

**Article X.—THE NORTH AMERICAN SPECIES OF *NEUROTERUS*
AND THEIR GALLS.**

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PLATES VIII–XIII.

The present paper constitutes the seventh installment of a series of papers on North American Cynipidæ and their galls which have been published by me in the Bulletin of the American Museum of Natural History.

***Neuroterus* Hartig.**

Neuroterus HARTIG, Zeitsch. für Ent., Vol. II, 1840, p. 185. MAYR, Gen. Gallenb. Cynip., 1881, p. 37; CRESSON, Synop. Hymen. N. Am., pt. I, 1887, p. 27; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 50; ASHMEAD, Psyche, Vol. X, 1903, p. 151.

Spathogaster HARTIG, Zeitsch. für Ent., Vol. II, 1840, p. 186; MAYR, Gen. Gallenb. Cynip., 1881, p. 37; ASHMEAD, Psyche, Vol. X, 1903, p. 51.

Ameristus FÖRSTER, Verh. Zool.-Bot. Gesell. Wien, Vol. XIX, 1869, p. 333; Zool. Record, 1869, p. 322; MAYR, Gen. Gallenb. Cynip., 1881, p. 37.

Manderstjerna RADOSZKOWSKI, Bull. Soc. Nat. Moscow, Vol. XXXIX, 1886, p. 304; MAYR, Gen. Gallenb. Cynip., 1881, p. 37.

Dolichostrophus ASHMEAD, Trans. Am. Ent. Soc. Vol. XIV, 1887, p. 129; Psyche, Vol. X, 1903, p. 151; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 37.

Head, thorax and scutellum smooth, polished or microscopically cracked. Thorax without grooves or with scarcely evident parapsidal grooves. Scutellum well rounded posteriorly and with a distinct, broad, transverse groove at the base. Antennæ 13–14-jointed in the female, 14–15-jointed in the male. First and second joints short and stout, third joint very long and slender, remaining joints gradually becoming shorter. Abdomen large and subpetiolate in the female, small and with a long petiole in the male. Wings of the male very long, usually shorter in the female. Radial area long and narrow, open or closed at the margin. Areolet large and distinct. Cubitus extending to or nearly to the first cross-vein. Legs smooth, delicate. Claws simple or toothed.

Type: Neuroterus politus Hartig.

***Neuroterus batatus* (Fitch).**

Cynips quercus batatus FITCH, 5th Rep. Nox. Ins. N. Y. Trans. N. Y. Agricul. Soc., 1858 (1859), p. 810; THOMAS, Trans. Ill. Hort. Soc., 1878 (1879), p. 198; PACKARD, Bull. 7, U. S. Ent. Com., 1881, p. 39; 5th Rep. U. S. Ent. Com., 1890, p. 111.

Cynips q. batatus OSTEN SACKEN, Ent. Zeit. Stettin, 1861, pp. 410, 414; Proc. Ent. Soc. Phila., Vol. I, 1861, p. 71; PACKARD, 5th Rep. U. S. Ent. Com., 1890, p.

113; BASSETT, Proc. Ent. Soc. Phila., Vol. III, 1864, p. 684; Can. Ent., Vol. IX, 1877, p. 121; Trans. Ent. Soc. Lond., 1873, p. xx.

Cynips batatus OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, pp. 340, 344, 350, 353.

Neuroterus batatus MAYR, Gen. Gallenb. Cynip., 1881, p. 37; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 132; Bull. I, Col. Biol. Assoc., 1890, p. 38; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 262, pl. xiii, fig. 1; Am. Mus. Journ., Vol. IV., 1904, p. 107, fig. 41; Ins. Galls Vicin. N. Y., 1904, p. 21; fig. 41; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 40; BRODIE, Ann. Rep. Forest. Ontario, 1896, p. 117, fig. 3; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 50; FELT, Ins. Affect. Park & Woodl. Trees 1906, p. 624.

Female. Head black, microscopically reticulated, face with a fine thin pubescens, palpi and mouth parts brown. Antennæ 13-jointed, first three joints yellow, the following ones brown. Thorax jet black, shining, microscopically reticulated. Parapsidal grooves wanting. Anterior parallel lines scarcely evident. Scutellum smooth, shining, microscopically reticulated, with a few scattered hairs; foveæ at base wanting; separated from the thorax by a deep smooth groove. Abdomen black, smooth and shining. Legs yellowish brown, femora dark brown in the middle as are also the hind tibiæ. Wings hyaline, veins brown, cross-veins heavy. Areolet large. Length, 2 to 2.25 mm.

Male. Antennæ 14-jointed. Abdomen petiolate. Legs wholly pale yellow. Length, 1.25-2 mm.

Gall. (Plate VIII, Figs. 1-8.) On the terminal twigs of young white oak (*Quercus alba*). Polythalamous, hard, woody, uneven swellings, often resembling a potato in shape. They are usually much longer than broad, and often covered with a glaucous bloom. Green in summer and brown in winter.

Habitat. Canada; New England and Middle States southward; Ohio; Illinois; westward to Colorado.

There are two annual generations of *Neuroterus batatus*. The first brood appears early in May, from galls of the preceding year's growth, and the second brood in June, from green galls. The second brood oviposits in the galls from which they were produced. Mr. Bassett states (Can. Ent., IX, p. 121) that he reared thousands of *Neuroterus batatus* of both generations, for a series of years, and always with the same results. The early summer brood from the leaf galls was always made up of both sexes in nearly equal numbers, while the brood from the late summer galls came out in the spring, just as the leaves began to appear, and were all females.

***Neuroterus noxiosus* (Bassett).**

Cynips noxiosa BASSETT, Can. Ent., Vol. XIII, 1881, p. 108.

Neuroterus noxiosus MAYR, Gen. Gallenb. Cynip., 1881, p. 37; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; GILLETTE, 27th Rep. Agric. Mich. 1888, p. 471; Psyche, Vol. V, 1889, p. 187; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 262; Am. Mus. Journ., Vol. IV, 1904, p. 107, fig. 42; Ins. Galls Vicin.

N. Y., 1904, p. 21, fig. 42; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 44; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51; FELT, Ins. Aff. Pk. & Woodl. Trees, 1906, p. 624.

Neuroterus noxia ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, p. 132.

Female. Head black, finely and evenly punctate, mouth part yellowish. Antennæ 13-jointed, first to sixth joints pale yellowish-brown, remaining joints dark brown. Thorax black, shining, apparently smooth, but under a high power lens, showing a fine crackled surface. Parapsidal grooves wanting. Scutellum black, microscopically wrinkled, with a curved groove at the base. Abdomen black, smooth and shining. Legs dark brown, joints and tarsi yellowish. Wings hyaline, veins dark brown and distinct. Areolet small, but sharply defined. Cubitus extending to the first cross-vein. Length, 1.25 to 1.50 mm.

Male. Somewhat paler than the female. Antennæ 14-jointed, third joint curved. Abdomen petiolate. Legs wholly yellowish brown. Length 1 to 1.25 mm.

Gall. Winter form. (Plate IX, Figs. 1-7). On the terminal twigs of swamp white oak (*Quercus platanooides*). Polythalamous. Hard and woody swellings varying greatly in shape and size, but usually tuber-like. Internally there are numerous larval cells. Length, 5 to 100 mm. Width, 4 to 25 mm.

Vernal form. (Plate IX, Fig. 8). The gall is an enormous development of the mid-rib on the petiole of the leaves. It is green, succulent and irregular in shape. The blade of the leaf becomes dwarfed and curled, and after the galls mature the leaf becomes shriveled and dried.

Habitat. New England and Middle States westward to Iowa.

This species is double brooded, the first brood appearing in May from the large woody galls of the previous year's growth, and the second brood in June from galls formed on the leaves and tender twigs.

Neuroterus consimilis Bassett.

Neuroterus consimilis BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 335; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 50.

Male. Head black, shining, broader than the thorax. Antennæ 15-jointed, longer than the body, dull brown. Thorax black, microscopically punctate. Parapsidal grooves reduced to two short lines, at the scutellum. Scutellum small, black, punctate, groove at base broad and shining in the middle, abdomen small, black. Legs: Anterior and middle pairs uniform dull yellowish brown, posterior pair nearly black with the joints yellowish brown. Wings hyaline, veins dark and well-defined. Areolet small. Radial area open. Length, 1.50 mm.

Female. Black. Parapsidal grooves wanting. Transverse groove at base of scutellum rather broad, shining and smooth. Abdomen large, with the terminal segments retracted within the first which is wide and deep. Posterior legs darker than in the male. Length, 2 mm.

Gall. (Plate X, Fig. 3.) On the young terminal twigs of white oak (*Quercus alba*) in midsummer. Polythalamous. Hard and woody, irregularly rounded with aborted buds and leaves. It is a greatly fore-shortened and enlarged branchlet and measures from about 4 to 12 mm. in diameter.

