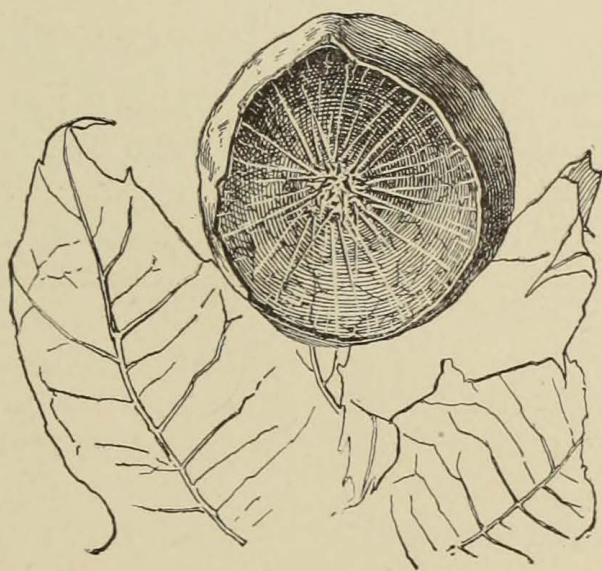


AMERICAN MUSEUM OF NATURAL HISTORY

The
Insect-Galls of the Vicinity
of
New York City



BY

William Beutenmüller

Curator of Entomology

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Guide Leaflet No. 16

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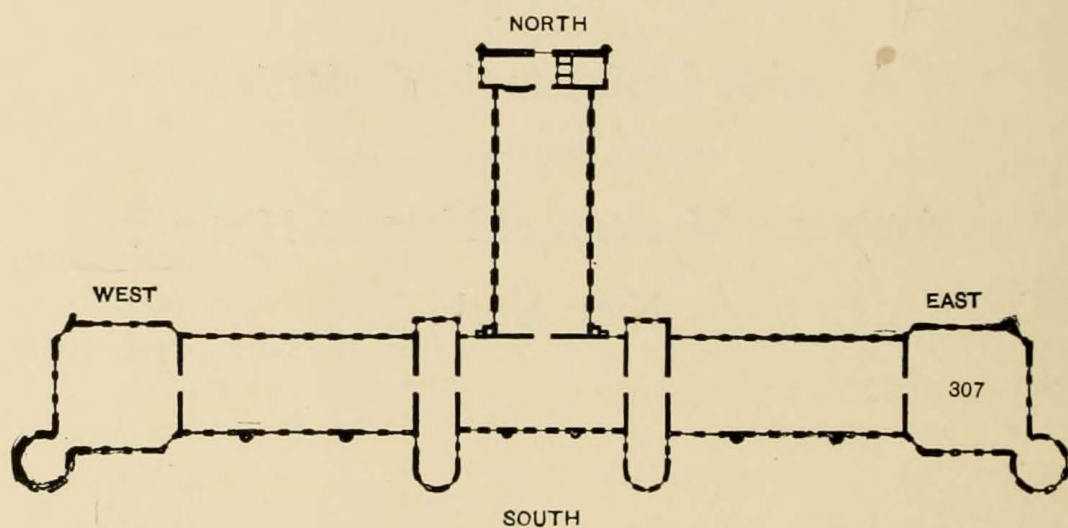
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The Insect-Galls
of the
Vicinity of New York City.

A Guide Leaflet to the Collection
in the
American Museum of Natural History,
New York.

By
WILLIAM BEUTENMÜLLER,
CURATOR OF ENTOMOLOGY.

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THIRD, OR GALLERY, FLOOR.

The collection of Insect-Galls upon which this Guide Leaflet is based is exhibited in Hall No. 307 of the East Wing, third floor of the Museum.

THE INSECT-GALLS OF THE VICINITY OF NEW YORK CITY.

EVERYWHERE throughout the woods, along the roadsides and in the fields, one finds on leaf or twig, stem or root peculiar swellings which evidently are not part of the normal growth of the plant. These deformations when produced by insects are called Galls. Generally one or more eggs are inserted in a bud, a flower, a leaf, a root or some other part of the plant, and the presence of this foreign body, together with the irritation caused by the larva among the vegetable cells, produces an abnormal growth of definite shape and uniform structure. The variety of Galls in respect to structure and substance is great. Every species of Gall-producing insect attacks its own particular plant and a particular part of that plant. Galls are of various sizes and colors and of almost every conceivable shape. Some resemble a tomato or a potato. Some are like the apple, plum, cherry and other small fruits. Some have the appearance of a pine-cone or a seed. They are smooth, wrinkled, downy, hairy or covered with spines and other protuberances. Some are succulent, while others are so fragile that they can be readily crushed, and still others are so corky, hard and woody that it requires a sharp knife to cut them. In color they are of many shades of green, yellow, red, brown and white.

The number of Galls formed by distinct species of insects and mites is so large that only a small proportion of the excrescences or of the insects causing them has yet been described. The present Guide Leaflet gives brief accounts, illustrated by figures drawn to a uniform scale, of some of the more conspicuous Galls made by members of the following families of insects found in the vicinity of New York City:

- (1.) **Hymenoptera** (CYNIPIDÆ and TENTHREDINIDÆ)—Gall-flies and Saw-flies.
- (2.) **Diptera** (CECIDOMYIIDÆ, MYCETOPHILIDÆ and TRYPETIDÆ)—Flies.
- (3.) **Hemiptera** (PSYLLIDÆ and APHIDIDÆ)—Plant-lice and Jumping-lice.
- (4.) **Acarina** (ACARIDÆ)—Mites.

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Besides these groups, which are the principal Gall-producers, some few species of other orders (Coleoptera and Lepidoptera) also produce Gall-like excrescences.

In the following list, the Galls which have been found in the vicinity of New York City are arranged according to the plants upon which they occur. The serial numbers refer to the descriptions on the succeeding pages.

	Species No.		Species No.
Wild Rose (<i>Rosa</i> sp.).		Black Oak (<i>Quercus velutina</i>).	
<i>Rhodites bicolor</i>	1.	<i>Amphibolips confluentus</i>	14.
“ <i>radicum</i>	2.	<i>Andricus piger</i>	31.
“ <i>globulus</i>	3.	<i>Cecidomyia pilulæ</i>	66.
“ <i>dichlocerus</i>	4.		
“ <i>verna</i>	5.	Scrub Oak (<i>Quercus nana</i>).	
“ <i>rosæ</i>	6.	<i>Amphibolips ilicifoliæ</i>	16.
“ <i>ignota</i>	7.	<i>Andricus punctatus</i>	20.
“ <i>lenticularis</i>	8.	“ <i>similis</i>	24.
		<i>Cecidomyia pilulæ</i>	66.
Trailing Blackberry (<i>Rubus canadensis</i>).		Rock Chestnut Oak (<i>Quercus prinus</i>).	
<i>Diastrophus bassettii</i>	9.	<i>Andricus papillatus</i>	23.
		“ <i>petiolicola</i>	28.
Blackberry (<i>Rubus villosus</i>).			
<i>Diastrophus cuscuteformis</i> ..	10.	White Oak (<i>Quercus alba</i>).	
“ <i>nebulosus</i>	11.	<i>Andricus seminator</i>	21.
Black Raspberry (<i>Rubus occidentalis</i>).		“ <i>futilis</i>	22.
<i>Diastrophus radicum</i>	12.	“ <i>clavula</i>	25.
		“ <i>petiolicola</i>	28.
Cinquefoil (<i>Potentilla canadensis</i>).		“ <i>lana</i>	29.
<i>Diastrophus potentillæ</i>	13.	<i>Cynips pisum</i>	34.
		<i>Acraspis erinacei</i>	35.
Scarlet Oak (<i>Quercus coccinea</i>).		<i>Biorhiza forticornis</i>	36.
<i>Amphibolips confluentus</i>	14.	<i>Holcaspis globulus</i>	37.
“ <i>inanis</i>	15.	<i>Neuroterus batatus</i>	41.
<i>Andricus punctatus</i>	20.	<i>Cecidomyia poculum</i>	67.
<i>Cecidomyia pilulæ</i>	66.		
Red Oak (<i>Quercus rubra</i>).		Pin or Swamp Oak (<i>Quercus palustris</i>).	
<i>Amphibolips confluentus</i>	14.	<i>Andricus cornigerus</i>	19.
“ <i>inanis</i>	15.	“ <i>palustris</i>	26.
“ <i>cælebs</i>	17.	<i>Cecidomyia pilulæ</i>	66.
“ <i>prunus</i>	18.		
<i>Andricus singularis</i>	27.	Black Jack Oak (<i>Quercus marylandica</i>).	
<i>Cecidomyia pilulæ</i>	66.	<i>Andricus punctatus</i>	20.
“ <i>niveipila</i>	68.	<i>Cecidomyia pilulæ</i>	66.

	Species No.
Swamp White Oak (<i>Quercus</i> <i>platanoides</i>).	
<i>Andricus petiolicola</i>	28.
" <i>capsulus</i>	30.
<i>Cynips strobilana</i>	33.
<i>Holcaspis duricaria</i>	38.
<i>Neuroterus pallidus</i>	40.
" <i>noxiosus</i>	42.
" <i>floccosus</i>	43.
" <i>umbilicatus</i>	44.

Post Oak (<i>Quercus minor</i>).	
<i>Andricus petiolicola</i>	28.
<i>Dryophanta polita</i>	39.

Scrub Chestnut Oak (<i>Quercus</i> <i>prinoides</i>).	
<i>Cynips prinoides</i>	32.

Wild Lettuce (<i>Lactuca canadensis</i>).	
<i>Aulax tumidus</i>	46.

Willow (<i>Salix</i> sp.).	
<i>Nematus pomum</i>	47.
<i>Euura ovum</i>	48.
<i>Cecidomyia strobiloides</i>	61.
" <i>rigidæ</i>	62.
" <i>batatas</i>	63.

Alder (<i>Alnus rugosa</i>).	
<i>Cecidomyia serrulatæ</i>	49.

Basswood (<i>Tilia americana</i>).	
<i>Cecidomyia verrucicola</i>	50.

Tulip-tree (<i>Liriodendron tulipi-</i> <i>fera</i>).	
<i>Cecidomyia tulipifera</i>	51.
" <i>liriodendri</i>	52.

Wild Cherry (<i>Prunus serotina</i>).	
<i>Cecidomyia serotinæ</i>	53.
<i>Acarus serotinæ</i>	87.

White Ash (<i>Fraxinus americana</i>).	
<i>Cecidomyia pellex</i>	54.

Honey Locust (<i>Gleditschia tria-</i> <i>canthos</i>).	
<i>Cecidomyia gleditschiæ</i>	55.

	Species No.
Hickory (<i>Hickoria</i> sp.).	
<i>Cecidomyia holotricha</i>	56.
" <i>caryæcola</i>	57.
" <i>tubicola</i>	58.
" <i>sanguinolenta</i>	59.
" <i>persicoides</i>	60.
<i>Phylloxera caryæcaulis</i>	86.

Dogwood (<i>Cornus florida</i>).	
<i>Cecidomyia clavula</i>	64.

Touch-me-not (<i>Impatiens bi-</i> <i>flora</i>).	
<i>Cecidomyia impatiens</i>	65.

Goldenrod (<i>Solidago</i> sp.).	
<i>Cecidomyia solidaginis</i>	69.
<i>Trypeta polita</i>	74.
" <i>solidaginis</i>	75.

Grape (<i>Vitis</i> sp.).	
<i>Cecidomyia viticola</i>	70.
" <i>vitis-pomum</i>	71.
<i>Lasioptera vitis</i>	72.

Red Maple (<i>Acer rubrum</i>).	
<i>Sciara ocellata</i>	73.

Hackberry (<i>Celtis occidentalis</i>).	
<i>Pachypsylla venusta</i>	76.
" <i>celtidis-gemma</i> ...	77.
" " <i>-vesiculum</i>	78.
" " <i>-mamma</i> ..	79.
" " <i>-cucurbitæ</i>	80.

Witch Hazel (<i>Hamamelis virginiana</i>).	
<i>Hormaphis hamamelidis</i>	81.
" <i>spinosus</i>	82.

Elm (<i>Ulmus americana</i>).	
<i>Colopha ulmicola</i>	83.

Sumac (<i>Rhus glabra</i>).	
<i>Pemphigus rhois</i>	84.

Huckleberry (<i>Vaccinium</i> sp.).	
<i>Solenozopheria vaccinii</i>	45.

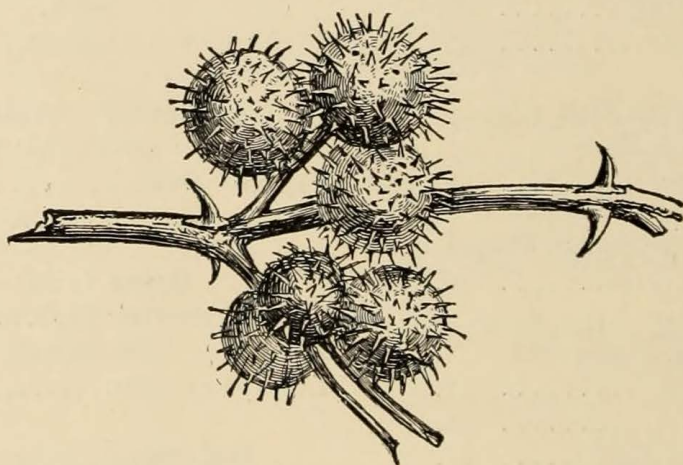
Poplar (<i>Populus</i> sp.).	
<i>Pemphigus populicaulis</i>	85.

6 INSECT-GALLS OF THE VICINITY OF NEW YORK CITY

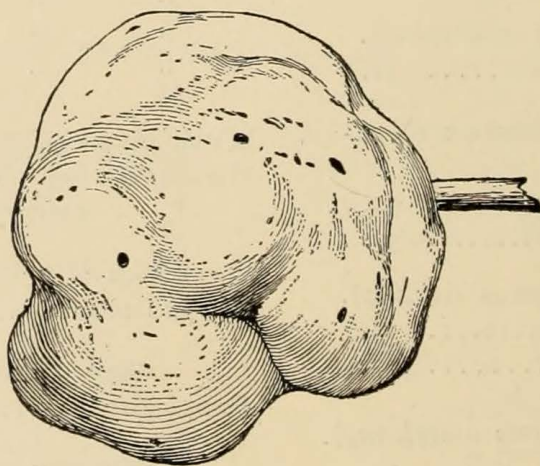
HYMENOPTERA. (Bees, Wasps etc.)

FAMILY CYNIPIDÆ (Gall-flies).

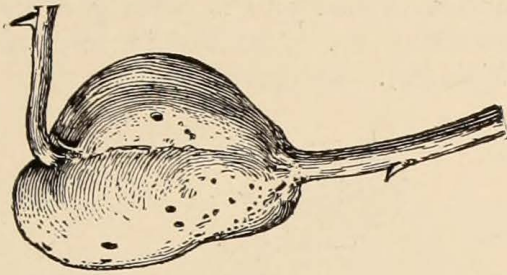
The species belonging to this family are small wasp-like insects termed Gall-flies because the majority of the species live within Galls. In the adult Gall-fly, the abdomen is usually much compressed and is joined to the thorax by a short peduncle. The wings have comparatively few veins, while some species are wingless. The antennæ are not elbowed. They consist of from 13 to 16 joints. The larvæ are maggot-like.



