

DISTRIBUTION OF THE CARDUALES (COMPOSITAE)
IN MICHIGAN.

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of Michigan State College in partial
fulfillment of the requirements for the
M. S. degree

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DISTRIBUTION OF THE CARDUALES (COMPOSITAE) IN MICHIGAN.

Since 1904, the year that Dr. Beal published his Flora of Michigan, no survey of the Michigan Carduales (Compositae) has been attempted. The survey the writer has undertaken has helped, he believes, to fill in and show increased or decreased ranges of some of our native and introduced plants.

The order Carduales is used here for the old and well established name Compositae. Under it are placed for convenience the three families, Cichoriaceae (Chicory Family), Ambrosiaceae (Ragweed Family) and Carduaceae (Thistle Family). These are used in Gray's Manual as divisions or tribes of the family Compositae. The Carduaceae here is the Compositae in Britton & Brown's Illustrated Flora.

For the compilation of this distribution list the writer has consulted the herbaria of the University of Michigan, Michigan State College, Kent Scientific Museum, Michigan State Normal College, the private herbaria of Messrs. C. Billington of Detroit, C. W. Fallass of Petoskey, B. A. Walpole of East Lansing, F. J. Hermann of Ann Arbor and M. W. Schnute of East Lansing, as well as his own personal collection. All available distribution lists have been used.

In general the nomenclature of Britton & Brown's Illustrated Flora of the Northern States and Canada is followed. Other names are applied where recent findings indicate their priority or permanency. No attempt is made to bring the nomenclature up-to-date, especially in cases where there is disagreement. The genus *Troximon* has priority over *Cynthia* (see Rhod. 26:126. 1924). The genus *Megalodontia* is united with *Bidens*. In every case where generic and specified names are substituted, the synonyms

used in the standard manuals, especially Britton & Brown's, are inserted.

In this paper 'tegules' is used in place of 'bracts of involucre', 'pedicel' for stalk of a single head of flowers, 'M. S. C.' for specimens sent in to and identified by members of the Department of Botany in Michigan State College. The county is used as the unit of distribution except where the reports^{are} from the islands of the Great Lakes. Certain distributional records are omitted from this paper because the writer believes they are unreliable.

Solidago, Aster, Helianthus, Achillea, Antennaria and Artemisia are extremely critical genera. Considerable disagreement exists among competent systematists as to what constitutes specific differences in certain of these genera. Field observations with more extensive collecting throughout the state should aid in clearing up some of the points of difference in the various groups and might assist future investigators.

In this order are included 254 species. Of these, fifty-three are adventive or naturalized from Europe or Asia, five from the western states, twelve from both the western and southern states and two from the Atlantic Coastal Plain.

The three families of the order are: Cichoriaceae with fifteen genera and thirty-eight species, Ambrosiaceae with three genera and nine species, Carduaceae with fifty-four genera and 207 species.

Of the thirty-nine species in the Cichoriaceae, twenty-one are adventive and almost without exception are considered weeds. They are mostly plants of fields and waste places. Lactuca virosa and Leontodon taraxacum may be classed as pernicious weeds. Hieracium aurantiacum and Sonchus arvensis are fully as plentiful in certain sections. Of the native species only Lactuca canadensis is a weed. All the adventive

species of Cichoriaceae may be called undesirables.

Of the nine species of Ambrosiaceae, only *Xanthium spinosum* is adventive from the Old World. *Iva ciliata* from the west is rarely reported. *Ambrosia elatior* is a pernicious weed. Except *Ambrosia psilostachya*, all other species are infrequent. All in the state are weeds or weedy plants.