Habitat. Connecticut (Waterbury).

The figure of the gall was made from one of the type specimens.

Neuroterus obtusilobæ (Karsch).

Diplolepis q. obtusilobæ KARSCH, Zeitsch. Gesammt. Naturwiss. Berlin, Vol. V, 1880, p. 292, figs. 3, 3a-b.

Neuroterus obtusilobæ DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Body almost smooth, brown-black, the antennæ and legs pale brownish yellow. Thorax nearly without gloss, wrinkled, and almost without sculpture. Scutellum not large. Abdomen shining, smooth. Antennæ 13-14-jointed, slightly thickened at the tip. Areolet of the wing closed. Length, 2 mm.; expanse 5 mm.

Gall. (Plate XIII, Fig. 8.) On the tip of the twigs of post oak (*Quercus minor*). Polythalamous. Irregularly rounded or ovate with aborted leaves. Hard and woody with gray brown tint. Inside are many larval chambers.

Habitat. Dallas, Texas.

This species is not known to me and the types should be in the Berlin Museum. The figure of the gall on Plate XIII is a copy of Karsch's illustration.

Neuroterus rileyi (Bassett).

— RILEY, Am. Ent., Vol. III, 1880, p. 153, fig. 56.

Cynips q. rileyi BASSETT, Am. Nat., Vol. XV, 1881, p. 149.

Neuroterus rileyi MAYR, Gen. Gallenb. Cynip., 1881, p. 37; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 132; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 46; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51; COOK, Proc. Iowa Acad. Sci., 1904, p. 225; 29th Rep. Dept. Geol. & Nat. Hist. Indiana, 1904 (1905), p. 837, fig. 30.

Cynips (Neuroterus) rileyi PACKARD, 5th Rep. U. S. Ent. Com. 1890, p. 114.

Female. Head black, smooth and shining, mandibles yellowish, tips black. Antennæ short, 13-jointed, joints one and two dark amber, third yellowish brown, remaining ones dusky yellowish brown. Thorax small, minutely crackled, shining, with a few pale hairs. Scutellum smooth, rounded with a broad groove at the base. Wings small, hyaline, veins heavy, dark brown. Areolet large and well defined. Radial area long and open. Abdomen subpedicellate, smooth, black and shining. Legs dark brown with pale yellowish joints. Length, 2.75 mm.

Gall. (Plate XI, Fig. 11). On the branches of young chestnut oak (*Quercus prinus*). Abrupt, irregular swellings varying in size and form from round, pustule-like bodies 4 mm. in diameter to a confluent mass of galls about 25 mm. in length and 12 mm. in diameter, containing many larvæ. The larger ones sometimes nearly or quite encircle the twig. They are covered with the bark of the branch and internally they are of a dense cork-like substance. When old and dry they are hard and woody.

Habitat. Ohio; Illinois; Indiana; Missouri; Iowa.

***Neuroterus niger* Gillette.**

Neuroterus nigrum GILLETTE, 27th Rep. Agric. Mich., 1888, p. 475, fig. 5; Psyche, Vol. V, 1889, p. 218, fig. 5; Proc. Iowa Acad. Sci., 1887-89 (1890), p. 56; *ibid.*, Vol. I, pt. II, 1892, p. 114.

Neuroterus niger DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Neuroterus perminimus BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 332; DALLA TORRE and KIEFFER, Ins. Gen. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head, thorax and abdomen very dark, almost black. Antennæ 13-jointed, brown. Parapsidal grooves wanting. Thorax notched posteriorly. Scutellum large, broadly rounded posteriorly and without foveæ. Legs brown, joints and tarsi pale. Wings hyaline, veins brown. Areolet distinct. Radial area long, narrow, closed. Length, 1 mm.

Male. Head dark brown. Thorax polished, dark brown. Abdomen reddish brown, very minute and petiolate. Legs pale, semi-translucent. Length .75 mm.

Gall. (Plate X, Fig. 1.) In numbers imbedded in the soft parts of the leaf of burr oak (*Quercus macrocarpa*) and white oak (*Quercus alba*). Monothalamous. Rounded or blister-like bodies protruding on both sides of the leaf, but somewhat more distinctly on the upper side; on the under side it has a minute nipple. Diameter 1-1.75 mm.

Habitat. Michigan; Ohio; Iowa; Indiana; Illinois; New York; New Jersey; Pennsylvania.

The types of *N. niger* are with Prof. Gillette and in the Agricultural College at Ames, Iowa. The latter were sent to me for examination by Prof. Summers. I fail to find any differences between the flies and galls of *N. niger* and *N. perminimus*, and I consider them one and the same species. The galls of *N. niger* occur on burr oak (*Q. macrocarpa*) and those of *N. perminimus* on white oak (*Q. alba*). The species is double brooded, the first brood emerges early in spring from galls of the previous year's growth, and the second brood appears during the latter part of June and early in July from galls formed by the first brood in May and June. The galls of the latter reach maturity late in August and in September.

***Neuroterus papillosus* sp. nov.**

Female. Head broader than the thorax, pitchy brown, shining, mouth parts paler, microscopically crackled, with a few scattered, whitish hairs. Antennæ 13-jointed, pitchy brown, slightly paler basally, and with minute hairs, first and second joints stout, second joint very stout, third and fourth joints long and slender, remaining joints shorter and rather stout. Thorax pitchy brown or almost black, microscopically crackled, shining, and deeply excavated at the hind margin. Scutellum rather large, well rounded posteriorly, shining, pitchy brown or black, with a few hairs. Abdomen similarly colored, smooth. Legs pale, yellowish, pellucid. Wings hyaline, hairy, veins brown. Areolet minute, but distinct. Length .75 mm.

Male. Head and body paler than the female, more rufous. Antennæ more yellowish brown, as are also the legs. Length, .75 mm.

Gall. (Plate X, Fig. 2.) In numbers on the leaves of swamp white oak (*Quercus platanoidea* in June. Monothalamous. Elongate oval, blister-like bodies protruding on both sides of the leaf, and without a nipple on the under side. Length about 1 mm.; width about .75 mm.

Habitat. Bronx Park, New York City.

The gall is somewhat similar to that of *N. niger*, but is smaller, and lacks the nipple on the under side. The flies emerge during June and early in July, from galls produced in May. The species is undoubtedly double brooded.

***Neuroterus howertoni* Bassett.**

Neuroterus howertoni BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 90.

Neuroterus howertonii DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 42; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head black or rufous. Antennæ 14-jointed, first joint long, club-shaped, second joint shorter and very stout, third joint long and slender, remaining ones short. All yellowish brown. Thorax, scutellum and abdomen black or rufous, smooth, shining. Legs pale yellowish, middle of tibiae and femora dark brown. Wings hyaline, veins brown. Areolet large. Length, about .75 mm.

Gall. (Plate XI, Fig. 6.) On the under side of the leaves of a species of live oak (*Quercus* sp.). Monothalamous. Rounded, thin-walled cells imbedded in the leaf and covered with a brown pubescence like the rest of the leaf. They occur in numbers upon the leaf and are usually not crowded. On the upper side of the leaf they are slightly less elevated and appear as pustules. Diameter about .50 mm.

Habitat. New Mexico.

Bassett described this species as being black in color, but a specimen I cut from one of the type galls is decidedly rufous. It is one of the smallest known species of *Neuroterus*.

***Neuroterus verrucarum* (Osten Sacken).**

Cynips quercus verrucarum OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. 1, 1861, p. 62.

Cynips q. verrucarum OSTEN SACKEN, Ent. Zeit. Stettin, 1861, pp. 409, 412.

Cynips verrucarum OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, pp. 340, 344, 348, 355.

Neuroterus verrucarum ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, pp. 128, 135; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 47; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Black, shining, mouth parts reddish, antennæ 13-jointed, somewhat incrassated towards the tip, brownish, sometimes brownish black, pale towards the base, especially at the tip of the first two and at the joint. Thorax shining, smooth, not punctate, without any grooves. Abdomen and scutellum black and smooth.

Legs yellowish at the joints; Base of coxæ, middle of femora and tibiæ brown, almost black, tarsi yellow. Wings hyaline, veins brown and thick, second cross-vein curved, almost angular. Areolet rather large and distinct. Cubitus slender, almost obsolete at the first cross-vein. Length, .75–1.25 mm.

Gall. (Plate XI, Fig. 5.) In numbers on the under sides of the leaves of post oak (*Quercus minor*) during August and September. Small, wart-like excrescences, densely covered with white crystal-like pubescence. The gall itself is hemispherical with a flat base, and is attached to the leaf by a minute point. Width, 1.50 to 2.25 mm.

Habitat. New York; New Jersey; Washington, D. C., south to Florida.