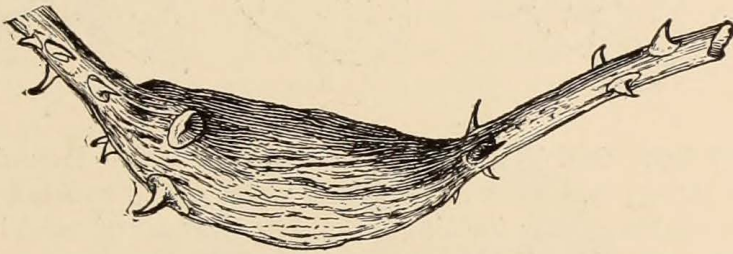
1. **Spiny Rose Gall** (*Rhodites bicolor* Harr.).—Spherical, covered with many long prickly spines. Yellowish green sometimes tinged with red in summer, and brown in winter. Soft in summer, woody in winter. Diameter $\frac{3}{8}$ to $\frac{1}{2}$ in. On twigs of wild roses. Rather common.



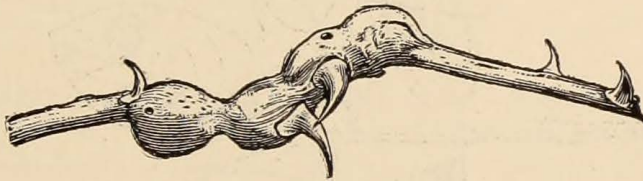
2. **Rose Root Gall** (*Rhodites radicum* Osten Sacken).—Irregularly rounded, with a deep impression above and below at place of attachment. Smooth, reddish brown. Pithy in substance, containing numerous cells. Length $1\frac{1}{2}$ to 2 in. At roots of the wild roses. Not common.



3. **Globular Rose Gall** (*Rhodites globulus* Beuten.).—Smooth, rounded or oblong, rising at each end abruptly from the branch. Rather soft and corky, containing numerous cells. About $\frac{3}{4}$ to 1 in. long and $\frac{3}{4}$ in. in diameter. On swamp rose (*Rosa carolina*). Not common.



4. **Long Rose Gall** (*Rhodites dichlocerus* Harr.).—Elongated, hard and woody, gradually tapering at both ends. Color reddish. Length from $1\frac{1}{2}$ to almost 2 in. Width about $\frac{1}{2}$ in. On stems of wild roses. Not common.



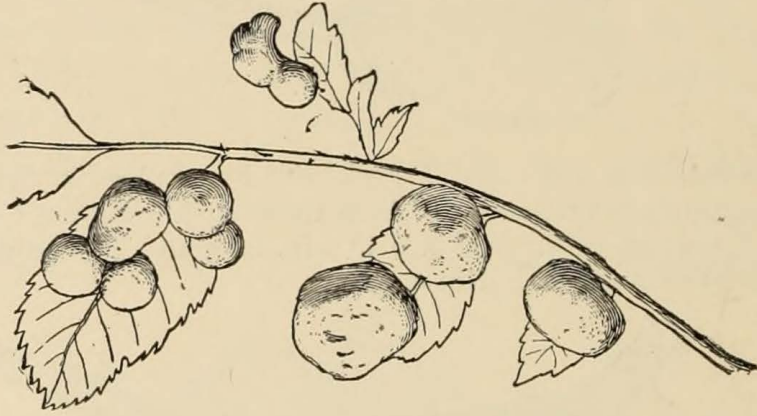
5. **Knotty Rose Gall** (*Rhodites verna* Osten Sacken).—Oblong or rounded and $\frac{1}{2}$ in. long. Sometimes there is a series of three or more swellings attached to each other. Reddish, hard and woody, with many cells inside. On stems of wild roses. Not common.



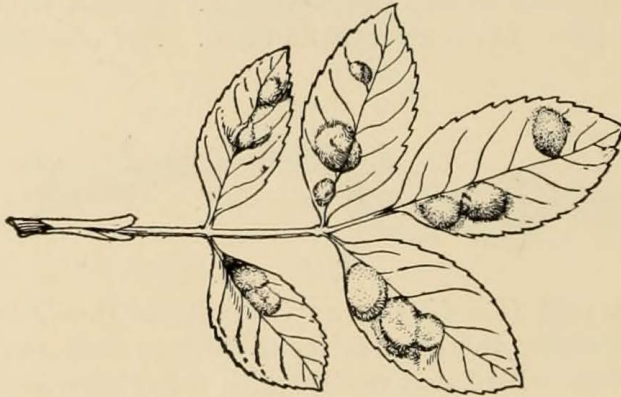
6. **Mossy Rose Gall** (*Rhodites rosæ* Linn.).—Composed of an agglomera-

8 INSECT-GALLS OF THE VICINITY OF NEW YORK CITY

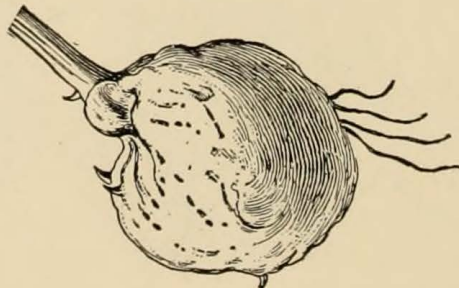
tion of hard cells around a branch and is densely covered with long green filaments forming a moss-like mass. About $1\frac{1}{2}$ in. in diameter. On the twigs of sweet brier (*Rosa rubiginosa*). Common locally.



7. **Mealy Rose Gall** (*Rhodites ignota* Osten Sacken).—Round, woody, about the size of a large pea, and covered with a white mealy substance. Sometimes two or three coalesce, thus forming an elongated mass of more irregular shape. Inside are several cells. On leaves of wild roses. Common.

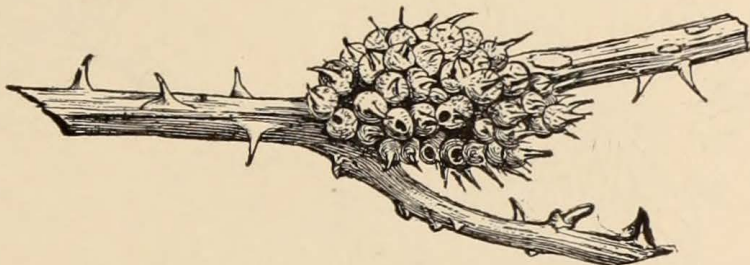


8. **Rose Lentil Gall** (*Rhodites lenticularis* Bass.).—Lentil shaped. In the parenchyma of the leaves of the wild rose (*Rosa lucida*). $\frac{1}{10}$ to $\frac{1}{7}$ in. in horizontal, and $\frac{1}{8}$ in. in vertical diameter. Not common.

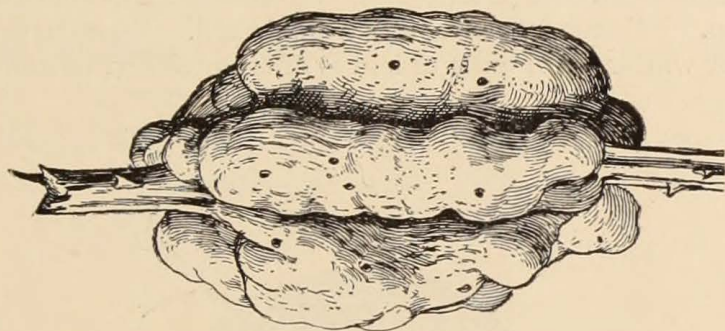


9. **Bassett's Blackberry Gall** (*Diastrophus bassettii* Beuten.).—Irregularly

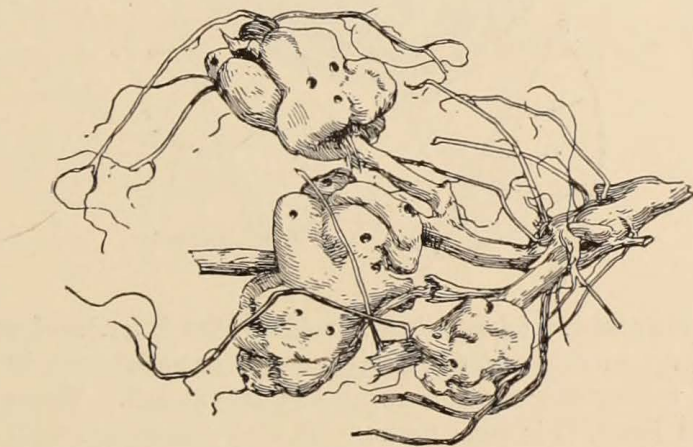
rounded or somewhat elongated. From about $\frac{1}{2}$ to 1 in. in diameter. Composed of a pithy substance with many rounded cells inside. Greenish, tinged with red. On the stems of the trailing blackberry (*Rubus canadensis*), close to the ground. Not common.



10. **Blackberry Seed Gall** (*Diastrophus cuscuteformis* Osten Sacken).—Consists of small globular, woody, seed-like bodies, pressed closely together, each provided more or less with spines. On stems of blackberry. Not common.



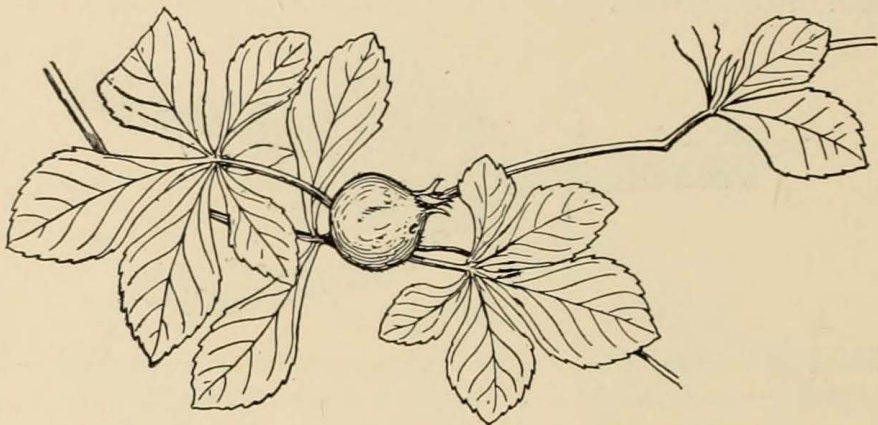
11. **Blackberry Knot Gall** (*Diastrophus nebulosus* Osten Sacken).—Oblong, surface somewhat uneven, with deep longitudinal furrows which divide the gall more or less completely into four or five parts. Length from 1 to 3 in. and diameter about 1 to $1\frac{1}{2}$ in. Dark green, turning reddish as the season advances. Hard, corky, with many oblong cells inside. On stalks of blackberry (*Rubus villosus*). Very common.



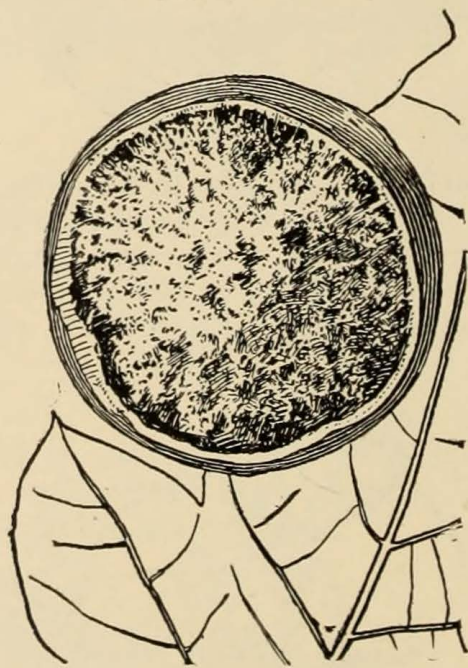
12. **Raspberry Root Gall** (*Diastrophus radicis* Bass.).—Irregularly rounded. Varying greatly in size and in shape from that of a pea to bodies

10 INSECT-GALLS OF THE VICINITY OF NEW YORK CITY

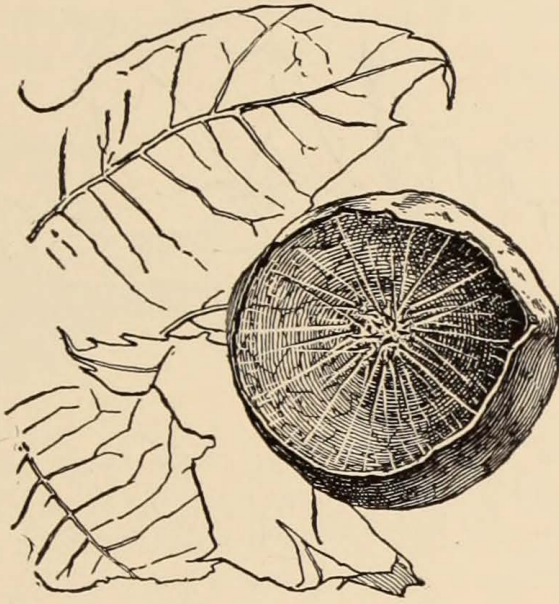
nearly 2 in. in length and 1 in. in diameter. On roots of black raspberry (*Rubus occidentalis*). Common.



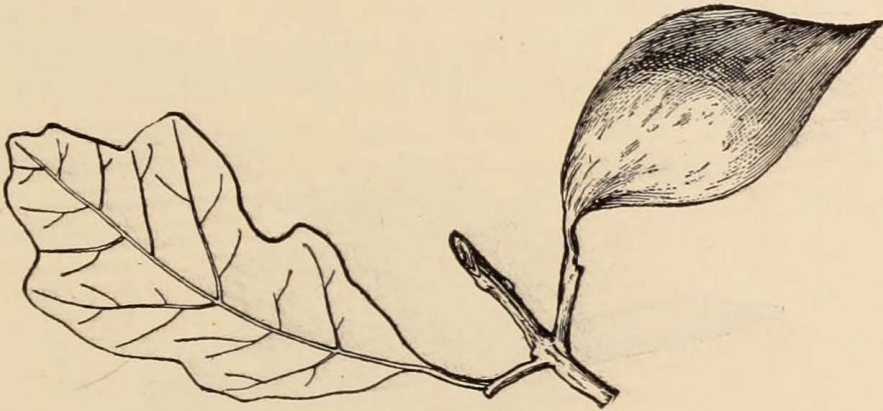
13. **Cinquefoil Axil Gall** (*Diastrophus potentillæ* Bass.).—Spherical or oblong, about $\frac{1}{3}$ to $\frac{1}{2}$ in. in diameter, containing a single cell. Green in summer; brown and spongy in winter. On axils of leaves of cinquefoil (*Potentilla canadensis*). Common.