Of the 208 species of Carduaceae, thirty-one are adventive from the Old World, but only eight of these are considered weeds. *Anthemis cotula*, *Arctium minus* and *Cirsium arvense* are bad weeds. *Cirsium lanceolatum*, *Anthemis arvensis* and *Chrysanthemum leucanthemum* are plentiful or even bad weeds in some sections. *Aster subulatus* and *Pluchea Camphorata*, plants of the Atlantic Coastal Plain, are found in salt marshes of Wayne County. One wonders how these species ever became established in such isolated areas. Five species are from the western states while twelve others are from both southern and western states. *Matricaria matricarioides*, from the Pacific Coast, has only been found in two or three localities but is probably present in others. *Grindelia squarrosa*, introduced in alfalfa seed, is spreading. None of the others need be considered in our weed flora. Of the native weeds, *Achillea Millefolium*, *Erigeron Annuus* and *Erigeron ramosus* are the commonest in dry soils, while *Solidago canadensis* and *Euthamia graminifolia* occupy the moister areas.

Some members of this order are cultivated for ornament, medicine and food and may be found as escapes. *Helianthus tuberosus*, the Jerusalem Artichoke, bears tubers which are a substitute for potatoes. They also contain inulin. *Inula helenium*, *Elecampane*, a coarse plant

adventive and found along roadsides in the southern counties is used in medicine. The root "contains about 44 percent of Inulin". Many others of the order contain volatile oils. *Tragopogon porrifolius*, the Vegetable Oyster, is grown as a garden vegetable. *Cichorium intybus*, Chicory, is cultivated in certain sections of the state and the root is dried, roasted and used as an adulterant or substitute for coffee.

Some members of the order spread rapidly. Their achenes are usually supplied with a special form of pappus so as to be easily carried by the wind.

A study of the general ecological distribution of the order reveals the fact that 147 species (58%) inhabit dry open soil, 57 (22%) moist open soil, 17 (7%) swamps, 17 (7%) rich woods, 15 (6%) dry woods, while *Bidens beckii* grows in water. More than 200 species grow either in dry or moist open soil. The composites are sun-plants.

A study of the record sheets reveals an interesting regional distribution. The greater majority have a state-wide distribution. Six species are confined to the shores of the Great Lakes and nearby areas, five to the southwestern counties, eleven to the two or three southern tiers of counties, twenty-three south of a line drawn between Saginaw Bay and Ottawa County, seventeen to the Lower Peninsula and ten to the Upper Peninsula. Ten species of *Solidago* alone are confined to the Lower Peninsula, six of which are south of Saginaw Bay. This genus of 24 species shows a wide range of habitats, having representatives in each. The habitats and ranges of the genus *Aster* are similar to those of *Solidago*. Nine species are state-wide, thirteen confined to the

Lower Peninsula, six to the Upper Peninsula and one to the confines of the Great Lakes. Their habitats vary from swampy to very dry situations. Members of other genera, distributed or localized in the southwestern counties, are from the western and southwestern states. It is in these counties and in other southern counties that species reported from northern Ohio and northern Indiana may be sought, e.g. *Ionactis linarii-folius*, *Eupatorium serotinum* and *Lactuca villosa*.

Aster faxoni, *Solidago gillmani*, *Cirsium pitcheri*, *Coreopsis lanceolata*, *Tanacetum huronense* and *Solidago racemosa* are native and interesting species along the Great Lakes. *Coreopsis lanceolata* and *Tanacetum huronense* are to be found north of Alcona and Benzie counties, while *Solidago racemosa* is recorded from rocky shores of Keweenaw Peninsula. *Cirsium pitcheri* and *Solidago gillmani* form a part of the interesting flora of the sand dunes. The former is endemic to the Great Lake region; the latter has not been reported south of Cheboygan County on the eastern side of the Lower Peninsula.

