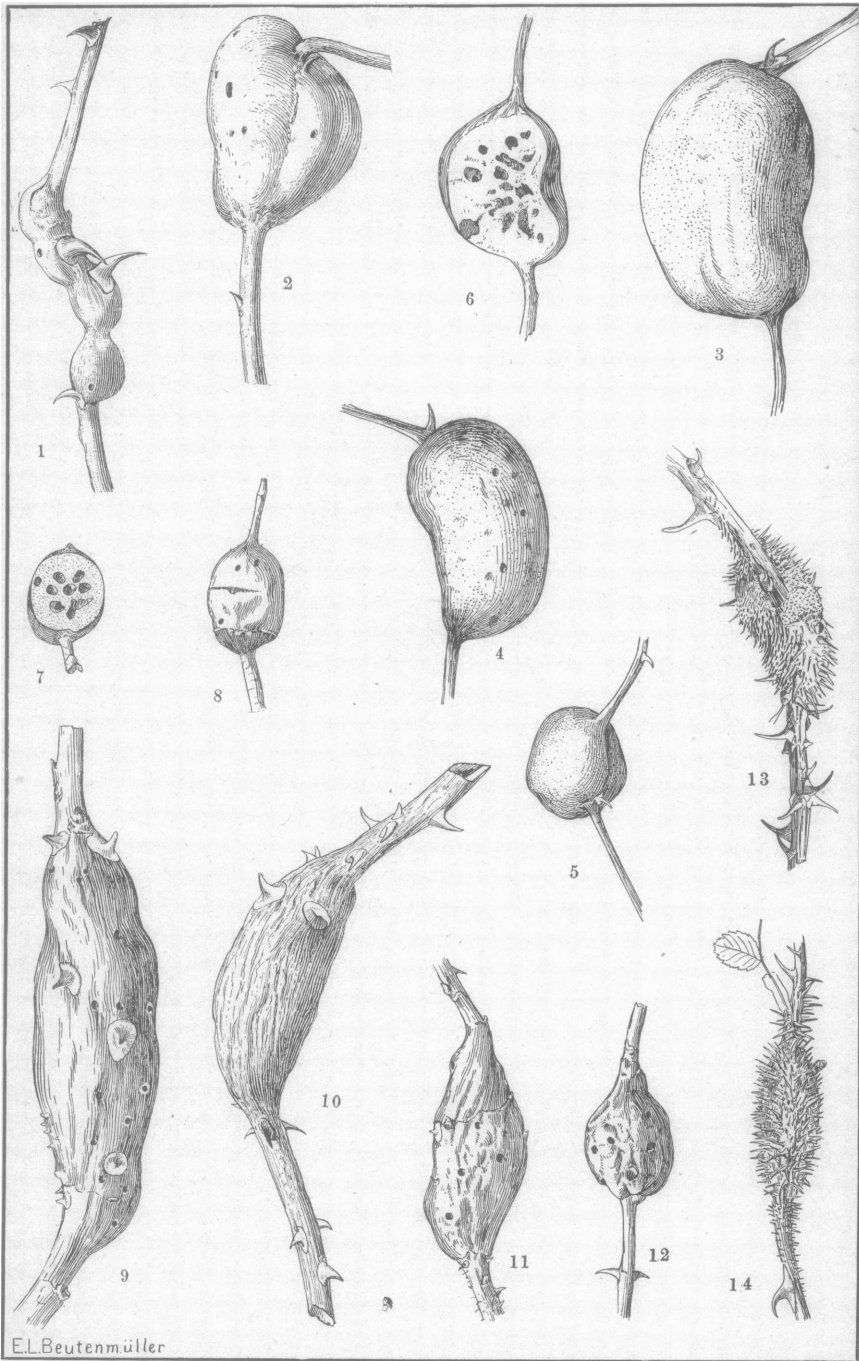
- Fig. 1. *Rhodites multispinosus* Gillette (type).
Figs. 2-4. *Rhodites fulgens* Gillette.
Figs. 5-9. *Rhodites variabilis* Bassett.
Figs. 10-12. *Rhodites fusiformans* Ashmead.
Fig. 13. *Rhodites rosæfolii* Cockerell.