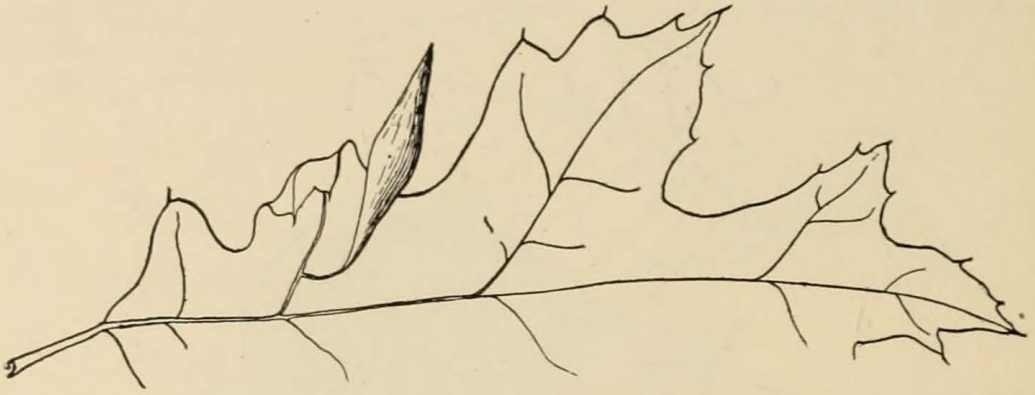
14. **Oak or May Apple** (*Amphibolips confluentus* Harr.).—Large, globular, more or less smooth outside and filled with a spongy substance, in the center of which is a hard woody kernel containing the larval cell. From 1 to 2 in. in diameter. When fresh, it is pale green, soft and succulent, with the contents whitish. Later in the season the shell becomes brown, hard and brittle, with the kernel woody and the spongy substance dark brown, but remaining soft. Confined to the leaves of the trees belonging to the red oak group. Common.



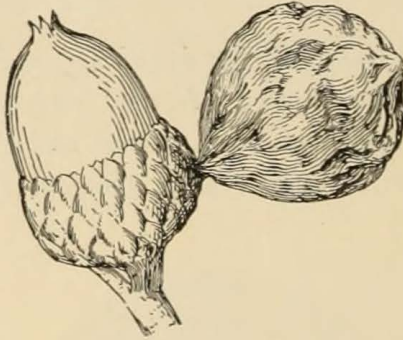
15. **Empty Oak Apple** (*Amphibolips inanis* Osten Sacken).—Shape like the preceding, but considerably smaller. Almost empty, the larval cell being kept in position by radiating filaments. Green and soft when young; brown and brittle when dry. On leaves of scarlet (*Quercus coccinea*) and red oak (*Q. rubra*).



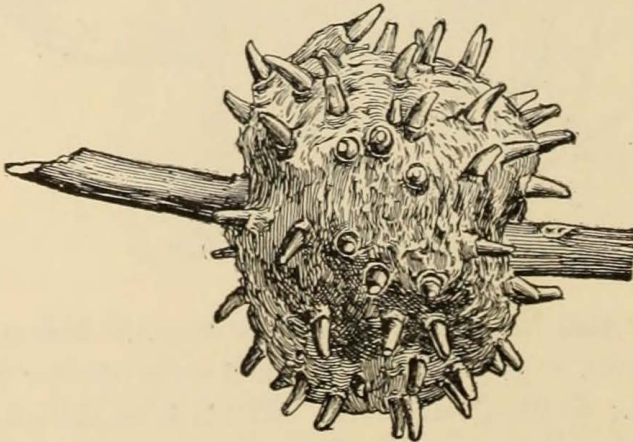
16. **Scrub Oak Gall** (*Amphibolips ilicifoliae* Bass.).—Elongated, fusiform, tapering at both ends, with the apex long and more slender than the base. Length about $1\frac{1}{2}$ in.; width about $\frac{3}{4}$ inch. Within is an elongated kernel held in position by radiating fibers. Green and soft in summer; brown and brittle in winter. On the leaves and petioles of dwarf oak (*Quercus nana*). Not common.



17. **Oak Spindle Gall** (*Amphibolips cælebs* Osten Sacken).—Elongated, spindle-shape, soft and green. Contains a kernel held in position by radiating fibers. Length $1\frac{1}{8}$ in. On leaf of red oak (*Quercus rubra*). Not common.

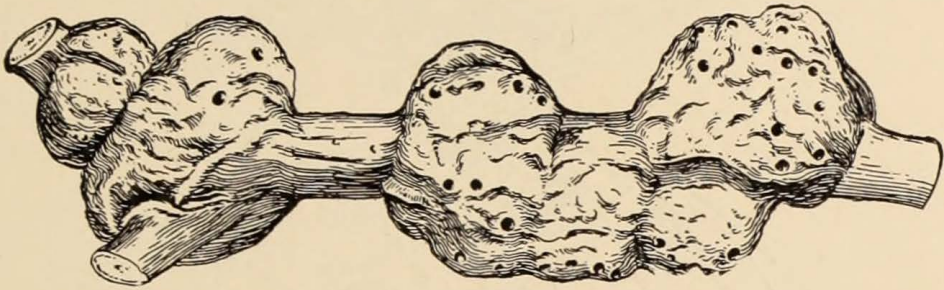


18. **Acorn Plum Gall** (*Amphibolips prunus* Walsh).—Globular, somewhat wrinkled or smooth, fleshy but solid; resembles a plum or cherry. About $\frac{1}{2}$ to 1 in. in diameter. Bright crimson outside, pinkish inside and shading to yellow towards the center. In the center is a single cell in which the larva lives. On cup of acorn of red oak (*Quercus rubra*). August and September. Sometimes rather common.

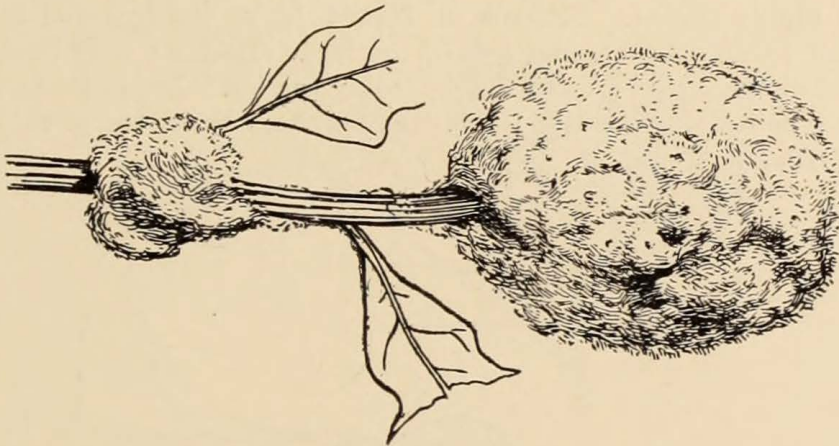


19. **Horned Knot Oak Gall** (*Andricus cornigerus* Osten Sacken).—Irregularly globular with many horn-like protuberances through which the gall-flies escape. Very hard and woody. Color of the branch. Inside brown with many larval

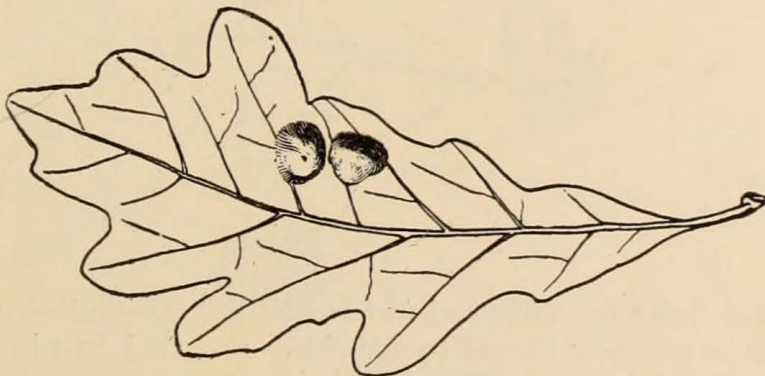
cells. About $\frac{1}{2}$ to $1\frac{1}{8}$ in. in diameter. On branches of the pin oak (*Quercus palustris*). Exceedingly common throughout the year.



20. **Oak Knot Gall** (*Andricus punctatus* Bass.).—Shape similar to the preceding gall, but without the horn-like protuberances. Sometimes found singly, but often a number may be seen, in greater or less proximity, on the same branch. On black jack oak (*Quercus marylandica*), scarlet oak (*Quercus coccinea*) and rarely on scrub oak (*Quercus nana*). Common.



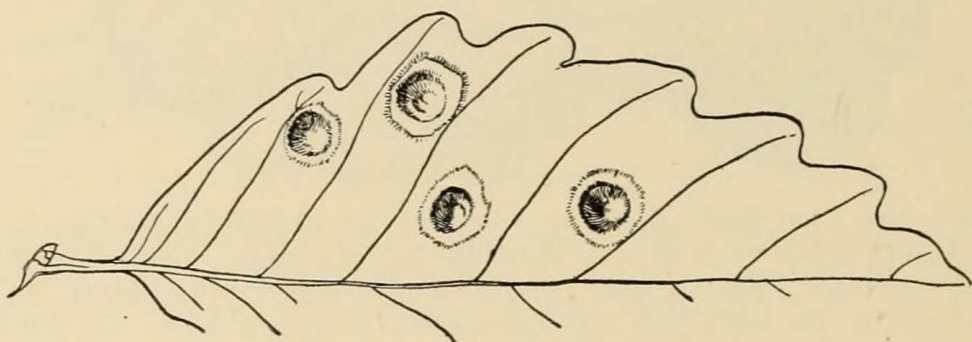
21. **Oak Seed Gall** (*Andricus seminator* Harr.).—Composed of a woolly substance and irregularly rounded. Inside are numerous bodies adhering to the twig and resembling canary seeds. About 1 to $1\frac{1}{4}$ in. in diameter. Pure white sometimes tinged with red; toward the middle of the summer it assumes a rusty brown color and gradually drops off the twig. On twigs of white oak (*Quercus alba*). Common.



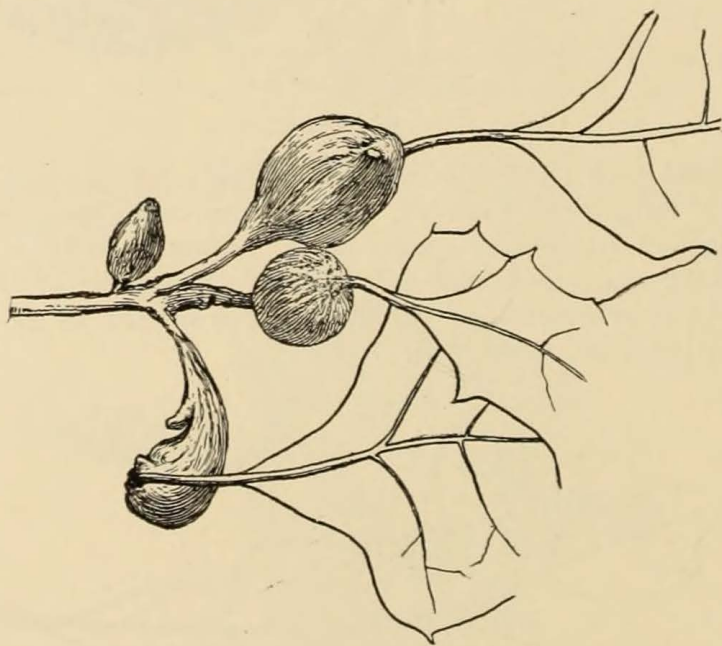
22. **Oak Wart Gall** (*Andricus futilis* Osten Sacken).—Rounded, somewhat

14 INSECT-GALLS OF THE VICINITY OF NEW YORK CITY

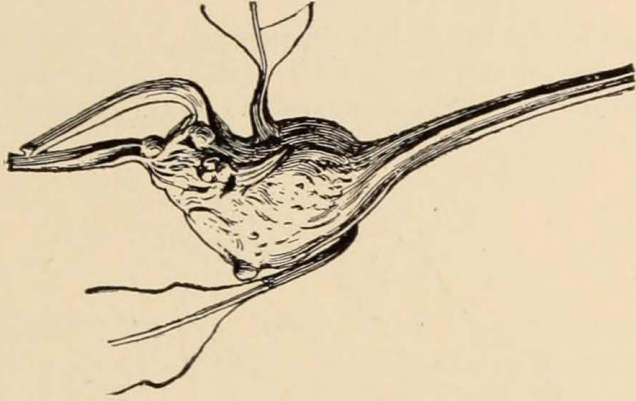
flattened, projecting on both sides of the leaf. Inside are two or three seed-like, oblong kernels, kept in position by white filaments. Pale green. In numbers on leaves of white oak (*Quercus alba*). Very common.



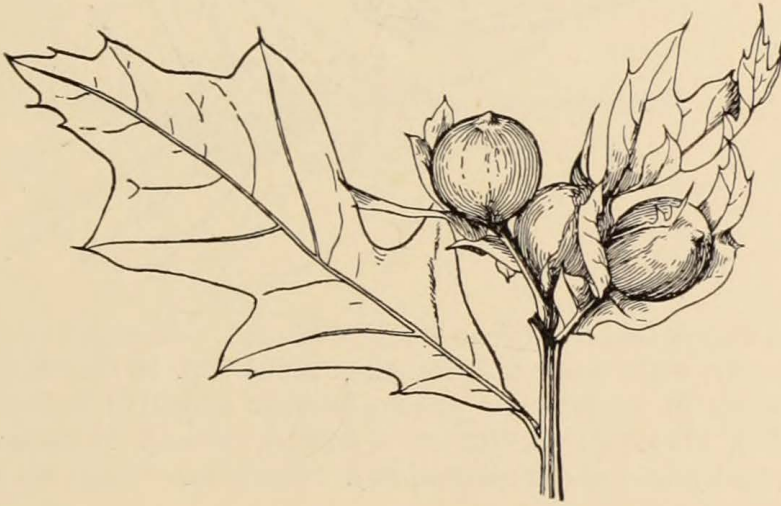
23. **Oak Nipple Gall** (*Andricus papillatus* Osten Sacken).—Rounded and somewhat nipple-shaped. Projects on both sides of the leaf and is enclosed in a reddish areola on the under side of the leaf. This is a very characteristic feature and distinguishes it from the preceding species. Inside are two or three kernels each containing a single larva. In numbers on leaves of chestnut oak (*Quercus prinus*). Common.



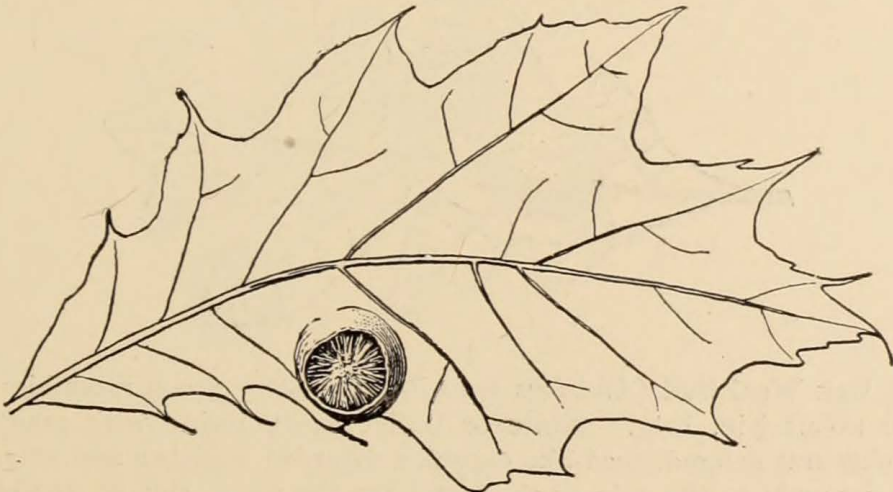
24. **Scrub Oak Club Gall** (*Andricus similis* Bass.).—Club-shaped, blunt at apex, which is generally turned to one side. Length $\frac{1}{2}$ to 1 in. Hard and woody, with a few leaves growing from it in summer. On terminal twigs of scrub oak (*Quercus nana*). Not common.