Certain species of the Upper Peninsula such as *Achillea borealis*, *Artemisia borealis*, *Erigeron acris* and *Senecio pauciflorus* with its var. *fallax* are limited to Keweenaw County. *Erigeron glabellum* is reported from the "plains" of the Upper Peninsula by Dr. A. B. Lyons. Others, as *Adenocaulon bicolor*, a peculiar plant of the wet woods, and *Solidago lepida*, var. *fallax* range farther east, *Adenocaulon* as far as Chippewa County. *Aster nemoralis*, an interesting "sand bog" species, and *Aster novae-belgii* seem to be confined to the eastern counties of the Upper Peninsula. Further examination may prove the presence of the latter to be a mistake, since it is mostly a Coastal Plain species.

Other native composites are rare in the state. *Eupatorium sessilifolium* is present in Jackson and Washtenaw counties and should be sought in other southern counties. It is a plant of dry banks, with the aspect of *Eupatorium perfoliatum* which, however, grows in moist places. *Eupatorium urticaefolium*, a plant of rich woods, is interesting because cows eating it produce poisonous milk. *Mikania scandens*, our only twining or climbing composite, is recorded from Muskegon county. *Ridax alternifolius* is reported from a few southern counties. It seems to be very rare. *Solidago houghtonii* is a rare goldenrod of sandy swamps bordering the upper ends of Lake Michigan and Lake Huron. One specimen of *Agoseris glauca* (Pursh) D. Dietr., a plant of the western prairies, was collected by Dr. H. T. Darlington in Oscoda County. It should be sought on the "Sand Plains" of the Lower Peninsula.

The writer is very grateful to Dr. H. T. Darlington and Dr. E. A. Bessey for suggestions and recommendations, and for the criticism and correction of the manuscript, also to Dr. E. E. Watson for the key to *Helianthus* and for his identification and verification of specimens of that genus.

CARDUALES (Compositae)

Flowers in a close head, on a common receptacle, surrounded by an involucre of separate or united bracts(tegules), and with 5(rarely 4) stamens inserted on the corolla, their anthers united in a tube. The I-loculed ovary inferior; the limb of the calyx(called a pappus) arising at its summit in the form of bristles, awns, scales, teeth or crowns, or else entirely absent. Corolla either strap-shaped or tubular. Style 2-cleft at the apex(in sterile flowers usually entire). Fruit seed-like (achene), dry, containing a single erect anathropous seed, with no endosperm. An immense family, in temperate regions chiefly herbs, without stipules, and with perfect, polygamous, monoecious, or dioecious flowers.

- All the flowers of the head with strap-shaped corollas(rays or ligules).....1. Cichoriaceae.
- All the flowers of the head with tubular corollas (none or reduced to a short tube or ring in pistillate flowers of Ambrosiaceae) or the marginal ones(or some of them) with strap-shaped corollas.
- Stamens distinct or nearly so, the anthers merely connivent; coarse monoecious herbs(in ours)..2. Ambrosiaceae.
- Stamens united by the anthers, forming a tube around the stigmas(except in Kuhnia).....3. Carduaceae.

CICHORIACEAE (Chicory Family)

- 1. Pappus wholly or in part of scales, or none.
- 2. Pappus none; achenes 20-30-nerved.....2. Lapsana.
- 2. Pappus of scales and bristles(scales only in Cichorium).
- 3. Pappus of scales only; flowers blue or white..1. Cichorium.
- 3. Pappus of scales, with an inner series of bristles; flowers yellow or orange.
- 4. Pappus-scales 5, rounded; annual.....3. Krigia.
- 4. Pappus-scales 10-15, linear to oblong; perennials.....4. Troximom.
- 1. Pappus of capillary or plumose bristles.
- 5. Bristles plumose.
- 6. Leaves basal; flowers scapose.
- 7. Receptacle chaffy; inner achenes long-beaked.....5. Hypochaeris.
- 7. Recpetacle naked; inner achenes not beaked..6. Apargia.
- 6. Leaves cauline.
- 8. Stem rough-pubescent.....7. Picris.
- 8. Stem glabrous.....8. Tragopogon.
- 5. Bristles smooth or somewhat scabrous, not plumose.
- 9. Achenes with spiny processes near the summit..9. Leontodon.
- 9. Achenes without spiny processes.