***Neuroterus minutissimus* (Ashmead).**

Cynips q. minutissima ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. vii.

Neuroterus minutissimus ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 128; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 44; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Black, smooth and shining, but showing faint delicate reticulations under a high power lens. Antennæ 14-jointed, yellowish brown, third joint longest. Legs yellowish brown, femora infuscated along the upper surface. Wings hyaline, veins yellowish, radial area open, the tip of subcostal just touches the outer edge, but is not thickened along the edge, radial vein reaches the outer margin. Areolet obliterated. Abdomen black, shining, triangular in outline with prominent, ovipositor sheaths. Length, 1 to 1.25 mm.

Gall. (Plate XI, Fig. 4.) On the under sides of the leaves of live oak (*Quercus virginiana*). Monothalamous. Globular and about the size of the head of an insect pin. Attached by a minute point to the leaf and densely covered with coarse, brown, moss-like wool. Diameter, 1.25 to 2.50 mm.

Habitat. Florida.

The gall very much resembles externally that of *N. verrucarum*. It occurs in numbers on the same leaf.

***Neuroterus floccosus* (Bassett).**

Cynips floccosa BASSETT, Can. Ent., Vol. XIII, 1881, p. 111.

Neuroterus floccosus MAYR, Gen. Gallenb. Cynip., 1881, p. 37; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 128; Bull. Col. Biol. Assoc., 1890, p. 38; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 262, pl. xii, fig. 2; Am. Mus. Journ., Vol. IV, 1904, p. 108, fig. 43; Ins. Galls Vicin. N. Y., 1904, p. 22, fig. 43; GILLETTE, Proc. Iowa Acad. Sci., Vol. I, 1892, p. 114; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 41; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51; JARVIS, 37th Rep. Ent. Soc. Ont., 1906 (1907), p. 71.

Neuroterus exiguiissima BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 332.

Neuroterus exiguiissimus DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head, thorax and abdomen shining black. Antennæ 13-jointed, first and second joint stout, third longer than the two preceding ones and very slender, remaining joints also slender, but slightly increasing in thickness towards the last; color pale, dusky yellowish brown. Thorax entirely smooth and without grooves. Scutellum smooth, with a curved groove at the base. Abdomen smooth. Legs dark brown, joints and tarsi pale. Wings hyaline, pubescent, veins rather heavy, brown, cubitus very delicate and almost colorless. Areolet large. Length, 75 to 1.50 mm.

Gall. (Plate XI, Figs. 1, 2, 3.) On the under side of the leaves of swamp white oak (*Quercus platanoïdes*) and white oak (*Quercus alba*) in autumn. When mature the gall consist of a rounded cell imbedded in the leaf and thickly covered with whitish wool (fig. 1), showing on the upper side (fig. 2) by a raised, smooth, blister-like projection. Sometimes the galls are confluent and almost cover the entire under surface of the leaf, causing the same to curl and become distorted. When old and dry the wool becomes tawny brown. Diameter, 1.50 to 3.50 mm.

Habitat. Canada; New England and Middle States; Ohio; Illinois; Iowa; Colorado (?).

A common species and often nearly all the late terminal leaves of young oaks are covered with the galls. The galls of *Neuroterus exiguissimus* Bassett occur on white oak and they are identical with those of *N. floccosus* which are found on swamp white oak (*Q. platanoïdes*). I also find the flies of *exiguissimus* to be the same as those of *N. floccosus*.

***Neuroterus umbilicatus* Bassett.**

Neuroterus umbilicatus (BASSETT MS.) BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 263; Am. Mus. Journ., Vol. IV, 1904, p. 108, fig. 44; Ins. Galls Vicin. N. Y., 1904, p. 22, fig. 44 (gall only).

Neuroterus umbilicatus BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 330; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51; FELT, Ins. Aff. Pk. & Woodl. Trees, 1906, p. 627; JARVIS, 37th Rep. Ent. Soc. Ont., 1906 (1907), p. 72; *ibid.*, 38th Rep. 1907 (1908), pl. B, fig. 6.

Female. Head black, smooth. Antennæ 13-jointed, rather short and slender, terminal joints thickened, somewhat club-shaped. Thorax black, polished, without hairs or grooves. Scutellum small, black, without foveæ. Abdomen black, legs clear, dark, shining brown, sometimes nearly black, with the joints paler. Wings hairy, veins pale, first cross-vein dark brown. Areolet small but distinct. Cubitus slender, equal throughout and reaching quite to the first cross-vein. Length, 1.50 mm.

Gall. (Plate XIII, Fig. 7.) In great numbers on the underside of the leaves of swamp white oak (*Quercus platanoïdes*) in August and September. Monothalamous. Small, circular, flattened and concave, with a minute conical elevation in the centre of the concavity. Beneath the conical elevation lies the minute larval cell. Brown and covered with minute hairs. The galls are easily detached, but leave an indentation which is seen as a flattened elevation on the upper side of the leaf. Diameter, 1 to 1.50 mm.

Habitat. Canada (Ontario); Connecticut; New York; New Jersey; Pennsylvania; Illinois.

***Neuroterus saltatorius* (Hy. Edwards).**

Cynips saltatorius HY. EDWARDS, Pacific Rural Press, 1874, p. (?); RILEY, Am. Nat., Vol. X, 1876, p. 218; Trans. St. Louis Acad. Sci., Vol. III, 1878, p. exci; Proc. U. S. Nat. Mus., Vol. V, 1883, p. 634; Ann. Mag. Nat. Hist., 5th ser., 1883, p. 142.

Cynips saltitans DODGE, Field and Forest, Vol. II, 1876, p. 56, fig.

Neuroterus saltatorius ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, p. 128; LINTNER, 7th Rep. Inj. Ins. N. Y., 1891, p. 309; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 46; HOWARD, Bull. 54, Bur. Ent., 1905, p. 81.

Female. Head pitchy brown black, subopaque, microscopically but distinctly crackled. Antennæ 13-jointed, all the joints rather stout. Thorax pitchy brown, smooth and polished, posterior margin slightly notched. Abdomen blackish, polished. Legs reddish brown. Wings hyaline. Length, .75 mm.

Gall. (Plate XI, Fig. 12.) On the under side of the leaves of a species of white oak (*Quercus undulatus*). Rounded, almost globular, attached by a flattened base to the surface of the leaf, apex with a slight point. It is microscopically granulated, thin-shelled, and becomes easily detached. No larval cell. Diameter, .75-1 mm.

Habitat. California (Marysville, Yuba Co.).

The article on jumping-galls published by Hy. Edwards in the 'Pacific Rural Press' is not accessible to me and I do not know whether the perfect insect was described. The above description of the gall-fly was made from specimens cut from the type galls. The species has also been recorded from New York, New Jersey, Ohio, Indiana, Missouri and Michigan, occurring on burr oak (*Quercus macrocarpa*), white oak (*Q. alba*), and post oak (*Q. minor*). I believe the latter belongs to another species. The true *saltatorius* is from California.

***Neuroterus cockerelli* sp. nov.**

Female. Head, thorax and scutellum black, shining and microscopically crackled and wrinkled, more distinctly so at the sides of the head and thorax. Antennæ 13-jointed, slender, first, second and third joints pale yellowish, remaining joints dusky brown. Thorax without grooves. Scutellum with a broad transverse groove at the base. Abdomen shining, smooth, pitchy brown black or wholly black. Legs: Femora and tibiæ dark brown, joints pale, coxæ and tarsi pale yellowish. Claws black. Wings hyaline, veins distinct, brown. Areolet large. Cubitus reaching the first cross-vein. Length, 1.25 to 1.75 mm.

Gall. (Plate XI, Fig. 10.) On the leaves of a species of oak. Hemispherical or subhemispherical, pale brown, minutely crackled, hard and flattened at the base. Width, 4 mm.; height, 2.50 mm.

Habitat. Manitou, Colorado (T. D. A. Cockerell).

***Neuroterus longipennis* Ashmead.**

Neuroterus longipennis ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, pp. 132, 140; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 43; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Black, smooth and shining. Antennæ and legs yellowish. Thorax smooth and without grooves, although in certain lights there are opaque lines. Scutellum swollen, finely rugoso-punctate. Abdomen very small, black and shining. Wings hyaline, very long, radial area open, large and long. Areolet distinct. Cubital cell closed, cubitus being long and pale. Length, 1-1.25 mm.

Gall. (Plate XII, Fig. 11.) On the petiole of the leaf or surrounding the base of new shoots of laurel oak (*Quercus laurifolia*), in May. Small, oblong, irregular, woody swellings, measuring from 8 to 9 mm. in length and 3.50 to 4 mm. in diameter.

Habitat. Florida.