25. **White Oak Club Gall** (*Andricus clavula* Bass.).—Club-shaped, hard and woody, with a few leaves growing from it. Length $\frac{1}{2}$ to 1 in. Green in summer; brown in winter. On tips of twigs of white oak (*Quercus alba*). Very common.

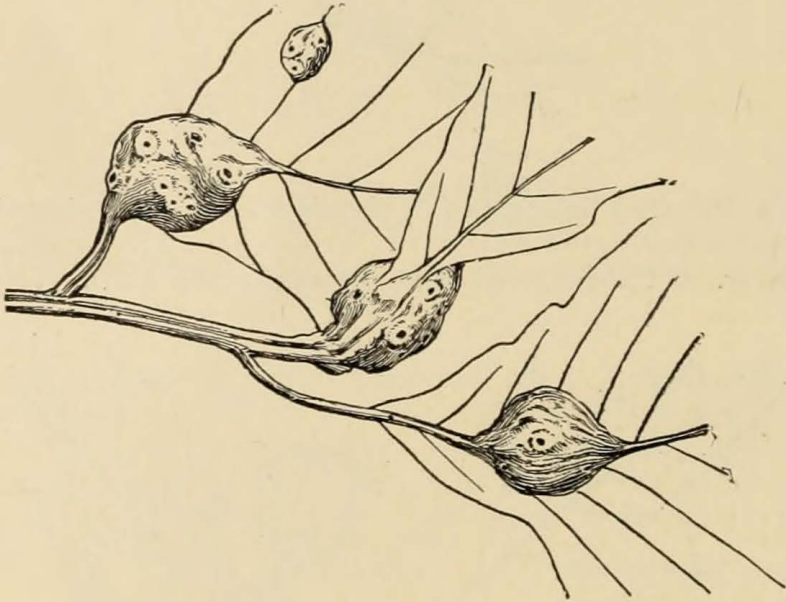


26. **Succulent Oak Gall** (*Andricus palustris* Osten Sacken).—Globular, green, succulent. Hollow inside, with a small seed-like kernel which rolls about freely. Diameter about $\frac{1}{2}$ in. On buds and young leaves of pin oak (*Quercus palustris*). May.

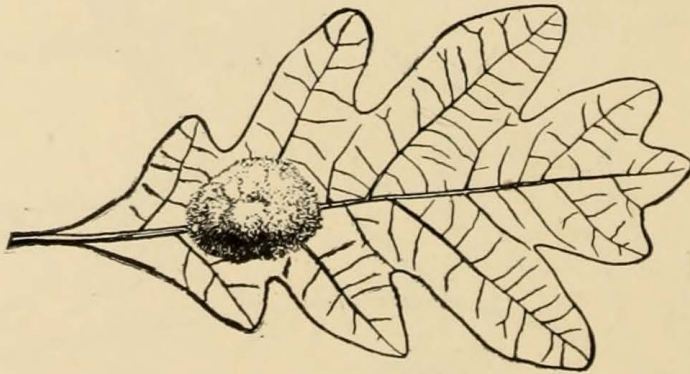


27. **Small Oak Apple** (*Andricus singularis* Bass.).—Globular, smooth,

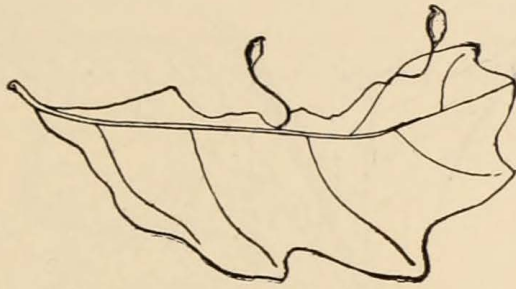
with an oblong kernel inside held in position by radiating fibers. Green and soft in spring; brown and brittle later in the season. Varies from $\frac{1}{4}$ to $\frac{1}{2}$ in. in diameter. On leaves of red oak (*Quercus rubra*). Rather common.



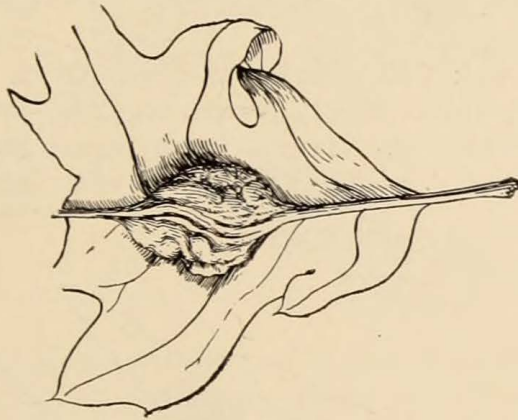
28. **Oak Petiole Gall** (*Andricus petiolicola* Bass.).—Rounded or club-shaped, hard and woody, with many cells inside. About $\frac{3}{4}$ in. in diameter. Green in summer; brown in winter. On petiole, base or midrib of leaf of white oak (*Quercus alba*), chestnut oak (*Quercus prinus*), swamp white oak (*Quercus platanooides*) and post oak (*Quercus minor*). Common.



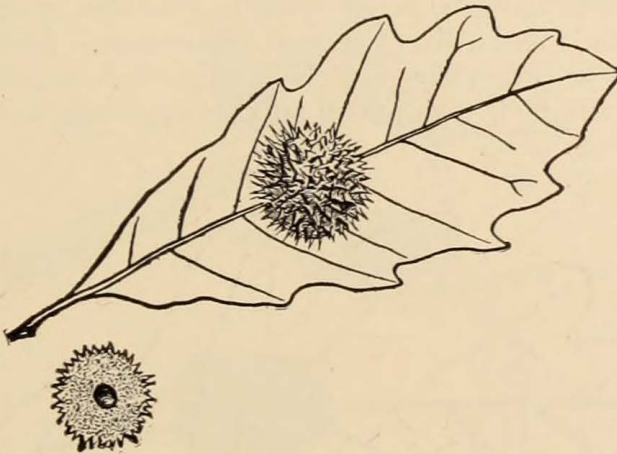
29. **Oak Wool Gall** (*Andricus lana* Fitch).—Very much resembles a mass of wool about $\frac{5}{8}$ in. long. White or buff colored, inside with many small, bright chestnut colored, seed-like capsules, crowded together and attached by their lower ends to the vein of the leaf. On the under side of ribs of leaf of white oak (*Quercus alba*). Common.



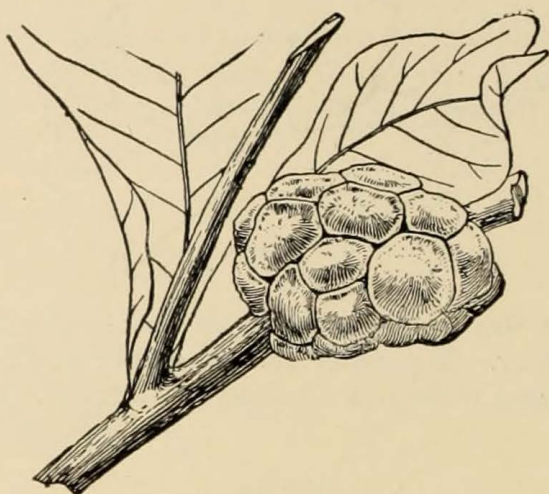
30. **Oak Capsule Gall** (*Andricus capsulus* Bass.).—Oval and attached to a pedicel, $\frac{1}{2}$ to $\frac{3}{4}$ in. long. Resembles the capsule of certain mosses. On the margin of leaf of swamp white oak (*Quercus platanoides*). Not common.



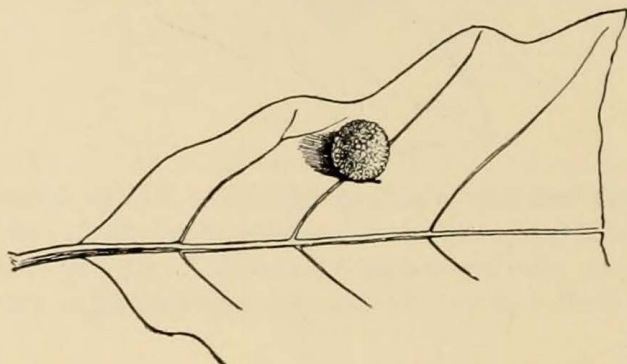
31. **Oak Midrib Gall** (*Andricus piger* Bass.).—A large, irregular woody swelling on the midrib of leaf of black oak (*Quercus velutina*), always on the under side and usually on the lower half of the leaf. Upper side indicated by a widening of the midrib and a slight depression of the leaf at that point. Rather common.



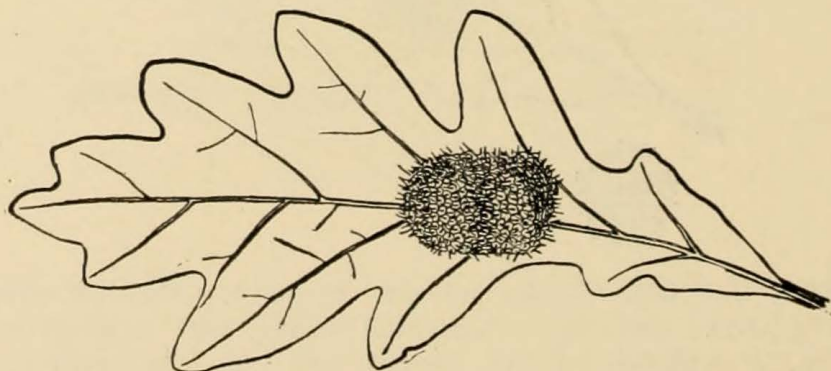
32. **Spiny Oak Gall** (*Cynips prinoides* Beuten.).—Globular, covered with numerous cone-like projections, hard and woody, with a small cell inside. About $\frac{1}{2}$ in. in diameter. Green, tinged with red. On upper side of leaf of dwarf chestnut oak (*Quercus prinoides*). Not common.



33. **Pine-Cone Oak Gall** (*Cynips strobilana* Osten Sacken).—Consists of many wedge-shaped bodies, closely packed together, with their pointed bases attached to a common center. Hard and corky with a single cell in each. They break off readily when dry. On twigs of swamp white oak (*Quercus platanoides*). Not common.

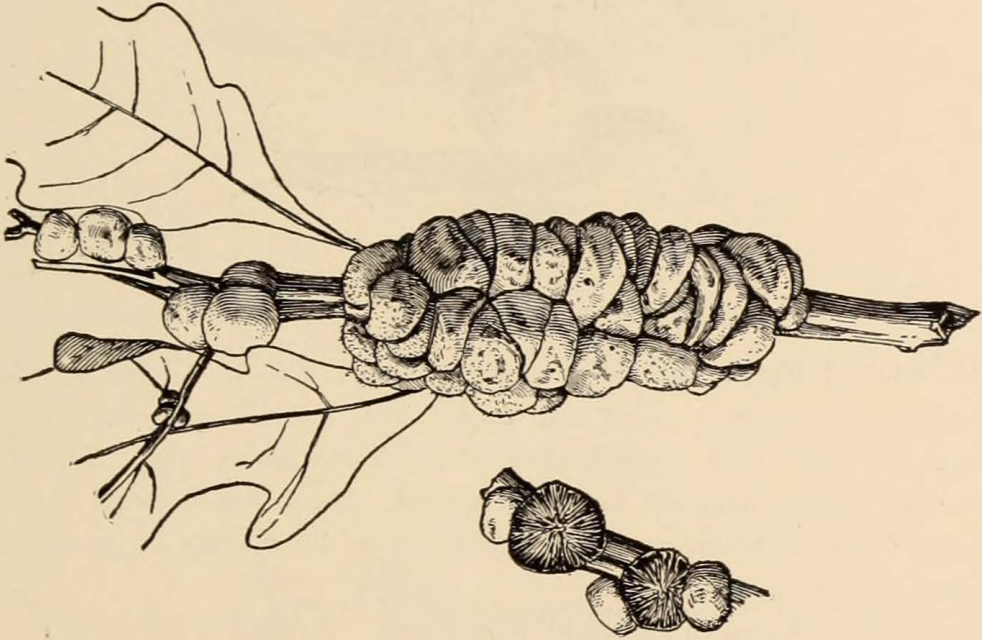


34. **Oak Pea Gall** (*Cynips pisum* Fitch).—Globular, green and about the size of a pea, which it resembles in general appearance. Surface finely netted with fissures or cracks and intervening elevated points. Inside are two cavities divided in the middle by a thin partition. On upper and under sides of leaves of white oak (*Quercus alba*).

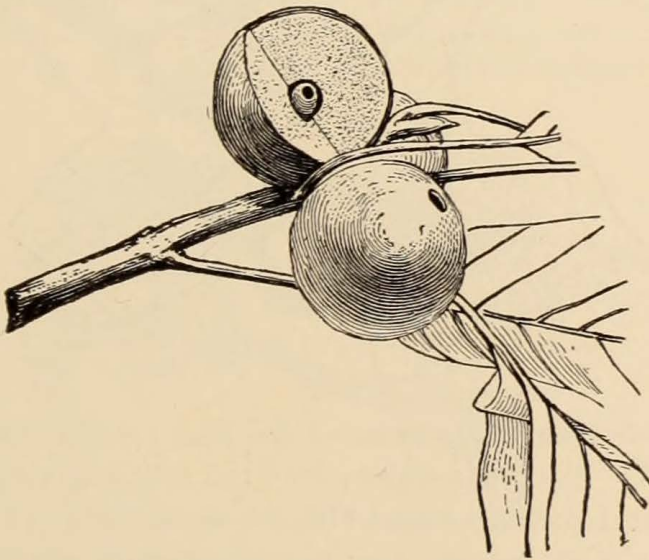


35. **Oak Hedgehog Gall** (*Acraspis erinacei* Walsh).—Rounded or oblong

oval, covered with numerous, rather long spines. Length about $\frac{3}{4}$ in. Yellow or greenish yellow with the spines bright red, especially when young. On one of the principal veins of leaf of white oak (*Quercus alba*). Common.