PLATE XLVII.

- Figs. 1-3. *Rhodites nebulosus* Bassett.
Fig. 4. *Rhodites gracilis* Ashmead.
Fig. 5. *Rhodites lenticularis* Bassett.
Fig. 6. *Rhodites utahensis* Bassett.
Figs. 7-8. *Rhodites radicum* Osten Sacken.

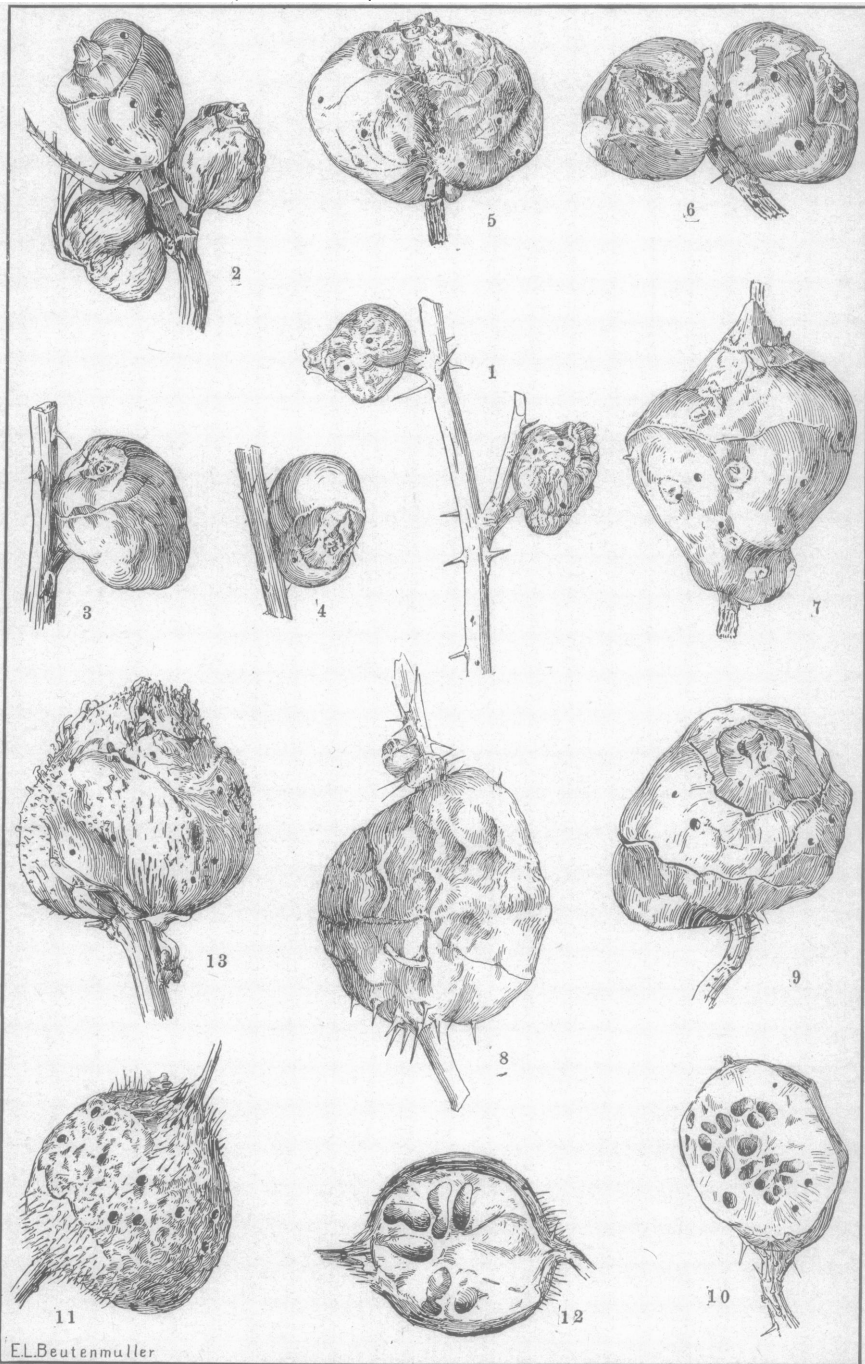


NORTH AMERICAN ROSE-GALLS.