***Neuroterus tectus* Bassett.**

Neuroterus tectus BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 331; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head black, microscopically crackled and with a distinct facial ridge, mouth parts pale yellowish. Antennæ 13-jointed, rather stout, dark brown, pale at the base. Thorax, scutellum and abdomen black or dark brown, smooth and shining. Legs translucent brown, joints and tarsi pale. Wings hyaline, veins distinct but not heavy. Areolet large. Cubitus reaching the first cross-vein. Length, .75 to 1 mm.

Male. Color as in the female. Antennæ 14-jointed, somewhat paler. Abdomen petiolate.

Gall. (Plate XII, Figs. 1, 2.) On the small twigs of dwarf chestnut oak (*Quercus prinoides*) in May and June. The gall is very conspicuous and is in shape of an enlargement of the base of the young branchlet. In some cases the galls hardly increase the size of the branch or interfere with its growth while in others it entirely checks its extension.

Habitat. Connecticut; New York; New Jersey; Pennsylvania.

***Neuroterus virgens* Gillette.**

Neuroterus virgens GILLETTE, Ent. News, Vol. IV, 1893, p. 166; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 52.

Male. "Head black, and shining; under a power of seventy-five diameters the surface has a finely crackled or scaled appearance as has also the mesothorax; ocelli medium size, face with a median ridge; antennæ 13-jointed, gradually thickened to the tip, first three joints yellowish, third joint longest, first and second joints much thickened; mandibles reddish, but black at the tips; mesothorax shining without parapsidal grooves, broadly notched at the base of the scutellum; scutellum with shallow groove at base, the surface appearance the same as that of the thorax and head. Wings a little longer than the entire body, radial nervure long and narrow, areolet medium size, radial nervure reaching or nearly reaching the costal margin. Feet with tarsi yellowish brown, tibiæ usually of the same color, but in some cases almost black, femora blackish in the middle and sometimes almost entirely black, coxæ always black at the base, but light at the tip. Length, 1.50 to 2 mm." (C. P. Gillette.)

Gall. "This species can hardly be said to produce a gall. The cells of the flies were found in the spring of the year in twigs of last summer's growth. The twigs are usually slightly swollen where the cells occur, but not enough to attract

attention. I should not have noticed them at all had I not seen dead twigs with numerous small punctures in them, from which flies had escaped during previous years." (C. P. Gillette.)

Habitat. Manitou, Colorado; May 8.

This species is not known to me and the types are with Prof. Gillette. The gall undoubtedly occurs on oak.

***Neuroterus minutus* (Bassett).**

Cynips minuta BASSETT, Can. Ent., Vol. XIII, 1881, p. 96.

Neuroterus minutus MAYR, Gen. Gallenb. Cynip., 1881, p. 37; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 131; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 44; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Male. Very pale, semi-translucent, yellowish brown, with the top of the thorax darker and in some specimens showing three longitudinal pale yellowish bands. Eyes and ocelli black. Antennæ 14-jointed, first three joints very pale, remaining ones dusky. Abdomen dark brown, petiole pale, yellowish. Scutellum small, smooth and shining. Legs very pale, claws dark brown. Wings hyaline with a slight smoky tinge, veins distinct. Areolet distinct. Length, .75 to 1.50 mm..

Female. Head, thorax and abdomen dark brown. Antennæ 13-jointed, color as in the male. Length, .75 to 1 mm.

Gall. (Plate XII, Figs. 3, 4, 5.) On the petiole and midrib of the leaves of white oak (*Quercus alba*) very early in spring when the leaves begin to expand. They occur in clusters and stunt the growth of the leaves. The gall itself is composed of a number of cells in the leaf and is covered with a pinkish pubescence.

Habitat. Connecticut; New York; New Jersey; Pennsylvania.

***Neuroterus distortus* Bassett.**

Neuroterus distortus BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 336; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head black or pitchy brown, face very broad with a distinct median ridge. Eyes black opaque. Antennæ 13-jointed, brown, paler basally. Thorax pitchy brown or black, very glossy, high and smooth, and without grooves. Scutellum large, well rounded and separated from the thorax by a deep shining groove. Abdomen brown or black, smooth and shining. Legs clear pale yellowish brown, semi-transparent, femora slightly darker in the middle. Wings hyaline, slightly dusky, veins brown and distinct. Areolet large. Length 1 to 1.50 mm.

Male. Similar to the female in color. Antennæ 14-jointed. Abdomen distinctly petiolate. Length, 1-1.50 mm.

Gall. (Plate XII, Fig. 6.) On the tips of young branchlets of swamp white oak (*Quercus platanooides*) in May. Polythalamous. The gall consists of oval or rounded chambers in the bud or on the very young leaves which are often curled and distorted. The tip of the twig becomes dwarfed in length and turned to one side. The galls are very inconspicuous and would escape notice were it not for the rosette-like cluster of leaves surrounding them. The capsules measure about .50 mm. The figure of the gall on Plate XII, is enlarged.

Habitat. Connecticut; New York; New Jersey.

***Neuroterus pallipes* Bassett.**

Neuroterus pallipes BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 89.

Neuroterus bassetti DALLA TORRE, Wien. Ent. Zeit., Vol. XI, 1892, p. 131; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 40.

Neuroterus pallidipes DALLA TORRE, Wien. Ent. Zeit., Vol. XI, 1892, p. 131; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head black and shining. Antennæ 13-jointed, pale brown at the base, growing dusky toward the tips. Thorax smooth, shining. Scutellum smooth with a transverse groove at the base. Abdomen black. Legs almost colorless. Wings hyaline, veins distinct, but not heavy. Areolet large, bounded by slender veins. Cubitus reaching the first cross-vein. Length, 1.25 mm.

Male. Color of the female. Legs brown or brownish in the middle of the tibiæ and femora. Abdomen petiolate. Length, 1.25 mm.

Gall. (Plate XII, Fig. 10.) On the midrib or principal veins of the leaves of white oak (*Quercus alba*) in May. Monothalamous. Small, oval, thin-walled swellings covered with a dense brownish pubescence. The affected leaves become distorted and dwarfed.

Habitat. Massachusetts; New York; New Jersey.

Dalla Torre erroneously states that Bassett described this species as *Neuroterus pallidipes* and that the name was preoccupied by *Neuroterus pallidipes* Schenck (Jahrb. Ver. Naturk. Nassau, Heft, 17-18, 1862-63, p. 194). Neither of these authors described a species under this name, but both did describe a *Neuroterus pallipes*. I have retained Bassett's name because Schenck's species appears to be an *Andricus*.

***Neuroterus vernus* Gillette.**

Neuroterus vernus GILLETTE, Bull. 7, Iowa Agricul. Exp. Sta., 1889, p. 281; Ent. Am., Vol. VI, 1890, p. 22; Proc. Iowa Acad. Sci., Vol. I, pt. II, 1892, p. 114; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 47; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head black, apparently smooth, mouth parts brown, tip of palpi black. Antennæ 13-jointed, first and second joints short and stout, third joint very long, remaining joints short, joints one to three pale, remaining ones dusky brown. Thorax polished, black, mesothorax notched posteriorly. Scutellum smooth, with a groove at the base. Abdomen black. Legs brown, joints pale. Claws black. Wings hyaline, veins very pale. Areolet large. Cubitus continuous to the first cross-vein. Length, 1 to 1.30 mm.

Gall. (Plate XII, Figs. 8, 9.) In numbers on young leaves or catkins of burr oak (*Quercus macrocarpa*) in May and June. The galls are enlargements of the petiole, midrib or soft parts of the leaves, dwarfing and deforming them. When on the catkins, these become much enlarged and irregularly swollen, and remain green upon the tree until the flies within have completed their growth.

Habitat. Iowa.

According to Prof. C. P. Gillette the eggs are deposited early in April and the galls resulting from the eggs deposited at this time begin to give a second brood of flies May 16. The second brood of flies bred from June galls by Prof. Gillette differs from those of the first brood by having more light colored parts. The base of the mandibles, first three or four joints of the antennæ and feet are distinctly lighter colored. In some cases the anterior tibiæ and the greater part of the anterior femora are distinctly whitish, and the antennæ are distinctly 13-jointed. The male is unknown. The figures of the galls on Plate XII were made from type specimens sent to me by Prof. Gillette. Figure 8 is much enlarged.

***Neuroterus pallidus* Bassett.**

Neuroterus pallidus BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 88; BEUTENMÜLLER, Am. Mus. Journ., Vol. IV, 1904, p. 107, fig. 40; Ins. Galls Vicin. N. Y., 1904, p. 21, fig. 40; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 45; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head: Vertex and posterior portion varying from dark brown to almost black, face pale yellowish brown. Antennæ 13-jointed, pale yellowish basally, gradually changing to brown. Thorax notched posteriorly, dark brown, smooth and shining, sides pale brown. Scutellum brown, smooth and shining, with long, transverse groove at the base. Abdomen rather large, black or almost black, smooth and shining. Legs pale, translucent, yellowish, claws black. Wings hyaline, veins dark brown. Areolet large. Cubitus rather delicate and almost reaching the first cross-vein. Radial area open. Length, .75 to 1 mm.