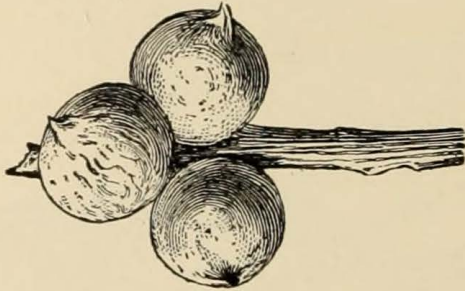
36. **Oak Fig Gall** (*Biorhiza forticornis* Walsh).—Consists of many small, soft, bladder-like bodies, each containing a single cell, which is held in position by radiating fibers. They are closely pressed together and somewhat resemble figs packed in boxes,—hence the name “Fig Gall.” Pale yellow, often beautifully tinged with bright red. Brown in winter. On twigs of white oak (*Quercus alba*). Common.



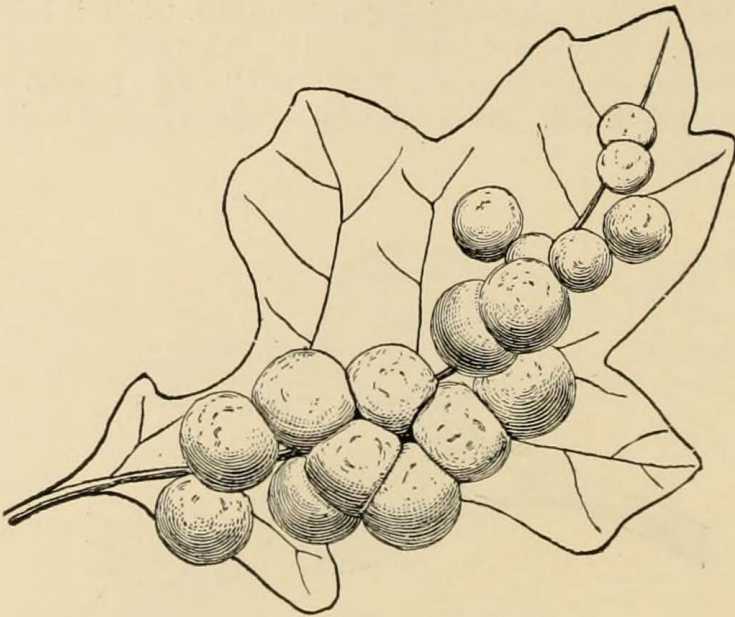
37. **Oak Bullet Gall** (*Holcaspis globulus* Fitch).—Bullet-like, corky, with a small cavity in the center containing a single larva living in an oval, whitish

20 INSECT-GALLS OF THE VICINITY OF NEW YORK CITY

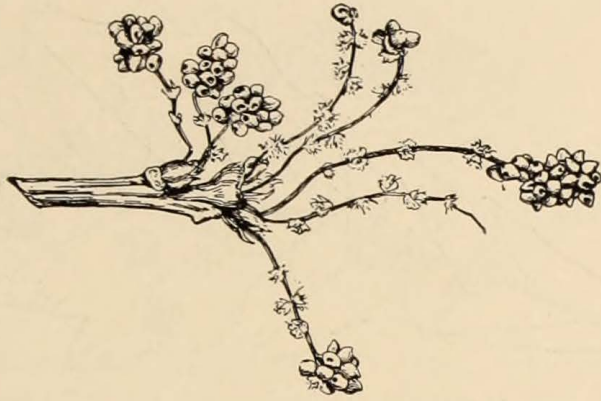
shell. Yellow, tinged with red in summer; brown in winter. Grows singly or in clusters of two or three on terminal twigs of white oak (*Quercus alba*). Common.



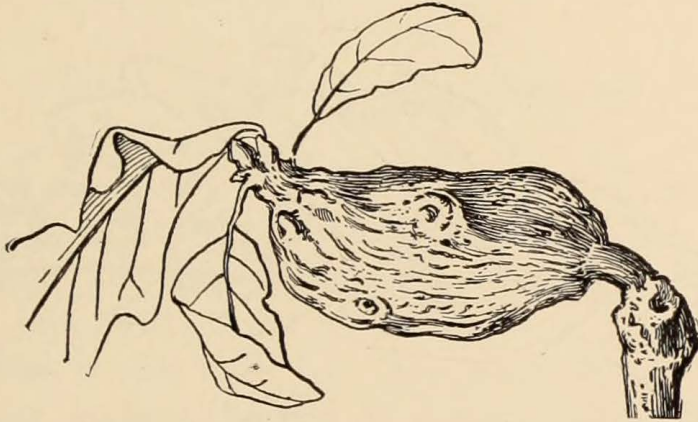
38. **Pointed Bullet Gall** (*Holcaspis duricaria* Bass.).—Globular, with a short point at the apex. Hard and woody, with a small cavity in the center containing a small oval, whitish shell in which the larva lives. Yellow and tinged with red in summer; brown in winter. On terminal twigs of swamp white oak (*Quercus platanoïdes*) growing singly or in clusters of two or more. Common.



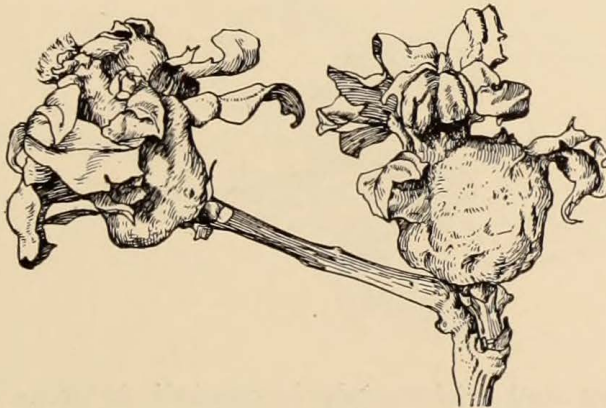
39. **Polished Oak Gall** (*Dryophanta polita* Bass.).—Globular, smooth, with a thin outer shell. Inside is a single round cell held in position by radiating fibers. Pale green, sometimes tinged with red, and about $\frac{1}{4}$ to $\frac{3}{4}$ in. in diameter. On both surfaces of the leaves, at or near the summit of young and thrifty shoots, of post oak (*Quercus minor*). Grows singly or in clusters. August and September. Not rare in the pine barrens of New Jersey.



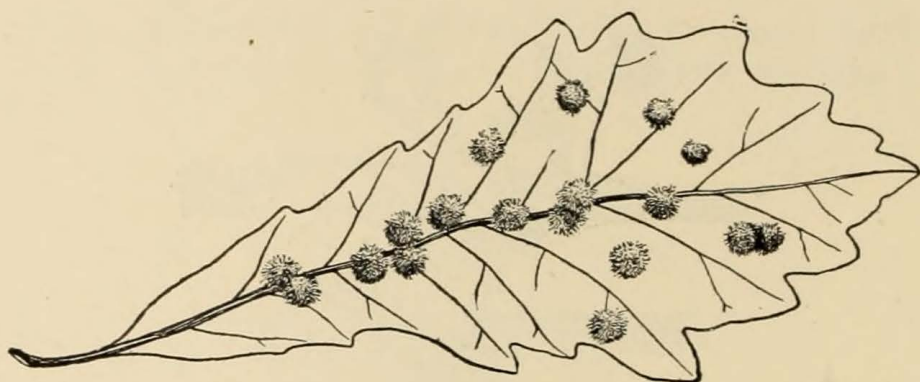
40. **Oak Flower-Stem Gall** (*Neuroterus pallidus* Bass.).—Small, unevenly globular, smooth and of a fine, soft cellular consistence. Pale wood color. In masses on flower stems of swamp white oak (*Quercus platanoïdes*). Not common.



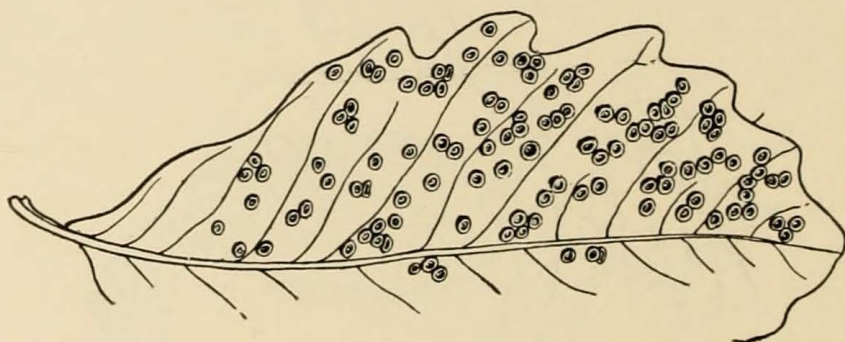
41. **Oak Potato Gall** (*Neuroterus batatus* Fitch).—Generally large and uneven, often resembling a potato in shape. Hard and woody, the surface being coated with a pale bluish bloom. Inside it is dense, corky, with many larval cells. On white oak (*Quercus alba*) below the terminal shoot. Common.



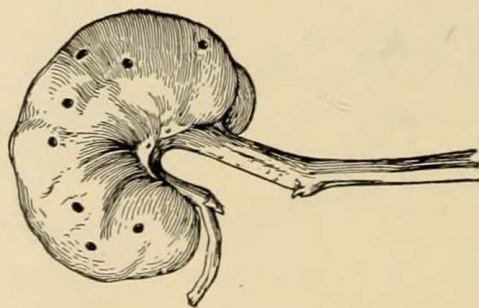
42. **Noxious Oak Gall** (*Neuroterus noxiosus* Bass.).—Irregularly rounded, hard and woody, with many larval cells inside. On the terminal twigs of swamp white oak (*Quercus platanoïdes*). Common.



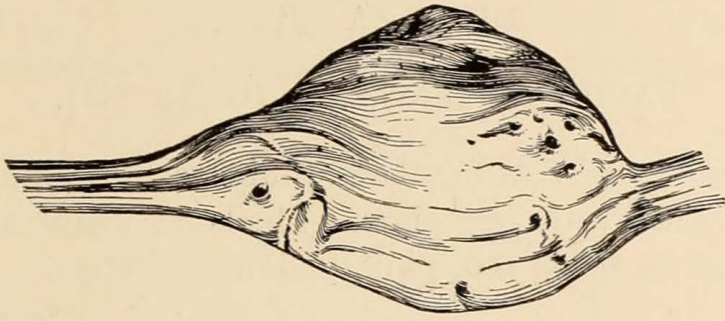
43. **Oak Flake Gall** (*Neuroterus floccosus* Bass.).—Small, hemispherical, covered with white hairs. Found in numbers on the under side of leaf of swamp white oak (*Quercus platanoïdes*). On the upper side of the leaf it is indicated by a small, smooth, shining blister-like elevation. Common.



44. **Oak Button Gall** (*Neuroterus umbilicatus* Bass.).—Small, rounded, much depressed, with a rather deep cavity on top, in the center of which is a minute nipple. About $\frac{1}{10}$ in. in diameter. Found in numbers on the under side of leaf of swamp white oak (*Quercus platanoïdes*). On the upper side of the leaf it is indicated by a circular spot. Common.



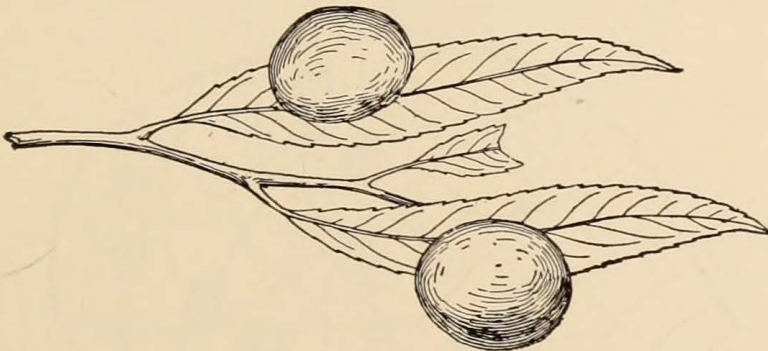
45. **Huckleberry Gall** (*Solenozopheria vaccinii* Ashm.).—Rounded, elongate, concave at place of attachment to the stem, turning the same downward. Green and pithy in summer; brown, hard and woody in winter. On stems of huckleberry. Common.



46. **Lettuce Tumor Gall** (*Aulax tumidus* Bass.).—Varies greatly in shape and size from a slight, knotty and irregular enlargement of the stalk to a large and more or less ovate swelling, 2 to 3 in. long and 1 in. in diameter. Inside it is pithy and filled with many cells. Found on the main stalk of wild lettuce (*Lactuca canadensis*), usually near the summit, often in the panicle itself, and then covered with the short flower stems. Common.

FAMILY TENTHREDINIDÆ (Saw-flies).

With few exceptions the members of this family do not produce galls, the larvæ being leaf-eaters. The larvæ very much resemble the caterpillars of butterflies and moths, but they have, ordinarily, from 12–16 prolegs, while true caterpillars have as a rule only 10. The adult female is furnished with a pair of saws at the end of the abdomen which she uses to make slits in the leaves and stems of plants in which she places her eggs.

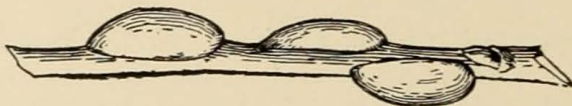


47. **Willow Apple Gall** (*Nematus pomum* Walsh).—Rounded and fleshy, somewhat resembling a miniature apple. Yellowish green, usually with a rosy cheek. Measures about $\frac{1}{2}$ in. in diameter. On leaves of bush willow. July and August. Rather common.

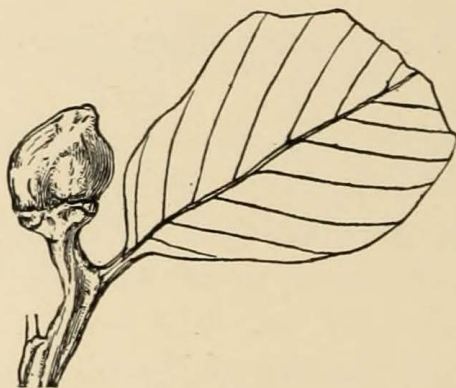
DIPTERA (Flies).

FAMILY CECIDOMYIIDÆ (Gall-gnats).

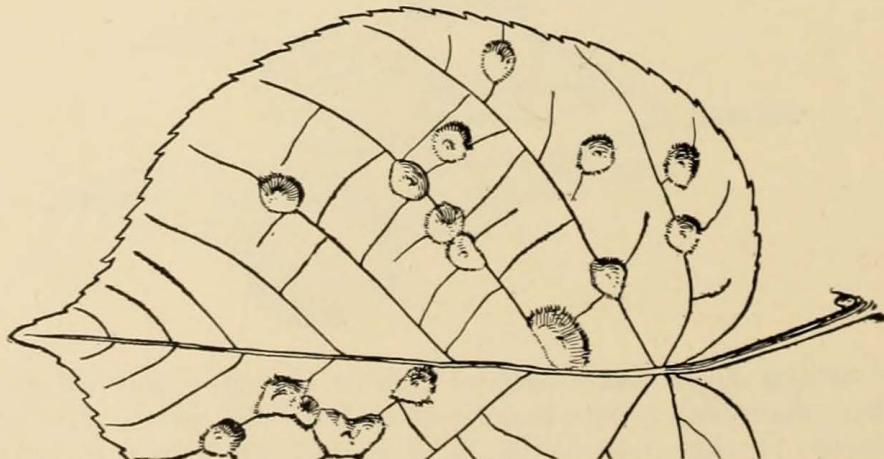
The members of this family are minute flies with the wings and body clothed with long hairs. The larvæ are small brightly-colored maggots, being red, pink, yellow or orange.