- 10. Achenes flat or somewhat flattened.
 - 11. Achenes narrowed at the summit or beaked; heads 6-30-flowered.....11. Lactuca.
 - 11. Achenes mostly truncate, not beaked; heads more than 30-flowered.....10. Sonchus.
- 10. Achenes not flattened, columnar and narrowed at the base, or spindle-shaped.
 - 12. Flowers cream-color or purplish.....15. Nabalus.
 - 12. Flowers yellow to orange-red.
 - 13. Pappus white.
 - 14. Achenes slender-beaked(rarely beakless); leaves entire.....12. Agoseris.
 - 14. Achenes beakless; leaves toothed or runcinate-pinnatifid.....13. Crepis.
 - 13. Pappus tawny.....14. Hieracium.

1. CICHORIUM (Tourn.) L.

CICHORIUM INTYBUS L. (Ancient Arabic name)

Chicory. Blue Sailors.

Roadsides and waste places throughout the state. Naturalized from Europe. July-Oct.

Specimens examined:- Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1893); St. Clair Co. (C. K. Dodge, 1896); Alcona Co. (J. Van Buskirk, 1909); Cheboygan Co. (F. C. Gates, 1911); Manistee Co. (G. W. Hull, 1912); Livingston Co. (E. W. Howard, 1914); Berrien Co. (E. W. Strong, 1914); Hillsdale Co. (G. Patch Sr., 1914); Allegan Co. (G. S. Gillet, 1914); Osceola Co. (C. W. VanAntwerp, 1915); Genesee Co. (G. Geiger, 1915); Kent Co. (J. H. Ashley, 1915); Van Buren Co. (Mrs. Wm. Lee, 1915); Kalamazoo Co. (S. E. Wolff, 1922); Clinton Co. (A. E. Cobb, 1915); Oakland Co. (C. Billington, 1915); Washtenaw Co. (F. J. Hermann, 1927); Wayne Co. (M. W. Schnute).

Reported from:- Tuscola Co. (C. K. Dodge); Grand Traverse Co. (H. T. Darlington, 1919); Bay to Mackinac Co. (C. K. Dodge); Schoolcraft Co. (C. K. Dodge); Ionia Co. (Wheeler & Smith); Emmet Co. (Fallass & Swift); Gratiot Co. (M. S. C., 1918); Antrim Co. (M. S. C., 1927); Ottawa Co. (M. S. C., 1922); Eaton Co. (M. S. C., 1919); Lenawee Co. (M. S. C., 1926); Saginaw Co. (M. S. C., 1927); Lapeer Co. (M. S. C., 1924); Muskegon Co. (M. S. C., 1923); Mecosta Co. (M. S. C., 1924); Cass Co. (M. S. C., 1915); Ingham Co. (M. S. C., 1913); Clare Co. (M. S. C., 1927); Presque Isle Co. (M. S. C., 1927); Keweenaw Co. (O. A. Farwell).

2. LAPSANA L.

LAPSANA COMMUNIS L. (growing in colonies).

Nipplewort.

Occasional in waste places. Adventive from Europe.

June-September.

Specimens examined:- Ingham Co. (C. F. Wheeler, 1896); Berrien Co. (H. T. Darlington, 1927); Mackinac Island, (C. K. Dodge, 1913); Oakland Co. (C. Billington, 1916); Chippewa Co. (E. A. Bessey, 1927).

3. KRIGIA Schreb.

KRIGIA VIRGINICA (L.) Willd.

Adopogon carolinianum Britton.

Dwarf Dandelion.

Probably not uncommon on the sandy areas of the Lower Peninsula.

Native. April-August.