Male. Head pale yellowish brown, eyes and ocelli black. Antennæ 14-jointed, pale yellowish basally, dusky terminally. Thorax pale brown with two yellowish longitudinal lines. Pleuræ and legs wholly pale yellowish brown, claws dark. Abdomen pale brown dorsally, paler beneath, petiole short. Length, .75 to 1 mm.

Gall. (Plate XII, Fig. 7.) In dense clusters at or near the ends of the aments of swamp white oak (*Quercus platanooides*), early in spring. Monothalamous. Round, smooth and unevenly globular. Pale faded wood color and of a fine soft cellular consistence. They are fragile and may be easily crushed.

Habitat. New York; New Jersey; Connecticut.

A distinct species readily known by its pale color. The gall is also very characteristic and may be easily known from other species found on the sterile flowers of the oaks.

***Neuroterus exiguus* Bassett.**

Neuroterus exiguus BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 333; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head black, almost smooth, shining. Antennæ 13-jointed, first large, stout, pointed at base, second as broad as the first, remaining joints slender, all semi-

translucent clear yellowish. Thorax black or pitchy brown, smooth, glossy and without grooves. Scutellum black or brown with a few microscopic hairs and an incurved, broad groove at the base. Abdomen black, or pitchy brown and shining. Legs dark brown with the joints paler. Wings hyaline, slightly dusky and pubescent. Radial area open, areolet large. Length, 1.50 mm.

Male. Similar to the female in color. Antennæ 14-jointed, all slender and delicate, except the first and second. Abdomen petiolate. Length 1.50 mm.

Gall. On the flower clusters of post oak (*Quercus minor*) in May. These galls are nodular enlargements but all more or less hidden in the flowerlet. They are very small and succulent and soon shrivel up and disappear after the flies have emerged.

Habitat. Connecticut; New York; New Jersey (Lakehurst).

The adult of this species is closely allied to *N. tectus*.

***Neuroterus laurifoliæ* Ashmead.**

Neuroterus laurifoliæ ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, pp. 128, 140; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 42; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Black, smooth and shining. Antennæ pale yellowish brown. Abdomen large, black and shining, almost globose. Legs pale yellowish with the tibiae and femora more or less infuscated in the middle, black or brown. Wings hyaline, radial area open, very long and narrow. Areolet large. Cubital cell open. Length, about 1.50 mm.

Gall. (Plate XI, Fig. 7, 8.) On the upper or under sides of the leaves of laurel oak (*Quercus laurifolia*). Monothalamous. Small, rounded, kernel-like with the disk flattened and attached to the leaf by a nipple-like point. The gall is covered with long, loose fawn-colored wool. Sometimes several galls occur upon the same leaf and the wool covering these forms a large, loose mass. When dry the galls and wool become readily detached from the leaves. Diameter of kernel 2 to 2.50 mm.

Habitat. Florida; Illinois.

***Neuroterus dubius* Bassett.**

Neuroterus dubia BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 335.

Neuroterus dubius DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head black, vertex microscopically crackled. Antennæ 14-jointed, joints 1 to 4 pale yellowish red. The remaining joints dusky reddish brown; joints one and two equal, third longer, fourth short, remaining ones very short. Thorax high and rounded, scarcely smooth, but shining, with two divergent grooves from the scutellum to the base of the wings. Scutellum finely and evenly rugose, with a broad groove separating it from the thorax. Foveæ wanting. Abdomen shining, black. Legs pale yellowish. Wings dusky hyaline, veins slender. Areolet large. Radial area open. Length, 1.50 mm.

Male. Antennæ 15-jointed, joints one and two shorter than in the female, first at base dark and shining, third joint long, pale brown, remaining joints short and

dark brown, opaque. Head, thorax and scutellum and the petiolate abdomen, black. Legs pale but less so than in the female. Otherwise like the female. Length, 1.50 mm.

Habitat. Connecticut (Waterbury).

The gall of this insect is unknown. The insects were found by H. F. Bassett in a box of galls of *Andricus pruinus*, but no galls appeared from which they seemed to have come.

***Neuroterus vesiculus* (Bassett).**

Cynips vesicula BASSETT, Can. Ent., Vol. XIII, 1881, p. 97.

Cynips affinis BASSETT, Can. Ent., Vol. XIII, 1881, p. 103.

Neuroterus vesicula MAYR, Gen. Gallenb. Cynip., 1881, p. 37; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 131; GILLETTE, 27th Rep. Agricul. Michigan, 1888, p. 471; Psyche, Vol. V, 1889, p. 188; Proc. Iowa Acad. Sci., Vol. I, pt. II, 1892, p. 114; DALLA TORRE, Cat. Hymen., Vol. II, 1892, p. 48; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 52.

Neuroterus affinis ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 131; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 37; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 50.

Female. Head black, finely rugose, ocelli large. Antennæ 14-jointed, yellowish brown basally changing to brown-black toward the tip. Thorax black, very finely and evenly punctate. Parapsidal grooves traceable but not deep. Anterior parallel lines obliterated or scarcely evident in certain lights. Scutellum somewhat shining, punctate and separated from the thorax by a broad, shining groove. Abdomen black, shining. Legs yellowish brown, basal half of femora sometimes somewhat darker, coxæ blackish. Wings dusky, hyaline, long, veins dark brown, cross-veins heavy. Cubitus reaching the first cross-vein. Areolet large and distinct. Length, 1.75 to 2.25 mm.

Male. Color as in the female. Antennæ 15-jointed, usually wholly dark brown. Legs somewhat paler. Wings longer. Abdomen petiolate. Length, 1.50 to 2 mm.

Gall. (Plate X, Figs. 4, 5, 6.) In the buds of white oak (*Quercus alba*), dwarf chestnut oak (*Quercus prinoides*) and swamp white oak (*Quercus platanoidea*), usually partly hidden in the scales of the bud, sometimes standing out round and free like a blister on the twig. Monothalamous, round, thin-walled and of a dark brown or greenish brown color, sometimes with grayish spots. In size it is only large enough to hold the larva within.

Habitat. Connecticut; New York; New Jersey; Illinois; Michigan; Iowa.

The galls of this large species of gall-fly are half grown in the autumn and develop so rapidly in the spring that the insects come out just as the leaves begin to expand. I can find no differences between the adults and galls of *N. affinis* (Plate X, Figs. 7, 8, 9) and *vesiculus*, and they are, as surmised by Bassett, one and the same species. It is a distinct species and may be readily known by its large size, punctate thorax with slight traces of par-

apsidal grooves. Mr. Lewis H. Weld, Evanston, Illinois, has bred this species from swamp white oak (*Quercus platanoides*). I have taken the galls in the vicinity of New York late in April. The flies begin to emerge about May 6.

***Neuroterus congregatus* Gillette.**

Neuroterus congregatus GILLETTE, Ent. News, Vol. IV, 1893, p. 166; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 50.

Male. "Head black, shining, with a fine crackled appearance, eyes large and prominent; face narrow and rectangular in outline. The inner margin of the eyes as seen in front being straight and parallel; mandibles reddish yellow, ocelli rather prominent and slightly elevated. Thorax smooth and shining, with the fine crackled appearance common to the genus, without any signs of parapsidal or other grooves, and with a broad notch at the base of the scutellum; scutellum without foveæ, but with a shallow basal groove, shining, and with the crackled appearance indistinct, especially on the central portion. Abdomen petiolate, black. Feet dark brown, light on the joints. Wings 3 mm. long, radial cell long and narrow, radial nervure almost attaining the costal margin, cubital nervure faint, and hence the areolet rather indistinct, all the nerves dark brown. Antennæ 14-jointed, joints 1-3 and often the basal portion of the fourth light yellow, remaining joints brown or blackish; first and second joints robust, third as long as the fourth and fifth together. Length, 2 mm." (C. P. Gillette.)

Gall. On the terminal and probably axial bud of oak (*Quercus* sp.). The twig expands next to the bud, and within the bud develop a number of little globular capsules covered and surrounded by a hairy or wooly growth. The capsules resemble those of *N. vesicula* Bass. They are in clusters composed of from ten to fifteen capsules. The clusters measure from 6 to 8 mm. in diameter.

Habitat. Colorado (Manitou).

This species is not known to me. According to Prof. C. P. Gillette the galls are found early in May and the flies hatch before May 17. The types are with Prof. Gillette.