48. **Willow Egg Gall** (*Euura ovum* Walsh).—Oval or elongated. Placed lengthwise on one side of a twig, often in a row of two or more. Hard and woody. On the stems of bush willow growing in swampy places. Rather common.

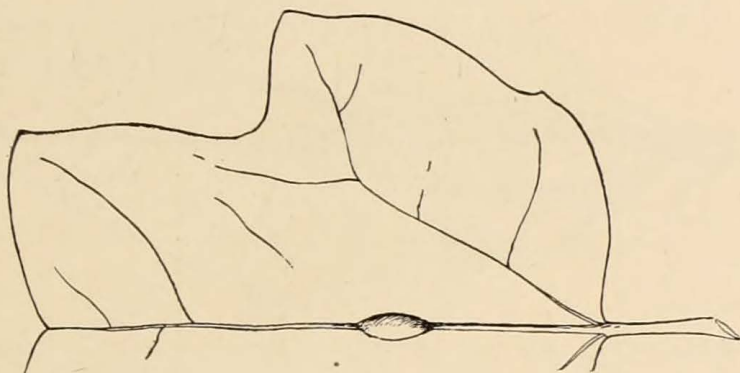


49. **Alder Bud Gall** (*Cecidomyia serrulatæ* Osten Sacken).—Rounded, bud-like, with the apex pointed, and often covered with a whitish bloom. Greenish in autumn and brown in winter. This gall is a deformation of the terminal bud of the common alder (*Alnus rugosa*). Rather common locally.

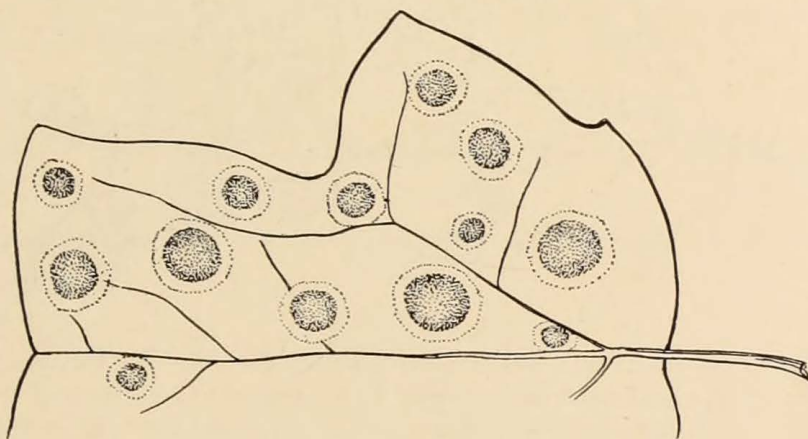


50. **Basswood Wart Gall** (*Cecidomyia verrucicola* Osten Sacken).—Rounded,

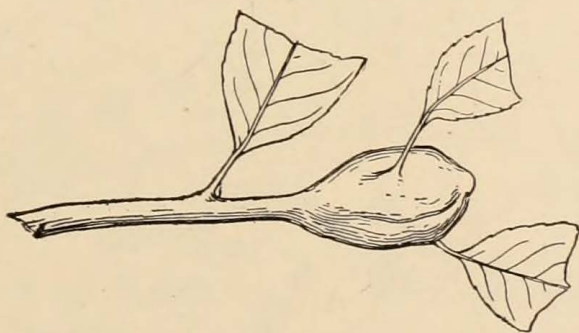
wart-shaped, about $\frac{1}{8}$ in. in diameter. In numbers on the same leaf of basswood (*Tilia americana*). July and August. Rather common.



51. **Tulip-tree Midrib Gall** (*Cecidomyia tulipifera* Osten Sacken).—A small rounded swelling on the midrib of the leaf of the tulip tree (*Liriodendron tulipifera*). Not common.

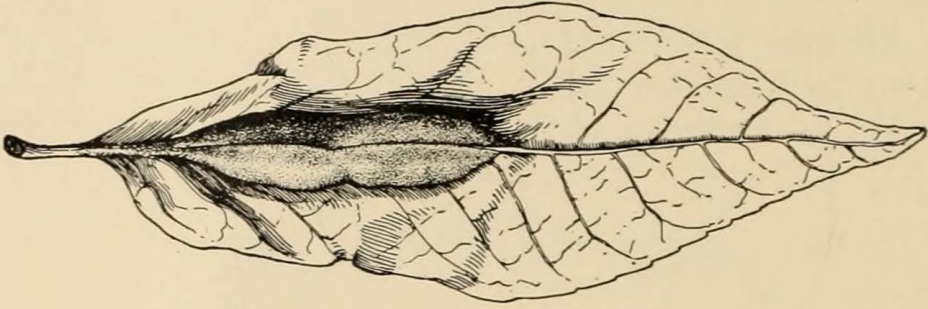


52. **Tulip-tree Spot Gall** (*Cecidomyia liriodendri* Osten Sacken).—Forms brown spots with a yellow or greenish areola on the leaves of the tulip tree (*Liriodendron tulipifera*). Common.

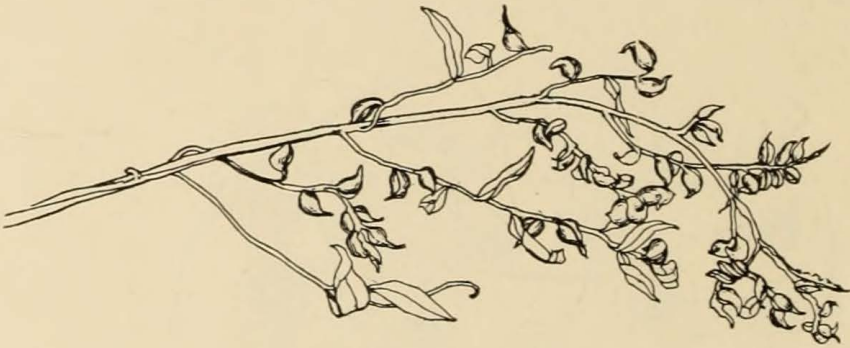


53. **Wild Cherry Bud Gall** (*Cecidomyia serotinae* Osten Sacken).—Rounded, club-shaped, with one or two leaves growing from its sides. Bright red in

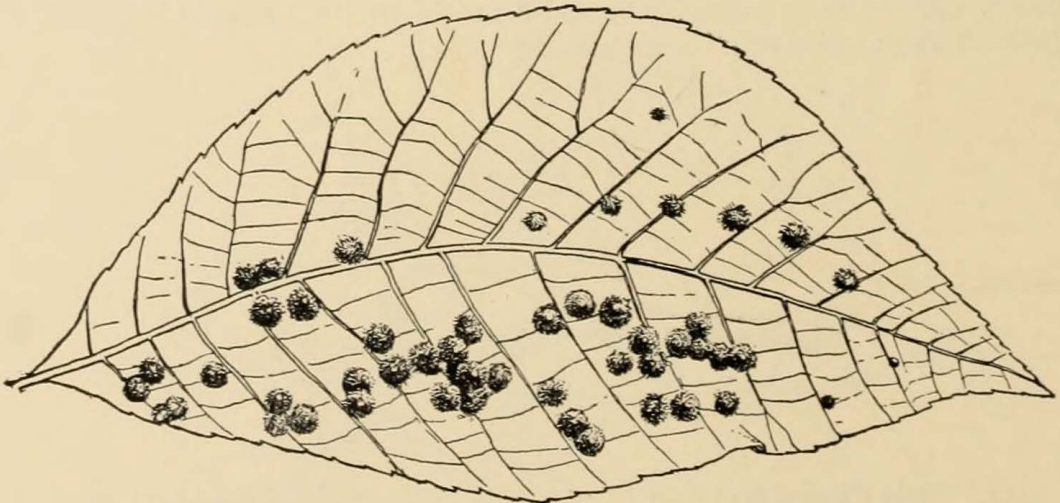
spring; brown in winter. This gall is an enlargement of the terminal bud of young shoots of the wild cherry (*Prunus serotina*). Common.



54. **Ash Midrib Gall** (*Cecidomyia pellex* Osten Sacken).—Rounded, oblong or very much elongated, succulent. Under side indicated by being somewhat swollen. Pale green, sometimes tinged with red. Length from 1 to 2 in. On midrib of leaf of ash (*Fraxinus americana*). May and June. Rather common.

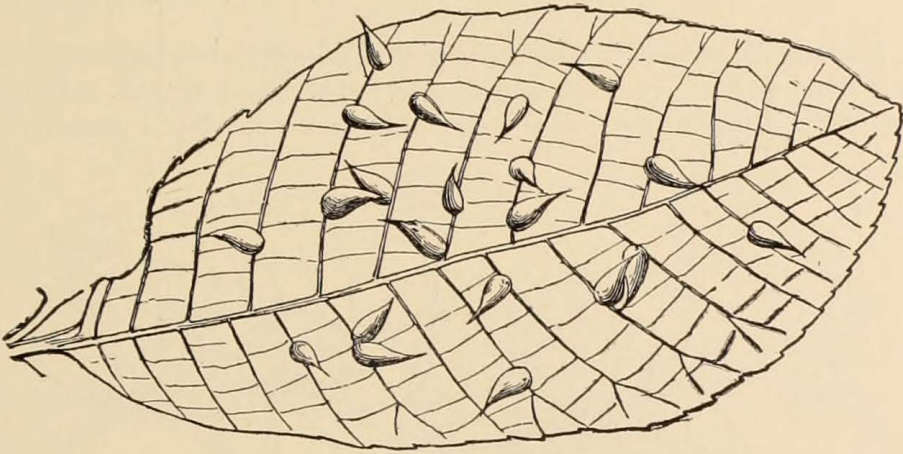


55. **Honey-locust Pod Gall** (*Cecidomyia gleditschiæ* Osten Sacken).—Formed of a single leaflet in such a way as to assume the shape of a small pod. On the leaves of honey-locust (*Gleditschia triacanthos*). Sometimes nearly all the leaves on the terminal twigs are deformed in this way. Not common.

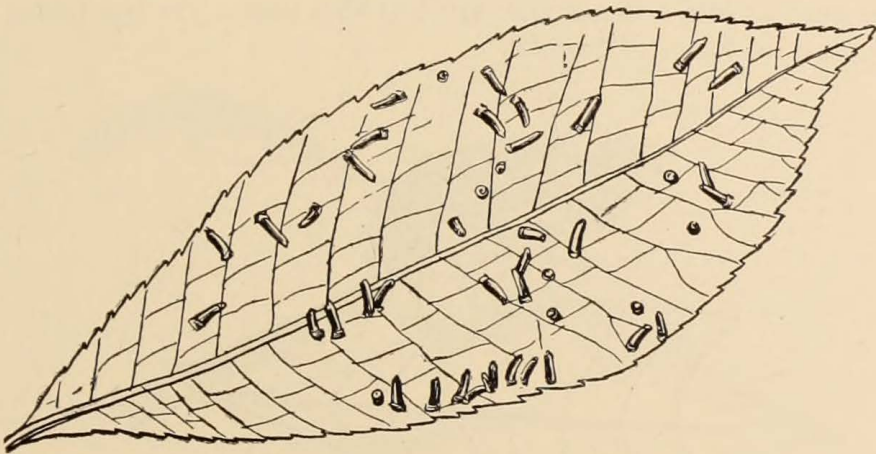


56. **Hickory Onion Gall** (*Cecidomyia holotricha* Osten Sacken).—Sub-

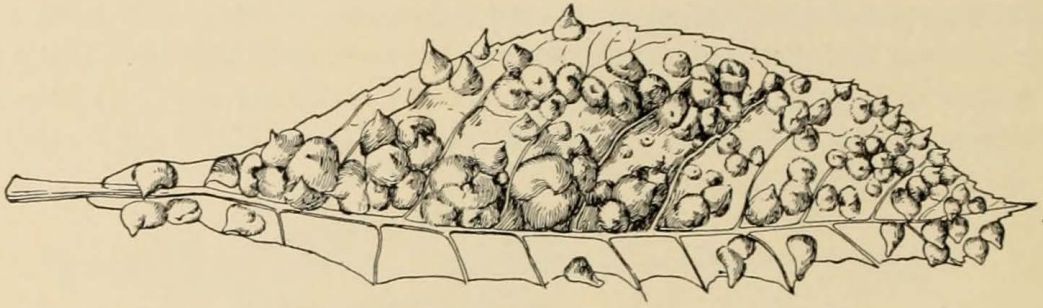
globular, onion-shaped and covered with pubescence which is pale when the gall is young and growing, and becomes rust-colored when mature. Inside it is hollow and contains a single larva. On the under surface of the leaves of different kinds of hickory. Sometimes they cover the entire under surface of the leaf. Very abundant.



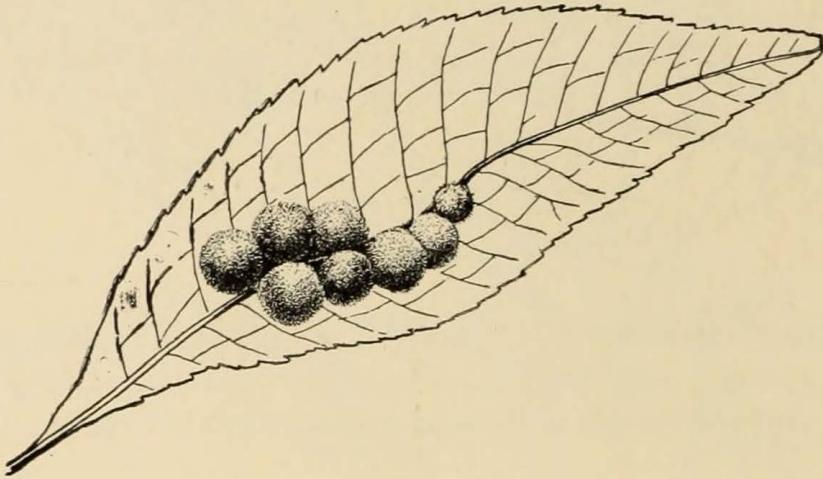
57. **Hickory Seed Gall** (*Cecidomyia caryæcola* Osten Sacken).—Smooth, elongated, rounded, with the tip produced into a point. Pale green. In clusters on the under surface of leaves of different kinds of hickory. Common.



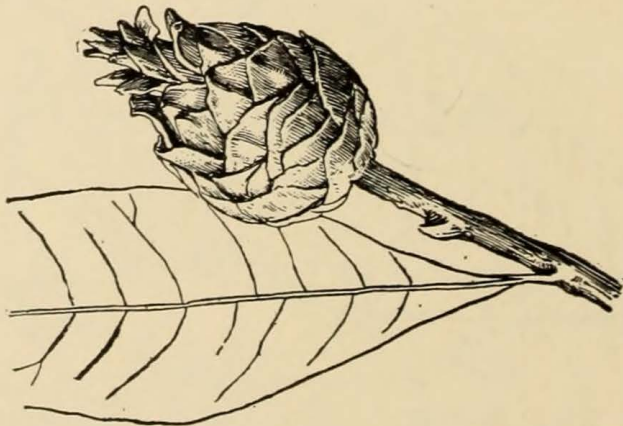
58. **Hickory Tube Gall** (*Cecidomyia tubicola* Osten Sacken).—Narrow, cylindrical, tube-like, inserted in a small protuberance on the leaf, breaking off very easily. Green when immature; black when fully grown. On under surface of the leaves of different kinds of hickory. Common.