Specimens examined:- Muskegon Co. (C. D. McLouth, 1895); Antrim Co. (W. S. Cooper, 1902); Arenac Co. (C. K. Dodge, 1912); Allegan Co. (C. Billington, 1917); Kalamazoo Co. (S. E. Wolff, 1922); Grand Traverse Co. (ex. Coll. Mary H. Clark, 1910); Berrien Co. (C. H. Kauffman, 1910); Kent Co. (Emma J. Cole, 1901).

Reported from:- Iosco Co., Alpena Co. (C. K. Dodge); Tuscola Co. (C. A. Davis); Beaver Island. (H. T. Darlington, 1923); Clare Co. (Wheeler & Smith Catalog); Manistee Co. (F. P. Daniels); Benzie Co. (M. S. C., 1920); Walton, Elk Rapids, Bay City (Beal's Catalog).

4. TROXIMON Gaertn.

TROXIMON VIRGINICUM (L.) Gaertn.

Krigia amplexicaulis Nutt.

Cynthia virginica D. Don.

Cynthia.

In moist woods and meadows throughout the state. Showy in flower.
May-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1827); Ionia Co. (C. F. Wheeler, 1890); Kent Co. (J. Shaddick & H. C. Skeels, 1896); St. Clair Co. (C. K. Dodge, 1897); Marquette Co. (B. Barlow, 1901); Ingham Co. (H. T. Darlington, 1916); Roscommon Co. (E. A. Bessey, 1919); Baraga Co. (H. T. Darlington, 1920); Kalamazoo Co. (S. E. Wolff, 1922); Wayne Co. (C. Billington, 1914); Eaton Co. (S. E. Wolff, 1927); Washtenaw Co. (C. D. LaRue, 1915); Berrien Co. (G. L. Ames, 1867); Cheboygan Co. (J. H. Ehlers).

Reported from:- Calhoun Co. (C. E. Barr); Tuscola Co. (C. A. Davis); Manistee Co., St. Joseph Co. (F. P. Daniels).

5. HYPOCHAERIS (Vaill.) L.

HYPOCHAERIS RADICATA L. (having roots, referring to the long tap-roots)
Long-rooted Cat's-ear.

Waste places. Rare. Adventive from Europe.

Specimens examined:- Oakland Co. (C. Billington, 1917. "Open field"); Kalamazoo Co., in grassland of Kalamazoo Country Club (S. E. Wolff, 1924).

6. APARGIA Scop.

APARGIA AUTUMNALE (L.) Hoffm. (autumnal)

Leontodon autumnale L.

Fall Dandelion.

In fields and waste places. Rare. June-Nov.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1897).

Reported from:- Ionia Co. (C. F. Wheeler, in Beal's Catalog); Gratiot Co. (C. A. Davis, in Beal's Catalog).

7. PICRIS L.

PICRIS HIERACIODES L. (resembling Hieracium, the Hawkweed)
Hawkweed Picris.

Waste places. Rare. June-Sept.

Specimens examined:- Ingham Co. (C. F. Wheeler, 1896).

Reported from:- Grand Traverse Co., Crawford Co. (W. L. Mc Atee, 1919); Wayne Co. (O. A. Farwell).

8. TRAGOPOGON (Tourn.) L.

Flowers purple; bracts of involucre longer than the rays; marginal achenes conspicuously tubercled; peduncle thickened at the summit.....1. *T. porrifolius*.
Flowers yellow; bracts of the involucre equaling or shorter than the rays; marginal achenes smooth or roughened; peduncle little thickened...2. *T. pratensis*.

1. TRAGOPOGON PORRIFOLIUS L. (having leaves like *Allium porrum*, the Leek) Oyster Plant. Salsify.

Generally distributed along roadsides and in waste places throughout the state. The root is the familiar vegetable known as oyster-plant. June-Oct. Naturalized from Europe.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Keweenaw Co. (O. A. Farwell, 1886); Washtenaw Co. (U. of M., 1887); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1906); Ottawa Co. (O. L. Boynton, 1912); Iosco Co. (Wells Parish); Wayne Co. (C. Billington, 1915); Kalamazoo Co. (S. E. Wolff, 1922); Houghton Co. (F. J. Hermann, 1926); Kent Co. (Emma J. Cole, 1901).