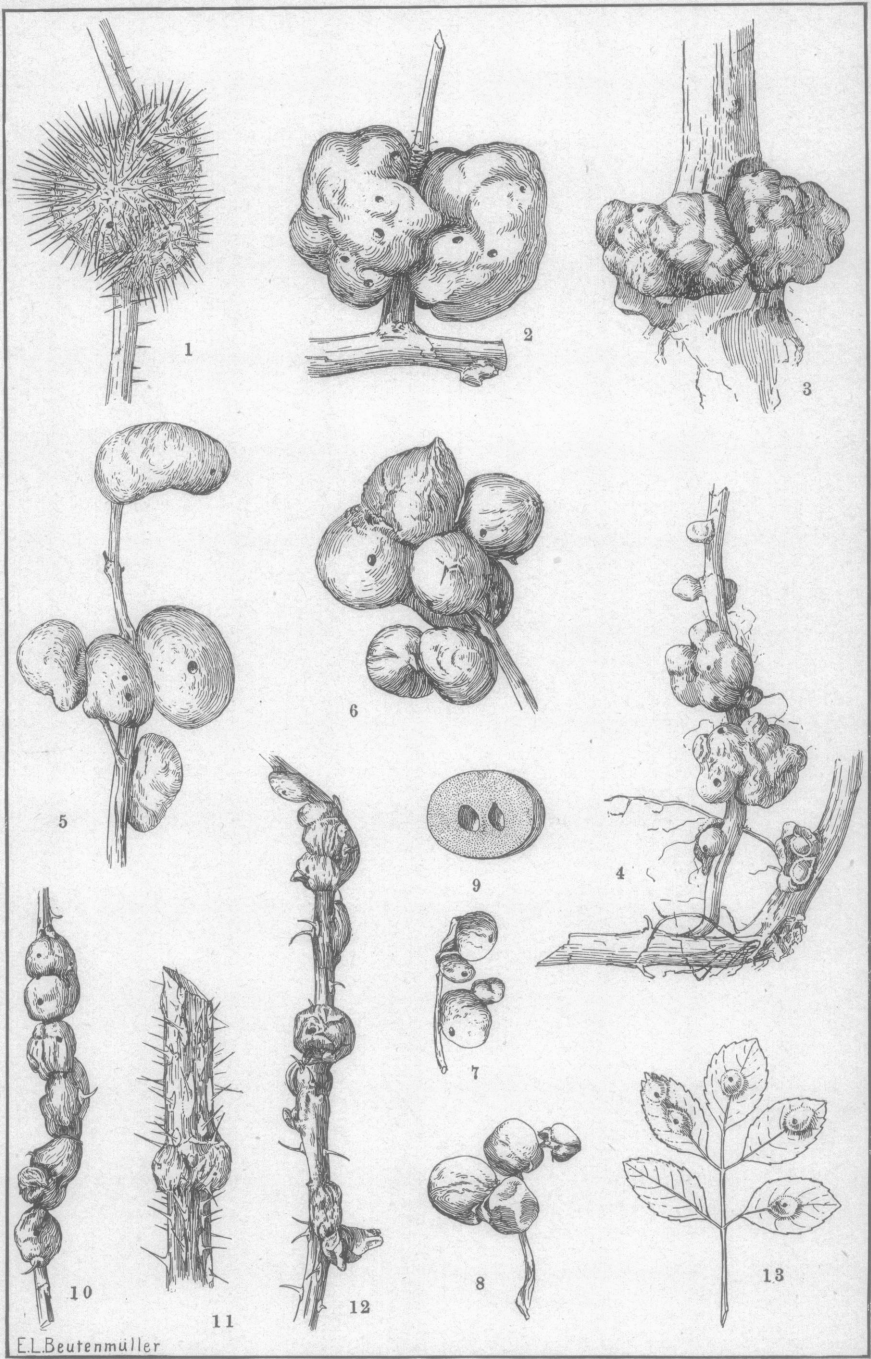


E.L. Beutenmüller

NORTH AMERICAN ROSE-GALLS.