59. **Hickory Cone Gall** (*Cecidomyia sanguinolenta* Osten Sacken).—Conical, somewhat narrowed at the base and of a blood red or purplish red color. In numbers on the under surface of the leaves of hickory. Not common.



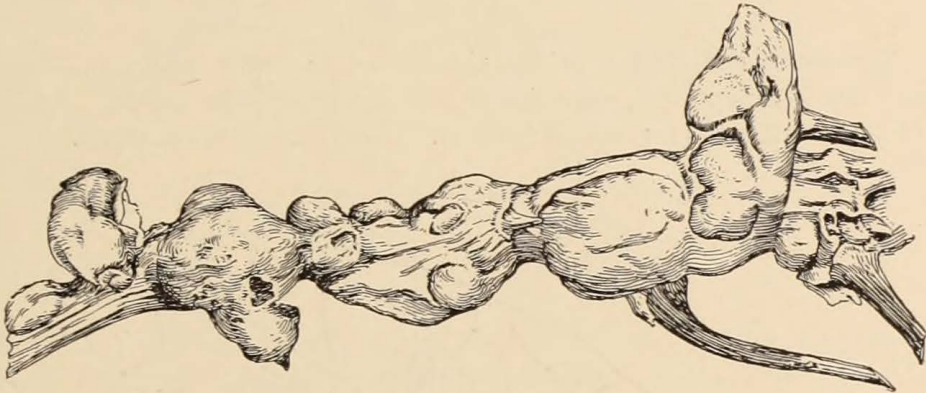
60. **Hickory Peach Gall** (*Cecidomyia persicoides* Osten Sacken).—Variable in shape, usually rounded and clothed with delicate down like that of a peach, looking somewhat like a diminutive fruit of this kind. On the under surface of the leaves of hickory. Common.



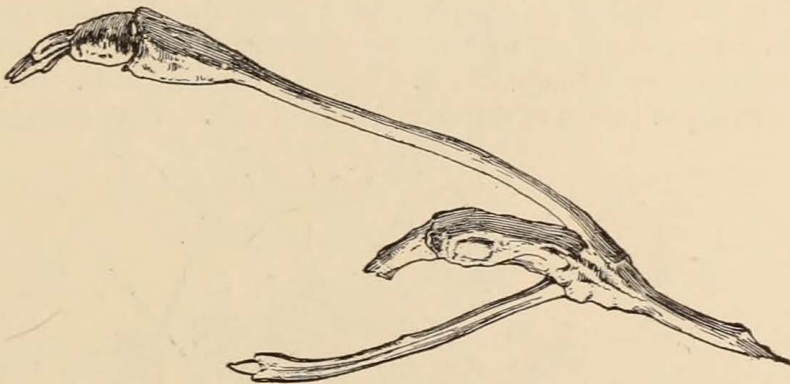
61. **Pine-Cone Willow Gall** (*Cecidomyia strobiloides* Osten Sacken).—Formed of closely imbricated leaves assuming the shape of a cone. On the terminal twigs of different kinds of low willow. Common.



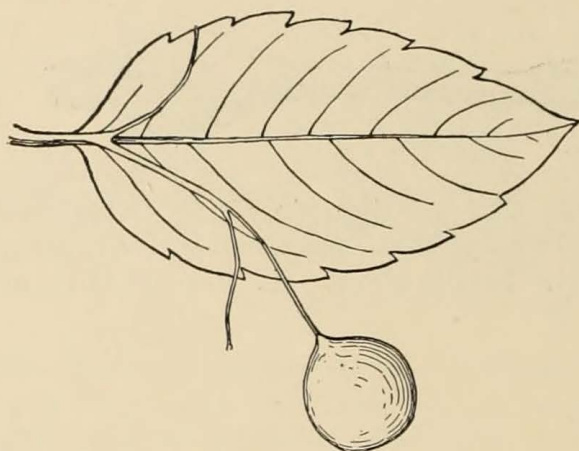
62. **Willow Club Gall** (*Cecidomyia rigidæ* Osten Sacken).—Elongated, club-like, tapering to a point at the apex, and with a number of small terminal buds growing from it. Length about $\frac{3}{4}$ in. On tips of branches of low willow. Rather common.



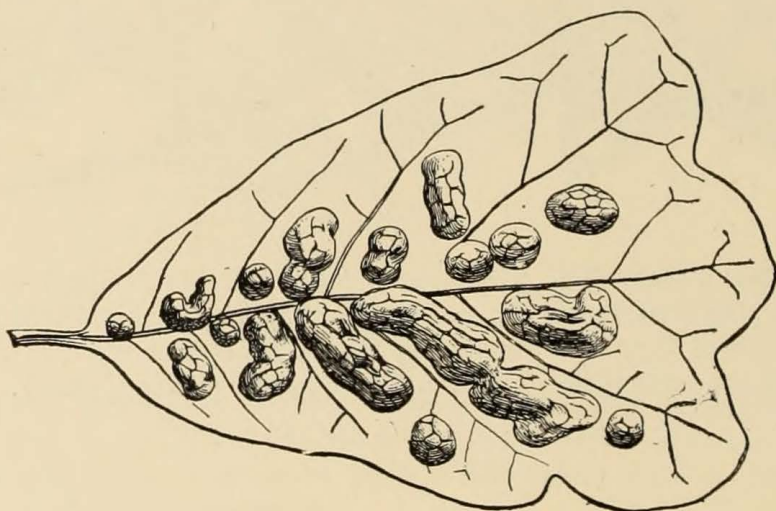
63. **Willow Potato Gall** (*Cecidomyia batatas* Osten Sacken).—Irregularly rounded, varying considerably in size and in shape. Hard and woody. Sometimes the different forms are strung together, one after another, in more or less proximity, on the same twig. On branches of willow (*Salix discolor*). Common.



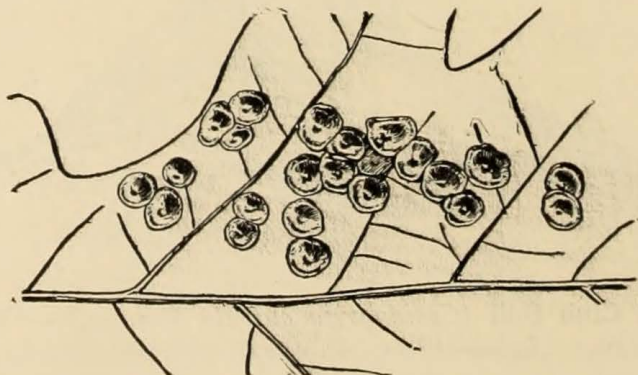
64. **Dogwood Club Gall** (*Cecidomyia clavula* Beuten.).—Club-shaped and about $\frac{1}{2}$ to 1 in. long. Inside is an elongated channel inhabited by a single larva. Green in summer and the color of the bark in winter. On terminal twigs of dogwood (*Cornus florida*). Common.



65. **Touch-me-not Gall** (*Cecidomyia impatiens* Osten Sacken).—Globular, succulent, semi-transparent, containing a number of cells inside. At base of flower of touch-me-not (*Impatiens biflora*). August. Not common.



66. **Oak Pill Gall** (*Cecidomyia pilulæ* Walsh).—Usually rounded, hard and woody. Frequently two or more galls are confluent and assume a very irregularly rounded or elongated form. Inside are several cells. Brown or green. On upper surface of leaves of different kinds of oak. Very common.



67. **Oak Spangles** (*Cecidomyia poculum* Osten Sacken).—Rounded, saucer-

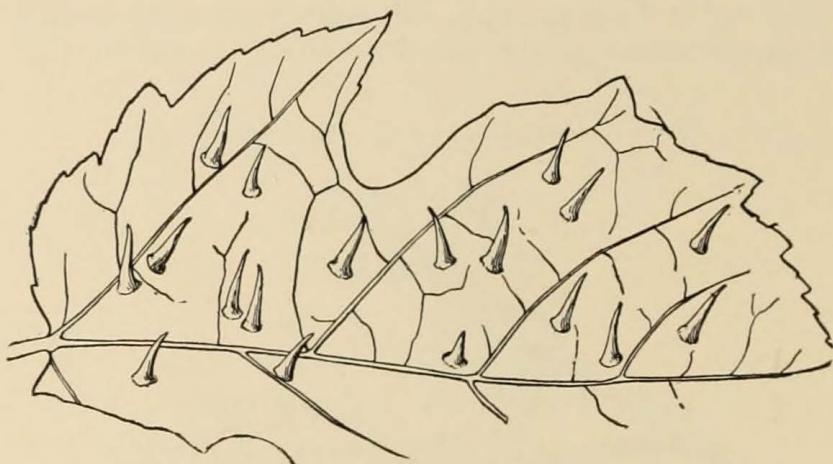
shaped. Pale red to light lavender. In clusters on under surface of leaf of white oak (*Quercus alba*). August and September. Common.



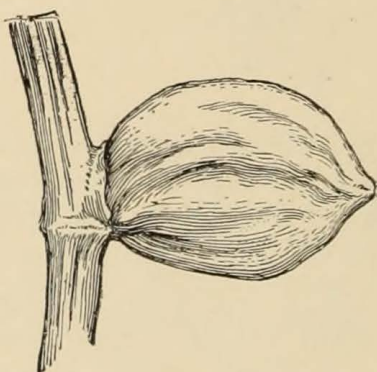
68. **Oak Fold Gall** (*Cecidomyia niveipila* Osten Sacken).—Consists of a large fold lined with white pubescence. Sometimes the entire leaf is folded with the edges curled, the under side of the leaf being inside of the gall. On red oak (*Quercus rubra*). May and June. Common.



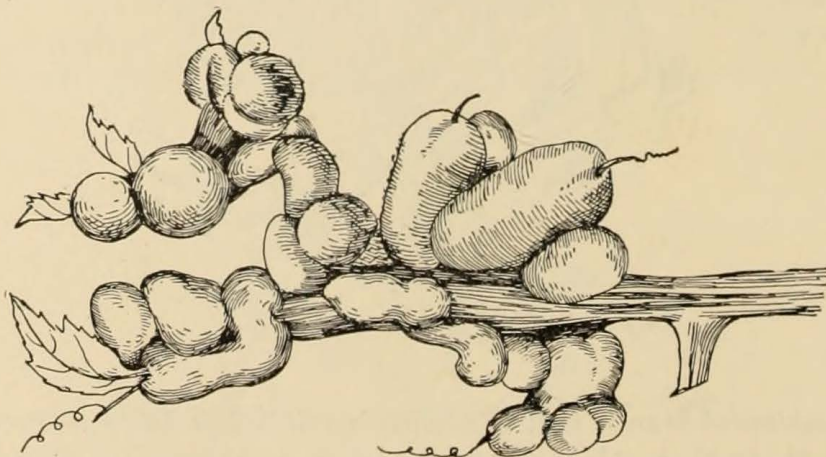
69. **Goldenrod Bunch Gall** (*Cecidomyia solidaginis* Loew).—Produced by the arrest of the stalk, which causes the leaves to accumulate, thus forming a globular bunch, consisting of several hundred leaves. On goldenrod (*Solidago*). Very common.



70. **Grape-vine Tube Gall** (*Cecidomyia viticola* Osten Sacken).—Narrow, elongated or conical. Green or bright red. In numbers on upper side of the leaves of wild grapes. July and August. Not common.



71. **Grape-vine Apple Gall** (*Cecidomyia vitis-pomum* Walsh and Riley).—Variable in size and in shape, usually rounded, flattened at the base and pointed at the top. When mature the gall often has eight or nine longitudinal ribs, like a muskmelon. Inside are numerous longitudinal cells each divided by a transverse partition. On stems of wild grapes. Common.

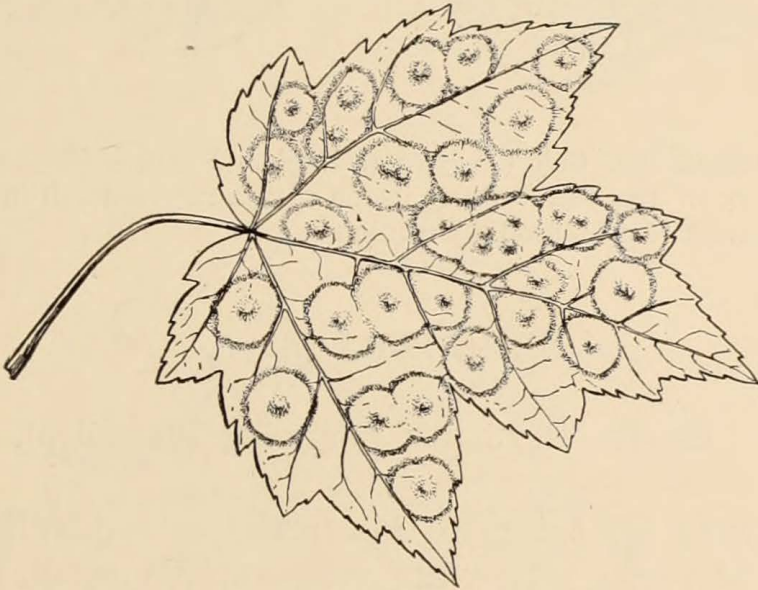


72. **Grape-vine Tomato Gall** (*Lasioptera vitis* Osten Sacken).—Consists of a bunch of irregular swellings of various rounded shapes. Soft, juicy and suc-

culent. Yellowish green, tinged with red or entirely of this color. On stems and leaf stalks of wild grapes. May and June. Common.

FAMILY MYCETOPHILIDÆ (Fungus-gnats).

The species of flies belonging to this family are of medium or small size and are more or less mosquito-like in form. Most of them feed on fungi and in damp places where there is decaying vegetable matter.



73. **Maple Spot Gall** (*Sciara ocellata* Osten Sacken).—Eye-like, circular, flat. Light yellow, with a red central dot, or entirely green or yellow. In numbers on the leaves of red maple (*Acer rubrum*). Common.

FAMILY TRYPETIDÆ.

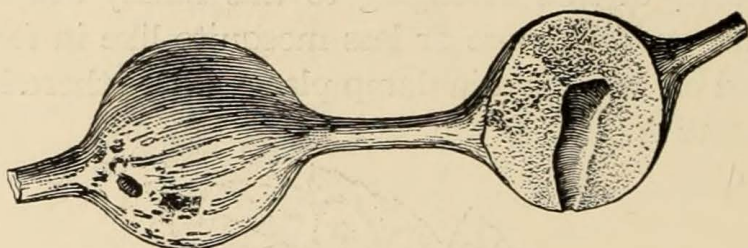
Only a certain number of species belonging to this family of flies produce galls. The wings of many of the species are beautifully marked with spots or bands.