Reported from:- Magician Lake district (H. S. Pepoon); Mackinac Island, Bay Co. to Mackinac Co., near shore of Lake Huron, Schoolcraft Co., Tuscola Co. (C. K. Dodge); Eaton Co. (H. L. Clark); Clinton Co. (M. S. C., 1912); Saginaw Co. (M. S. C., 1926); Wexford Co. (M. S. C., 1924); Gratiot Co. (O. A. Farwell).

2. TRAGOPOGON PRATENSIS L. (meadow) Yellow Goat's-beard.

Generally distributed along roadsides and in waste places throughout the state. Naturalized from Europe. June-Oct.

Specimens examined:- Ionia Co. (C. F. Wheeler, 1890); Kent Co. (H. C. Skeels, 1895); Washtenaw Co. (A. W. Cavanaugh, 1896); St. Clair Co. (C. K. Dodge, 1904); Van Buren Co. (H. S. Pepoon, 1906); Lenawee Co. (D. Woodward, 1912); Allegan Co. (L. E. Parmelee, 1915); Muskegon Co. (E. A. Bessey, 1916); Kalamazoo Co. (S. E. Wolff, 1922); Houghton Co. (F. J. Hermann, 1926); Keweenaw Co. (F. J. Hermann, 1926).

Reported from:- Calhoun Co. (C. E. Barr); Mackinac Island, Schoolcraft Co., Tuscola Co., Bay Co. to Mackinac Co., near shore of Lake Huron (C. K. Dodge); Emmet Co. (C. W. Fallass); St. Joseph Co. (F. P. Daniels); Grand Traverse Co. (M. S. C., 1922); Clare Co. (M. S. C., 1915); Montcalm Co. (E. A. Bessey, 1915); Ottawa Co. (M. S. C., 1914); Isabella Co. (M. S. C., 1915); Shiawassee Co. (M. S. C.); Oceana Co. (M. S. C., 1923); Oakland Co. (M. S. C., 1924); Mecosta Co. (M. S. C., 1926); Barry Co. (M. S. C., 1927); Keweenaw Co. (O. A. Farwell).

9. LEONTODON L. Dandelion

Heads dense in fruit; achenes greenish-brown, the beak 2-3 times their length; pappus white.....1. *L. taraxacum*.
Heads looser in fruit; achenes red or reddish, the beak not more than twice their length; pappus dull-white.....2. *L. laevigatum*.

1. LEONTODON TARAXACUM L.

Taraxacum officinale Weber

Taraxacum taraxacum Karst.

Common Dandelion.

Very common as a weed throughout the state. Naturalized from Europe. April-Sept.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Keweenaw Co. (O. A. Farwell, 1887); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1895); Van Buren Co. (H. S. Pepoon, 1906); Cheboygan Co. (F. C. Gates, 1911); Mecosta Co. (H. T. Darlington, 1916); Gogebic Co. (E. A. Bessey, 1919); Cass Co. (F. C. Gates, 1906); Kalamazoo Co. (S. E. Wolff, 1922); Washtenaw Co. (F. J. Hermann, 1926); Kent Co. (Emma J. Cole, 1901).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Berrien Co. (H. S. Pepoon); Mackinac Island (C. K. Dodge, 1912); Dickinson Co. (G. H. Coons, 1909); Muskegon Co. (C. D. McLouth); Bay Co. to Mackinac Co., near shore of Lake Huron, Tuscola Co., Chippewa Co., Charitv Islands, Schoolcraft Co. (C. K. Dodge); Manistee Co. (F. P. Daniels); Isle Royale (W. S. Cooper); Emmet Co. (Fallas & Swift); Charlevoix Co. (E. A. Bessey).