***Neuroterus clarkæ* sp. nov.**

Female. Head jet black, shining and microscopically crackled. Antennæ 14-jointed, first three joints pale, remaining ones brown black. Thorax jet black, highly polished and smooth, posterior margin slightly excavated. Scutellum minutely rugose, less polished than the thorax, with a few hairs and a transverse groove. Abdomen jet black, shining. Legs amber yellow, pellucid. Wings hyaline. Radial area closed. Cubitus not reaching the first cross-vein. Areolet minute, but distinct. Length, 1.25 mm.

Male. Jet black, legs somewhat darker than in the female. Antennæ 15-jointed. Scutellum smooth. Abdomen with a very short petiole.

Gall. (Plate XII, Figs. 12, 13.) On the edge of the leaf of white oak (*Quercus alba*) in May. Monothalamous. Light brown, bud-like and covered with short

wool. It is thin-shelled, fragile, and contains no separate larval cell. Length, 2-3 mm.

Habitat. Massachusetts (Magnolia).

A fine and distinct species kindly sent to me by Miss Cora H. Clarke. The flies emerge during the latter part of May and early in June.

Neuroterus gillettei Bassett.

Neuroterus gillettei BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 334; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. Head, thorax and scutellum shining black and smooth. Scutellum with a broad groove at the base. Antennæ 13-jointed. Abdomen rather small, almost black. Legs pale, shining translucent brown in the middle of the femora and tibiæ. Wings subhyaline, hairy, veins distinct and yellowish brown. Areolet large. Cubitus distinctly reaching the first cross-vein. Length, .75 to 1 mm.

Male. Black. Antennæ 14-jointed, first joint dark brown, short, second ovate, very pale, third joint long and slender, fourth to last very short, all pale in color. Abdomen petiolate, petiole pale, following segments dark. Length, .75 to 1 mm.

Gall. On the petioles and mid ribs of the leaves of post oak (*Quercus minor*). Polythalamous pustule-like and quite irregular in shape and size. When dry the galls are much shrunk and distorted.

Habitat. Connecticut (Waterbury); New Jersey (Lakehurst).

Neuroterus fragilis Bassett.

Neuroterus fragilis BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 335; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Male and Female. Head and thorax smooth, pale, semitranslucent brown. Abdomen dusky brown, petiolate in the male and very minute. Antennæ 14-jointed in the female, first joint small and short, second large, following joints very short; 15(?)-jointed in the male. Legs very pale. Wings subhyaline, veins distinct. Areolet present. Radial area open. Length, .75 mm.

Gall. (Plate XIII, Fig. 1.) On the leaves of a species of oak. Polythalamous. Pale yellowish green irregular swellings on the leaves usually on the midribs. When dry they are hard and pithy.

Habitat. California (San Diego).

Neuroterus quercicola Dalla Torre.

Neuroterus politus BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 89.

Neuroterus quercicola DALLA TORRE, Wiener, Ent. Zeit., Vol. XI, 1892, p. 131; Cat. Hymen., Vol. II, 1893, p. 46; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Male. Head black; antennæ 14-jointed, first and second joints pale yellow, remaining ones yellowish brown, all very slender. Thorax without furrows or grooves; thorax and abdomen black and very smooth; scutellum separated from the mesothorax by a smooth, shining furrow; a few scattered hairs on the posterior half of the scutellum. Abdomen long petiolated, second segment small, the remain-

ing ones very small. Legs pale yellow. Wings large, veins brown, slender, the cubitus reaching the first cross-vein and of equal size throughout. Areolet very small. Radial area large, long and open.

Gall. On the midribs of the leaves of oak (*Quercus undulata*?). Polythalamous, elongate swellings with the larval cells perpendicular to the surface of the leaf. Length 18 mm., width 9 mm.

Habitat. Southern Utah.

This species is not known to me. The types are in the American Entomological Society. According to Bassett the galls might be easily taken for those of *Andricus nigræ* or *Andricus tumifica*. Bassett's name *N. politus* is preoccupied by *N. politus* Hartig, a European species.

***Neuroterus irregularis* (Osten Sacken).**

Cynips quercus irregularis OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. I, 1861, p. 65.

Cynips q. irregularis OSTEN SACKEN, Ent. Zeit. Stettin, 1861, pp. 409, 413.

Cynips irregularis OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, pp. 340, 344, 349, 353.

Neuroterus irregularis ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 129; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 42; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Male. Head very dark brown, smooth and shining, mouth part pale yellowish. Antennæ 14-jointed, first and second joints stout, third joint very slender, somewhat curved and longer than the first and second together. First, second and third joints very pale, semitranslucent yellow, remaining joints short and dark brown. Thorax reddish brown above, pale beneath, smooth and shining. Scutellum rather large, smooth and shining with a curved groove at the base. Abdomen petiolate, dark brown. Legs very pale semitranslucent yellowish, claws blackish brown. Wings subhyaline, veins broad, radial cell long, rounded at tip. First cross-vein with a pale brown cloud. Length, 2 mm.

Female. Head, thorax and abdomen dark pitchy brown. Abdomen not petiolate and with the ventral sheath long. Antennæ 13-jointed. Legs very pale. Length, 1.50 to 1.75 mm.

Gall. (Plate XIII, Figs. 2, 3.) On the leaves of post oak (*Quercus minor*) and white oak (*Quercus alba*) during the latter part of May and early in June. Polythalamous. Succulent. Irregular in shape, somewhat flattened and projecting on both sides of the leaves. Yellowish in color and when dry are of a soft pithy substance, enclosing a number of hollow kernels in which the larvæ live.

Habitat. Massachusetts; Connecticut; New York; New Jersey; Maryland; Virginia and southward.

***Neuroterus majalis* (Bassett).**

Cynips q. majalis BASSETT, Proc. Ent. Soc. Phila., Vol. III, 1864, p. 682.

Cynips majalis OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, pp. 340, 344, 349.

Neuroterus majalis MAYR, Gen. Gallenb. Cynip., 1881, p. 37; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, pp. 129, 139; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 44; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Dolichostrophus majalis ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, p. 129; Psyche, Vol. X, 1903, p. 151.

Allied to *Neuroterus irregularis* in color; in markings and structure it is the same, and the only perceptible difference that I can find between the two species is in size. Length of male, 2.25 to 2.50 mm., of female, 2.25 mm.

Gall. (Plate XIII, Figs. 4, 5, 6.) On the leaves of white oak (*Quercus alba*) and chestnut oak (*Quercus prinus*) in May and June. Polythalamous. Very irregular in shape, flat, green and succulent. When dry, light brown and pitch-like. Diameter 6 to about 25 mm. Vertical diameter 6 to 9 mm.

Habitat. Massachusetts; Connecticut; New York; New Jersey; south to Florida.

***Neuroterus flavipes* Gillette.**

Neuroterus flavipes GILLETTE, Bull. 7, Iowa Agric. Exp. Sta., 1889, p. 281; Ent. Am., Vol. VI, 1890, p. 21; Proc. Iowa Acad. Sci., Vol. I, 1892, p. 114; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 41; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 51.

Female. "Head entirely black, face very sparsely set with gray hairs and finely rugose; vertex, genæ and occiput finely rugose. Antennæ 13-jointed, first two joints stout and nearly equal in length, third joint longest, fourth to thirteenth subequal in length, the last six or seven forming a slight club; color, light yellow. Thorax black, finely rugose, densely pitted on the shoulders and very thinly set with short gray pubescence. Two shining black, parallel lines begin at the collar and run back half way to the scutellum. Parapsidal grooves shallow and can be traced about two thirds of the way from the scutellum to the collar. Outside of each parapsidal groove is a short depressed line beginning near the base of the scutellum and running parallel with the groove past the base of the wing. Scutellum entirely black, densely pitted and with two shallow foveæ that are almost obsolete. Legs light yellow with the thighs and tibiæ dark, sometimes almost black; base of coxæ and pulvilli black. Abdomen black, polished and with a very few hairs. Ovipositor sheath protruding. Wings hyaline; veins rather slender and light yellow in color, areolet wanting, cubitus and anal vein almost obsolete and the radial nervure not reaching the costal margin. The anterior wings are without a fringe of hairs upon their borders and the hairs upon the surface of the wings are not well developed but appear in most cases as minute specks.

Male. "Antennæ 15-jointed, filiform and longer than the body; parapsidal grooves more distinct than in the female; wings with fringe of hairs and hairs better developed on the surface of the wing. Length, 1.4 mm.; otherwise as the female." (C. P. Gillette).

Gall. On the midrib or main veins of a leaf of burr-oak (*Quercus macrocarpa*) in July. A hard woody swelling, the leaf becoming much wrinkled and deformed as the result. Length about 18 mm. Diameter about 6 mm.

Habitat. Iowa (Ames).

According to Prof. C. P. Gillette the flies escape from the upper surface

of the leaf through a slightly raised teat-like projection. This species is not known to me but from the description it appears to be referable to the genus *Andricus* or subgenus *Callirhytis*. The types are with Prof. Gillette.