74. **Goldenrod Gall** (*Trypeta polita* Loew).—Consists of a small bunch of

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accumulated aborted leaves, $\frac{1}{2}$ to $\frac{3}{4}$ in. long. Caused by the arrest of the side branches. Inside, at the base, is a hollow space in which the larva lives. On stalk of goldenrod (*Solidago altissima*). Singly or in numbers. Common.

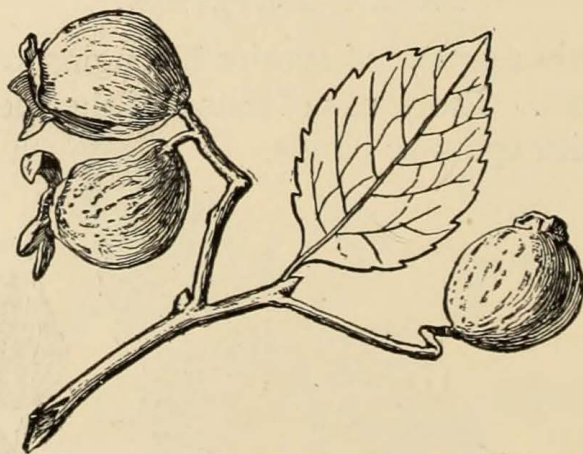


75. **Goldenrod Ball Gall** (*Trypeta solidaginis* Fitch).—Globular, ball-like and about 1 in. in diameter. Pithy inside with a rounded cell in the center. On the main stalk of goldenrod. Common.

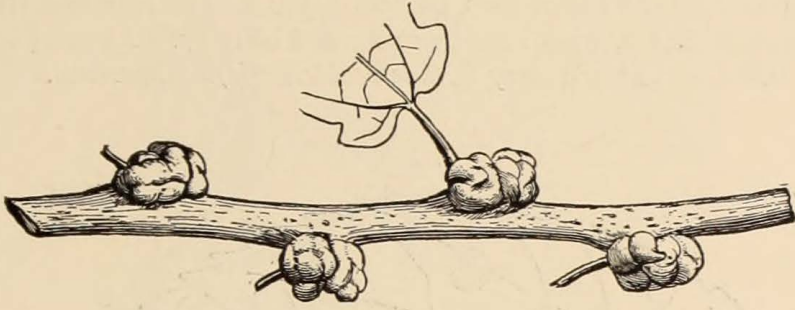
HEMIPTERA (Bugs).

FAMILY PSYLLIDÆ (Jumping Plant-lice).

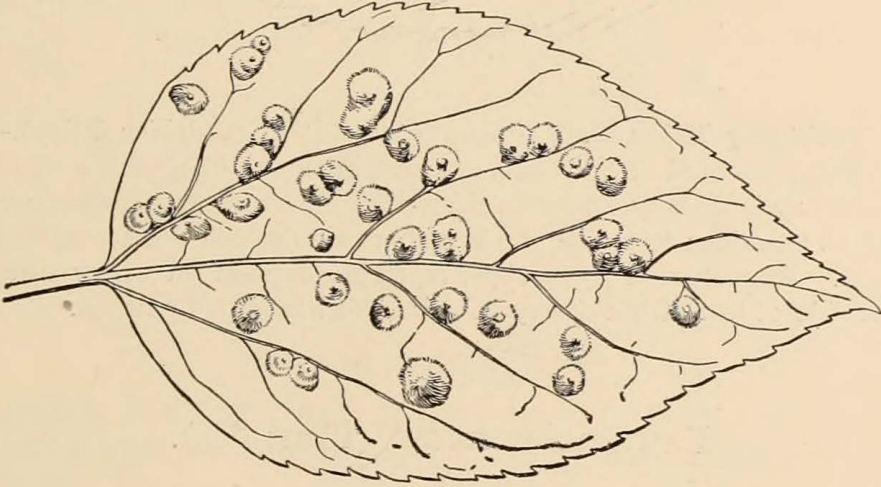
The insects belonging to this family subsist entirely upon the juices of plants. They are comparatively small, measuring from $\frac{1}{8}$ to $\frac{1}{16}$ inch in length. Their hind legs are formed for jumping.



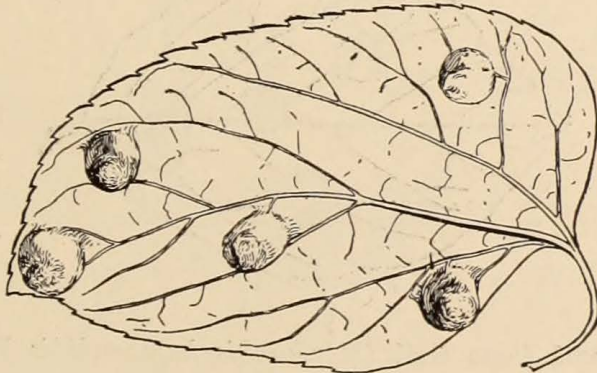
76. **Hackberry Petiole Gall** (*Pachypsylla venusta* Osten Sacken).—Globular or irregularly rounded. Consists of a thin outer shell with several compartments inside. On petiole of the leaf of hackberry (*Celtis occidentalis*). Not common.



77. **Hackberry Nodule Gall** (*Pachypsylla celtidis-gemma* Riley).—Variable in size and in shape. Bud-like and looking as if formed by the agglomeration of a number of rounded nodules. Hard and woody, with a number of cells inside. On branches of hackberry (*Celtis occidentalis*). It is a deformation of the young bud. Common.



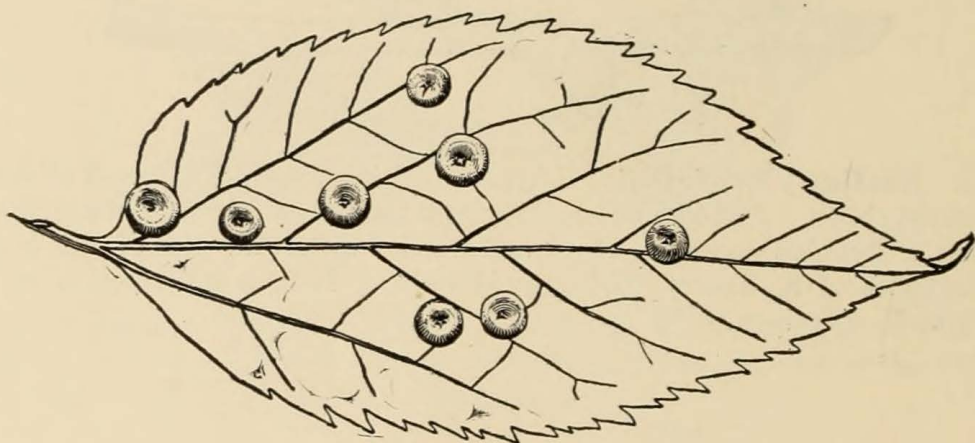
78. **Hackberry Blister Gall** (*Pachypsylla celtidis-vesiculum* Riley).—Circular, flat and blister-like. Convex on the under side with a small nipple in the middle. Green. In numbers on leaf of hackberry (*Celtis occidentalis*). Common.



79. **Hackberry Nipple Gall** (*Pachypsylla celtidis-mamma* Riley).—Repre-

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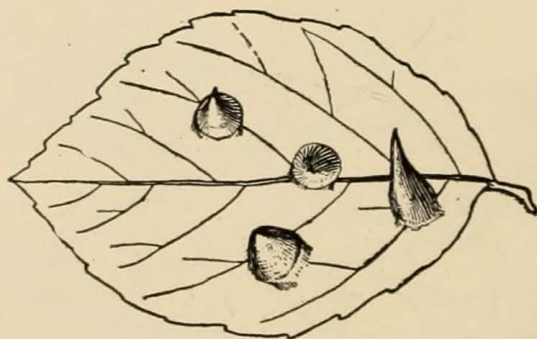
sented by a cup-shaped impression on the upper side of leaf and on the under side it is sub-cylindrical, with the apex rounded bluntly. About $\frac{1}{4}$ in. high and $\frac{1}{8}$ in. wide. On leaf of hackberry (*Celtis occidentalis*). Common.



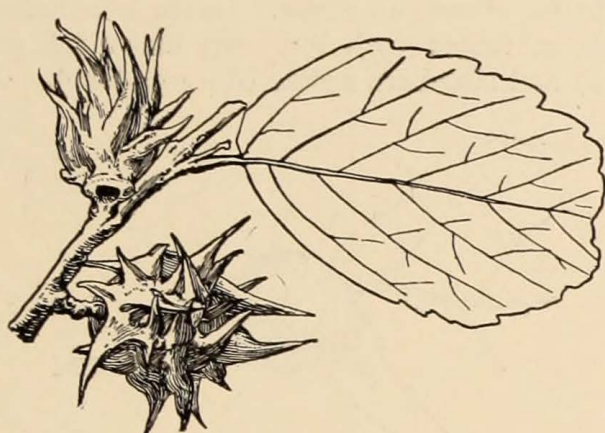
80. **Hackberry Melon Gall** (*Pachypsylla celtidis-cucurbitæ* Riley).—Under side rounded, truncated at apex and concave in the middle, with a small nipple. Around the top is usually an acute ridge which surrounds the concave depression, and at the sides near the top are short ribs, which are sometimes nearly obliterated. Represented by a cup-shaped impression on upper side of leaf. On under side of leaf of hackberry (*Celtis occidentalis*). Common.

FAMILY APHIDIDÆ (Plant-lice).

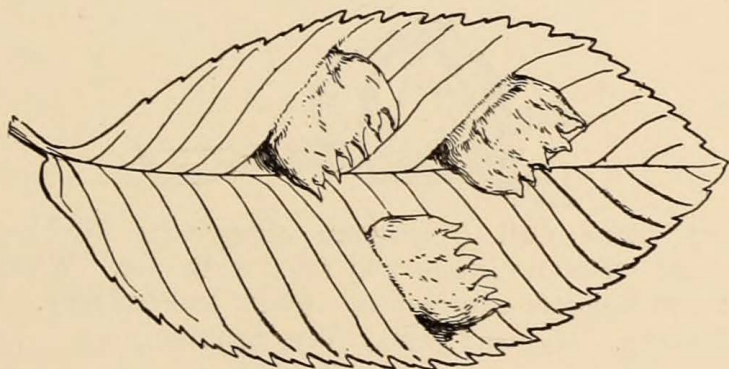
The plant-lice are well-known insects and infest nearly all kinds of plants. Comparatively few produce galls.



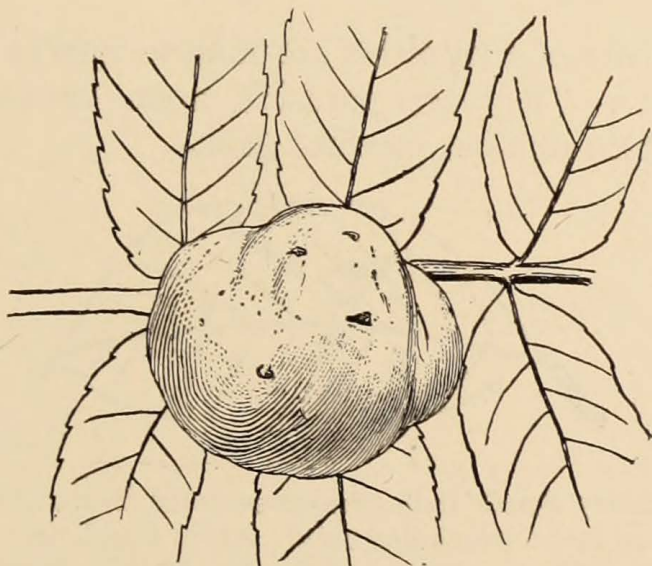
81. **Witch Hazel Cone Gall** (*Hormaphis hamamelidis* Fitch).—A conical swelling on upper side of leaf of witch hazel (*Hamamelis virginiana*). Very common.



82. **Spiny Witch Hazel Gall** (*Hormaphis spinosus* Shiner).—A deformation of the fruit bud, covered with a number of rather long spines, with a funnel-like exit at the base. Green in summer; brown in winter. On witch hazel (*Hamamelis virginiana*). Common.



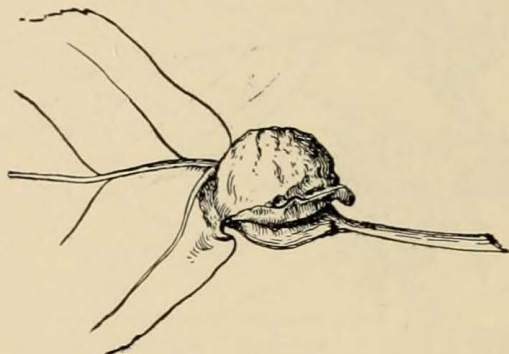
83. **Cock's Comb Elm Gall** (*Colopha ulmicola* Fitch).—Forms a cock's comb, blubber-like growth on the upper side of the leaf of the elm (*Ulmus americana*). June. Common.



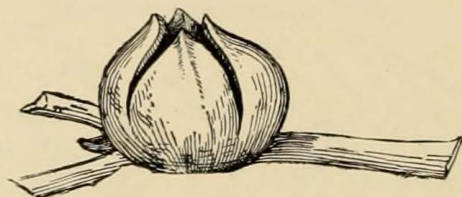
84. **Sumac Tomato Gall** (*Pemphigus rhois* Fitch).—Smooth, rounded,

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somewhat resembling a tomato in shape. Inside it is hollow and filled with lice. Yellowish green, tinged with red. On under side of leaf of smooth sumac (*Rhus glabra*) and stag-horn sumac (*Rhus typhina*). Common.



85. **Poplar Stem Gall** (*Pemphigus populicaulis* Fitch).—Irregularly globular, with a mouth-like orifice at the base on one side. On poplar at the junction of the stem and the leaf. Common.

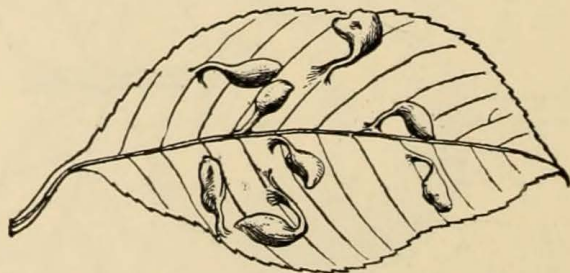


86. **Hickory Louse Gall** (*Phylloxera caryæcaulis* Fitch).—Globular or hickory-nut shape. Hollow inside and filled with lice. When fully grown it bursts open and becomes cup-shaped. Green and leathery. On twigs and leaf-stalks of hickory. May and June. Very common.

ACARINA. (Mites.)

FAMILY ACARIDÆ.

The members of this order are minute insects closely allied to the spiders. They are parasitic upon animals, man and plants; a certain number produce galls.



87. **Wild Cherry Pouch Gall** (*Acarus serotinae* Beuten.).—Stem-like, expanding at the end into a pouch-like sack. About $\frac{2}{5}$ in. long. Hollow, with an exit on under side of leaf. Green or red. In numbers on leaf of wild cherry (*Prunus serotina*). Common.

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