2. LEONTODON LAEVIGATUM Willd. (smooth)

Leontodon erythrospermum (Andrz.) Britton

Taraxacum erythrospermum Andrz.

Red-seeded Dandelion.

Generally distributed throughout the state but not as common as the preceding. Usually has two blossoming periods, one in the spring, the other in late summer.

Specimens examined:- Berrien Co. (H. S. Pepoon, 1906); Wayne Co. (J. M. Sutton, 1916); Gogebic Co. (E. A. Bessey, 1919); Washtenaw Co. (C. Billington, 1920); Oakland Co. (C. Billington, 1922); Jackson Co. (S. E. Wolff, 1927).

Reported from:- Muskegon Co. (V. O. Graham); Mackinac Co., Chippewa Co., Antrim Co., (E. A. Bessey, 1920); Montcalm Co. (E. A. Bessey, 1915); Delta Co. (M. S. C., 1920).

10. SONCHUS (Tourn.) L.

Heads bright yellow, about 2 cm. high; involucre glandular-pubescent (glabrous in one variety);

perennial, with slender creeping rootstocks.....1. *S. arvensis*.

Heads pale yellow, 1.2-1.6 cm. high; involucre usually glabrous; annuals, with fibrous roots...

Lower leaves lyrate-pinnatifid, mostly obovate, denticulate with soft spiny teeth, the terminal segment largest; upper leaves with auricled bases acute or acuminate; achenes transversely rugose.....2. *S. oleraceus*.

Lower leaves rarely lyrate-pinnatifid (if pinnatifid, the terminal segment no larger than the others), oblanceolate to obovate, denticulate with hard spiny teeth; upper

leaves with auricled bases rounded; achenes
not transversely rugose.....3. *S. asper*.

1. *SONCHUS ARVENSIS* L. (of cultivated ground)
Sonchus arvensis L., var. *glabrescens* ^{Guenther,} Wimm & Graeb.
Perennial or Field Sow-Thistle.

Generally distributed throughout the state. A bad weed in places.
Spreads by seeds and by rootstocks. Naturalized from Europe.
Native also of Asia. July-Oct.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1894); Bay Co. (C. F. Wheeler, 1898); Hillsdale Co. (C. J. Wright, 1901); Tuscola Co. (Mrs. John Bush, 1914); Allegan Co. (C. B. Cook, 1915); Missaukee Co., Roscommon Co. (H. T. Darlington, 1916); Gogebic Co. (H. T. Darlington, 1919); Alger Co. (C. K. Dodge, 1916); Oakland Co. (C. Billington, 1915); Mecosta Co. (J. C. Schlegel, 1927); Washtenaw Co. (B. A. Walpole, 1921).

Reported from:- Bay Co. to Mackinac, near shore of Lake Huron, Schoolcraft Co. (C. K. Dodge); Muskegon Co. (V. O. Graham); Wayne Co. (O. A. Farwell); Kent Co. (Wheeler & Smith Catalog); Manistee Co. (F. P. Daniels); Chippewa Co., Iosco Co., Sanilac Co., Macomb Co., (M. S. C., 1925); Midland Co., Montcalm Co. (M. S. C., 1926); Lapeer Co. (M. S. C., 1924); Isabella Co. (M. S. C., 1921); Genesee Co. (M. S. C., 1927); Livingston Co. (M. S. C., 1918).

2. *SONCHUS OLERACEUS* L. (suitable for a pot-herb)
Common Sow-Thistle.

Generally distributed. A weed of waste places. Not so difficult to eradicate as the preceding species. Naturalized from Europe.
May-Nov.