***Neuroterus crassitelus* Provancher.**

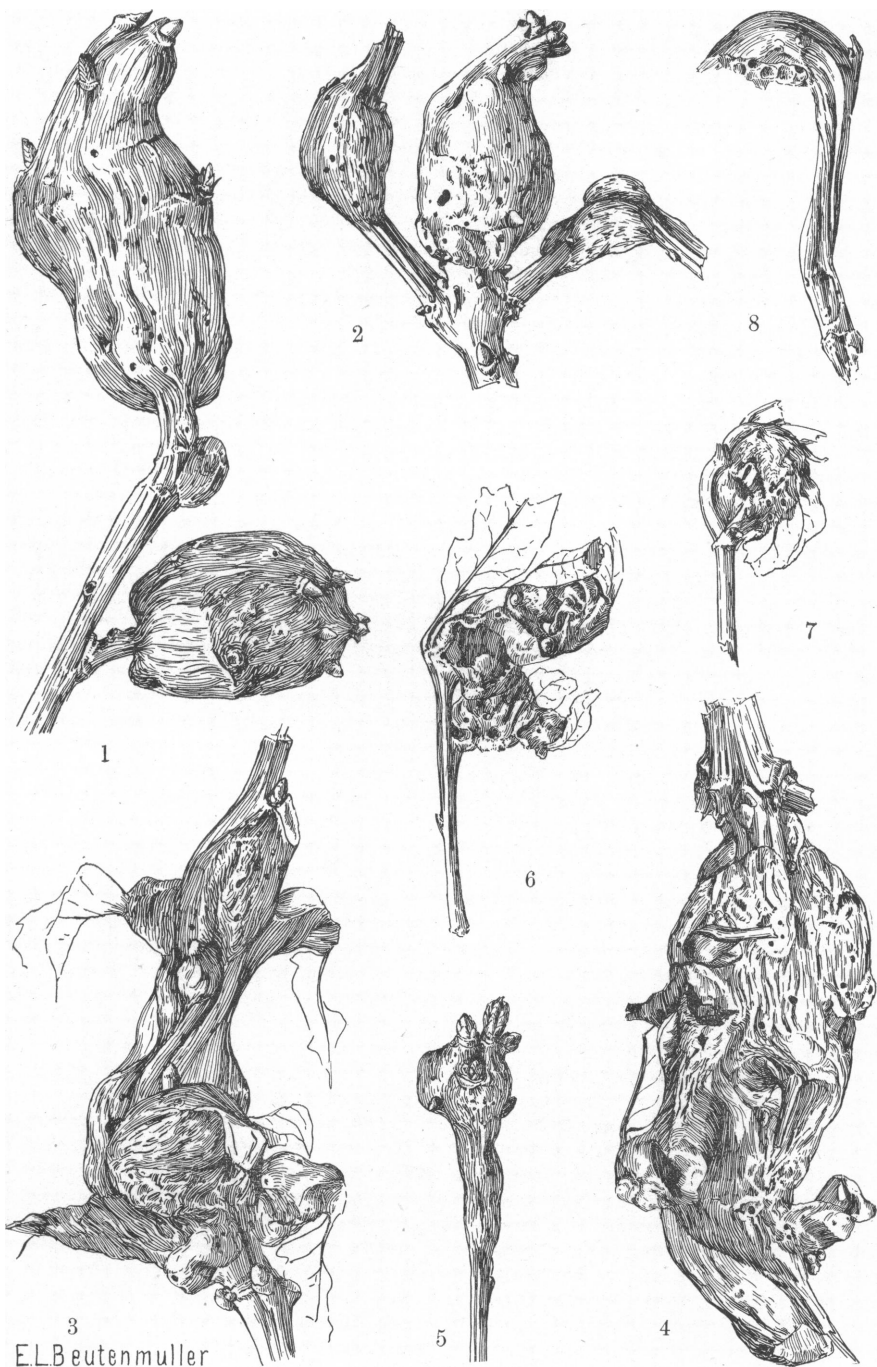
Cynips (*Neuroterus*) *crassitelus* PROVANCHER, Can. Nat. Vol. XII, 1881, p. 233; Fauna Ent. Can. Hymen., 1883, p. 548.

Neuroterus crassitelus ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 41; DALLA TORRE, and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 50.

Female. Reddish brown; a spot on the vertex, extremity of the antennæ, prothorax, metathorax and part of the scutellum, black. Antennæ almost as long as the head and thorax together, second joint very small, third joint long, thickened terminally. Thorax smooth, metathorax rounded, with the sutures of the lobes distinct. Scutellum black at the base and reddish on the summit, an impressed line at base, and without foveæ. Wings hyaline, radial area long and open. Areolet present. Legs reddish brown and the color of the abdomen. Abdomen very compressed, almost semicircular in form, second segment very large, ventral valve clear red, moderately long, its point acute. Ovipositor black, broad, straight and thickening into a club terminally. Length, 2.75 mm.

Habitat. Canada.

This species is not known to me; the gall is unknown.



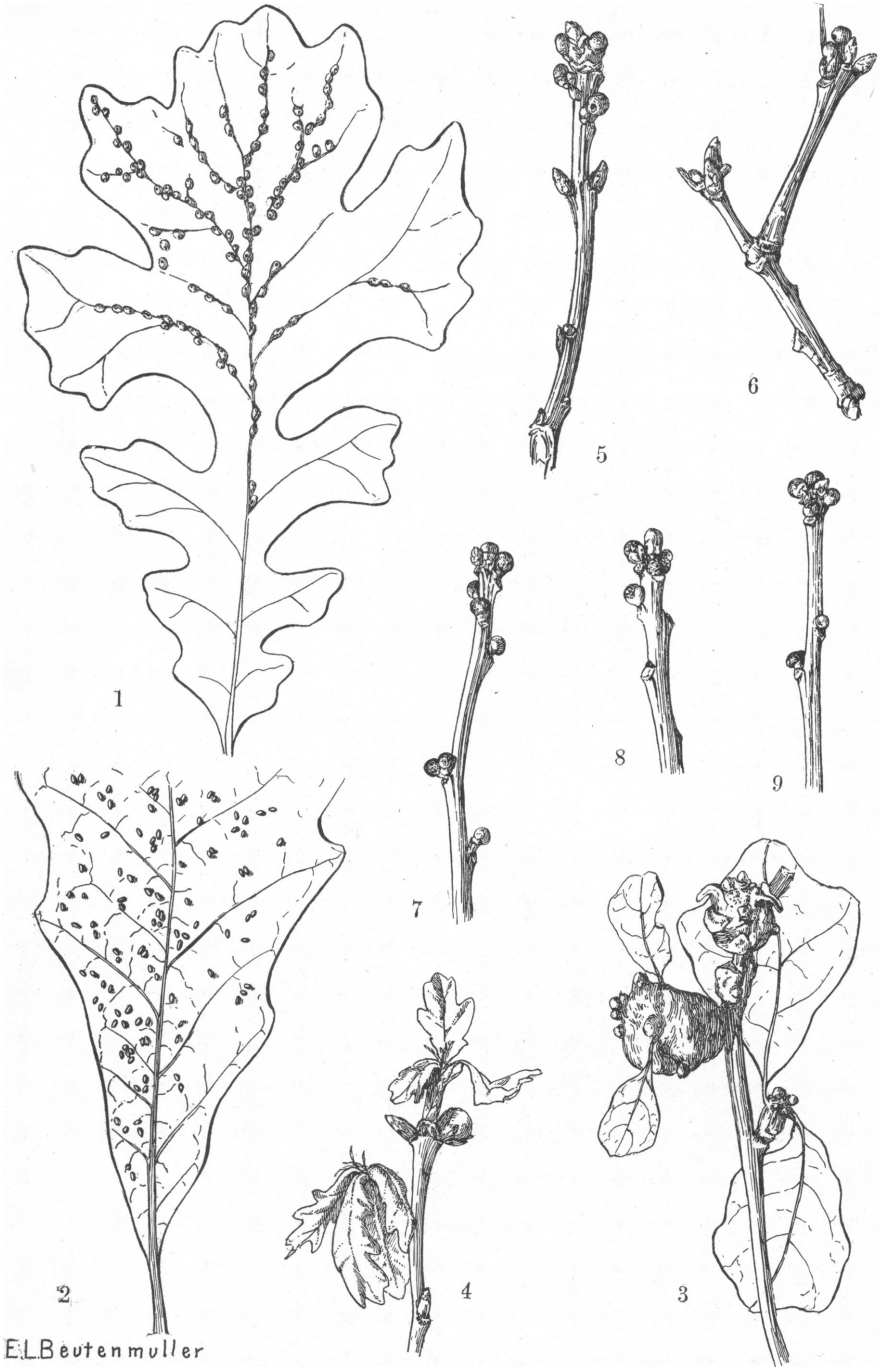
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Neuroterus batatus (Fitch).