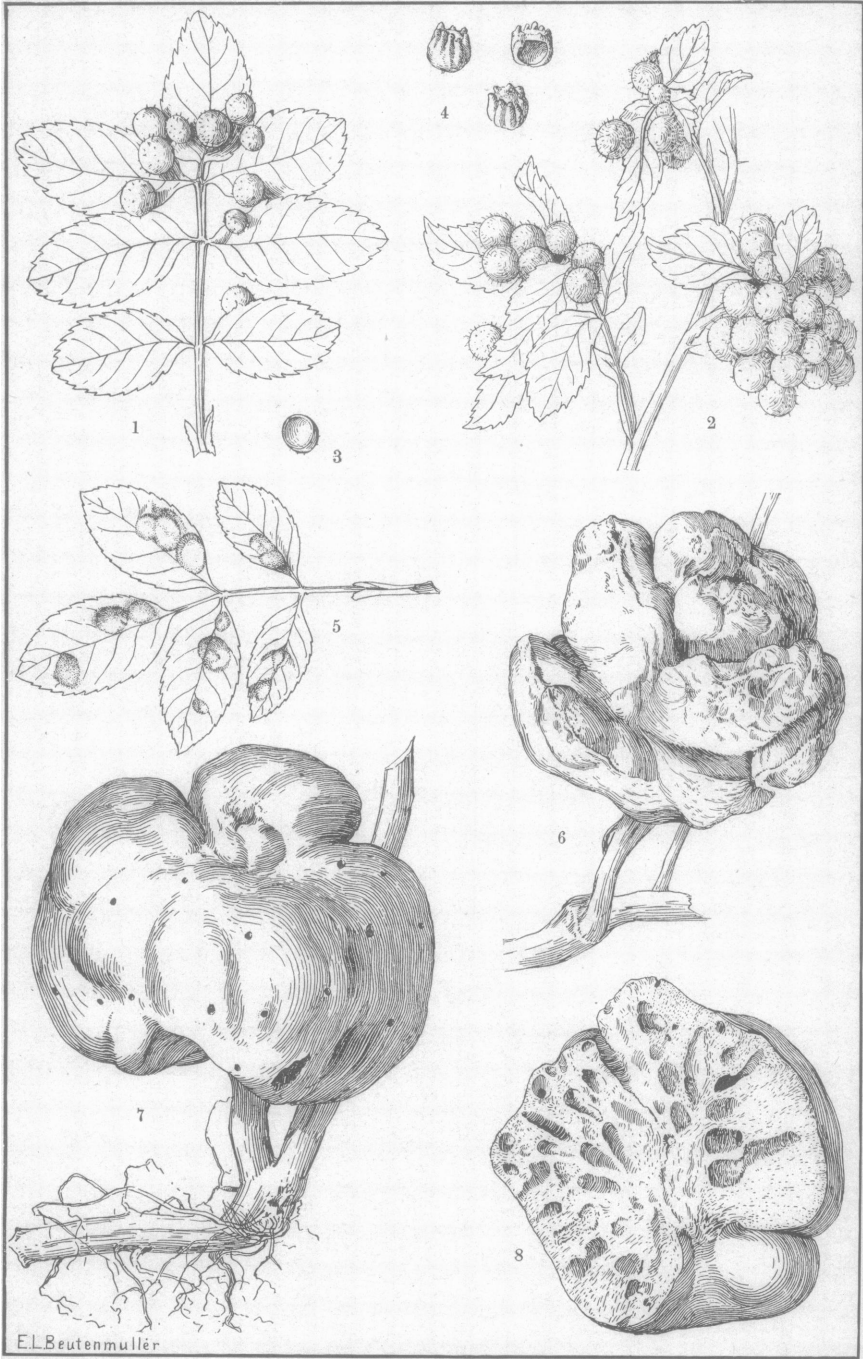


NORTH AMERICAN ROSE-GALLS.



E.L. Beutenmüller

NORTH AMERICAN ROSE-GALLS.



NORTH AMERICAN ROSE-GALLS.