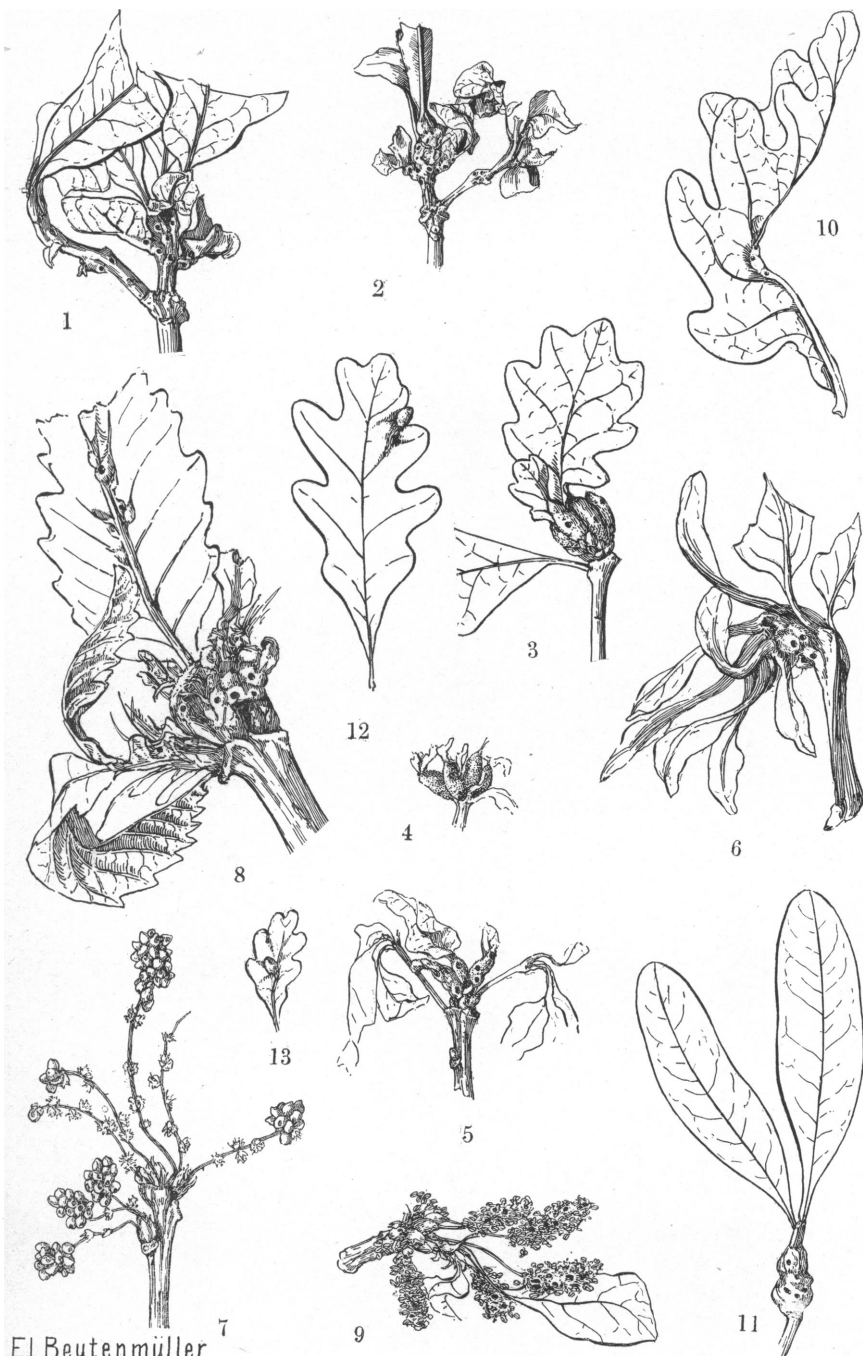
E.L. Beutenmüller

Neuroterus noxiosus (Bassett).



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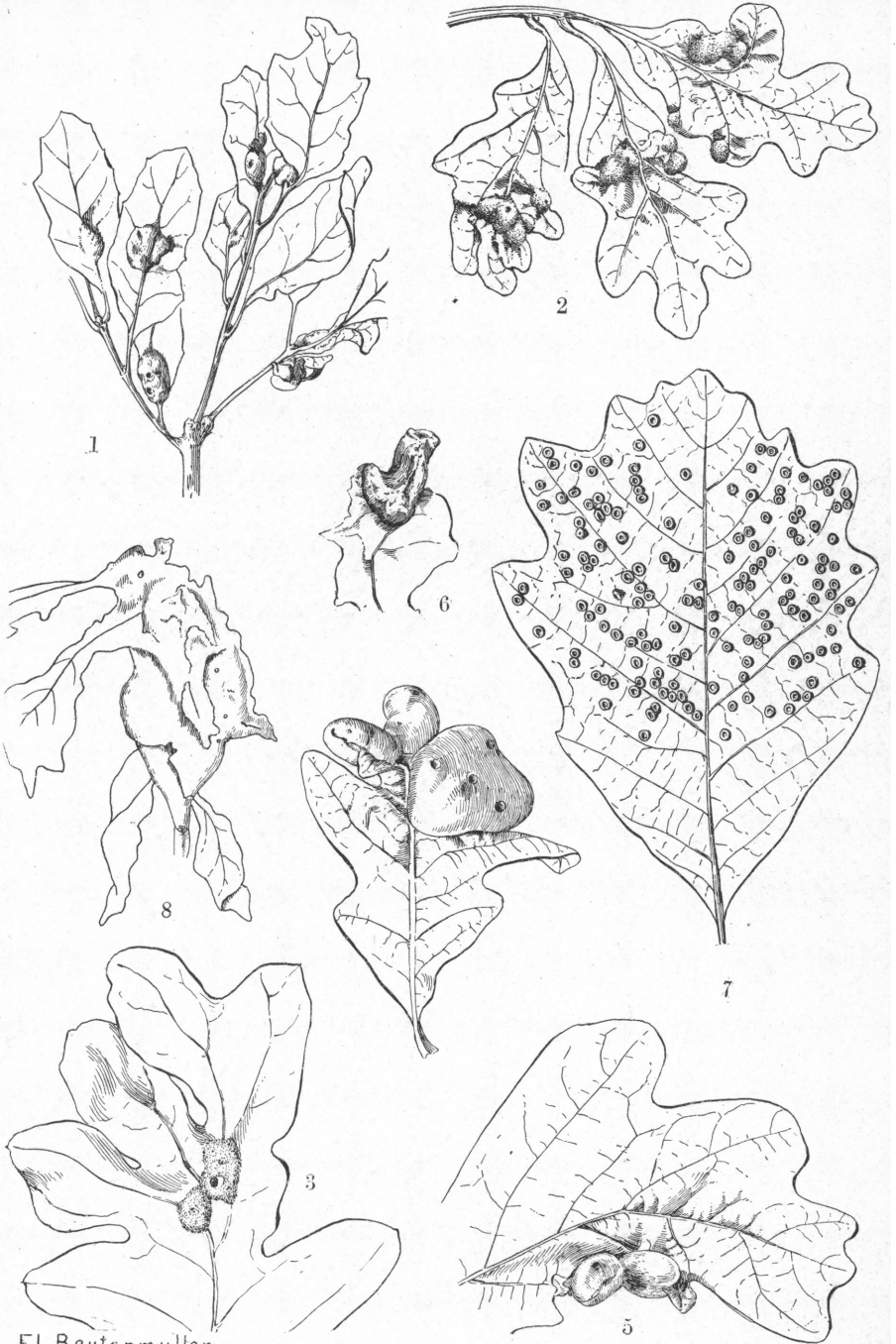
1. *Neuroterus nigrum* Gillette. 3. *Neuroterus consimilis* Bassett.
2. " *papillatus* sp. nov. 4-6. " *vesiculus* (Bassett).
7-9. *Neuroterus affinis* (Bassett).



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- 1-2. *Neuroterus tectus* Bassett.
 3-5. " *minutus* (Bassett).
 6. " *distortus* Bassett.
 7. " *pallidus* Bassett.

- 8, 9. *Neuroterus vernus* Gillette.
 10. " *pallipes* Bassett.
 11. " *longipennis* Ashmead.
 12, 13. " *clarkeæ* sp. nov.



EL. Beutenmüller

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|-------|--------------------------------------|-------|---|
| 1. | <i>Neuroterus fragilis</i> Bassett. | 4, 6. | <i>Neuroterus majalis</i> (Bassett). |
| 2, 3. | " <i>irregularis</i> (Osten Sacken). | 7. | " <i>umbilicatus</i> Bassett. |
| | 8. | | <i>Neuroterus obtusilobae</i> (Karsch). |