Specimens examined:- Kent Co. (H. C. Skeels, 1895); St. Clair Co. (C. K. Dodge, 1897); Keweenaw Co. (O. A. Farwell, 1885); Van Buren Co. (H. S. Pepon, 1905); Ingham Co. (M. Craig, 1905); Gogebic Co. (Bessey & Darlington, 1919); Wayne Co. (J. M. Sutton, 1914); Washtenaw Co. (C. D. LaRue, 1915); Kalamazoo Co. (S. E. Wolff, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Calhoun Co. (C. E. Barr); Bay Co. to Mackinac Co., near the shore of Lake Huron (C. K. Dodge); Dickinson Co. (G. H. Coons, 1909); Muskegon Co. (C. D. McLouth); Schoolcraft Co., Chippewa Co., Tuscola Co. (C. K. Dodge); Montcalm Co., Macomb Co. (Wheeler & Smith catalog); St. Joseph Co., Manistee Co. (F. P. Daniels); Ionia Co. (M. S. C., 1914); Huron Co. (M. S. C., 1918); Ottawa Co. (M. S. C., 1924); Charlevoix Co. (E. A. Bessey, 1920); Gratiot Co. (C. A. Davis).

3. *SONCHUS ASPER* (L.) Hill (rough)
Spiny-leaved Sow-Thistle.

Distribution general. In situations similar to the preceding.
Annual. Naturalized from Europe. May-Nov.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1888); Mecosta Co. (H. M. Bailey, 1892); St. Clair Co. (C. K. Dodge, 1893); Ingham Co. (H. C. Skeels, 1894); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Alger Co. (C. F. Wheeler, 1900); Marquette Co. (B. Barlow, 1901); VanBuren Co. (H. S. Pepon, 1906); Cheboygan Co. (F. C. Gates, 1911); Charlevoix Co.

(E. A. Bessey, 1912); Jackson Co. (O. S. Ludlow, 1914); Roscommon Co. (H. T. Darlington, 1916); Wayne Co. (B. F. Chandler, 1916); Gogebic Co. (H. T. Darlington, 1919); Emmet Co. (J. H. Ehlers, 1920); Washtenaw Co. (B. A. Walpole, 1920); Mackinac Co. (J. H. Ehlers, 1916).

Reported from:- Dickinson Co. (G. H. Coons, 1909); Muskegon Co. (C. D. McLouth); Bay Co. to Mackinac Co. ("cities & villages", C. K. Dodge); Schoolcraft Co., Chippewa Co., Tuscola Co. Charity Islands (C. K. Dodge); Calhoun Co. (C. C. McDermid); St. Joseph Co. (F. P. Daniels); Osceola Co. (M. S. C., 1923); Sanilac Co. (M. S. C., 1925); Gratiot Co. (C. A. Davis).

11. LACTUCA (Tourn.) L. Wild Lettuce.

Pappus tawny; achenes thickish, narrowed above, but not beaked, several-nerved; flowers pale blue....1. *L. spicata*.

Pappus white; achenes flattened, tapering to a short slender firm beak, or to a filiform beak; flowers yellow or blue.

Achenes oblong, tapering to a short slender firm beak; flowers blue; involucre 1.5-2 cm. long; perennial.....2. *L. pulchella*.

Achenes oblong or oval, with filiform beaks; flowers mostly yellow, often drying blue; involucre 1.3 cm. long or less; annuals or biennials.

Leaves with prickly margins and midribs; achenes several-nerved; heads 6-12-flowered.....3. *L. virosa*.

Leaves without prickly margins or midribs; heads 12-20-flowered.

Lower leaves pinnatifid, rarely entire, not sagittate at the base, or only slightly so.

Lower leaves hirsute or hispid-setose on the midrib beneath; stem usually hairy at the base.....4. *L. hirsuta*.

All leaves glabrous; stem glabrous and glaucous.....5. *L. canadensis*.

Lower leaves entire or merely toothed, lanceolate to oblong, with conspicuous sagittate-clasping bases.....6. *L. sagittifolia*.

1. LACTUCA SPICATA (Lam.) Hitchc. (spiked)

Mulgedium leucophaeum DC.

Damp thickets, in rich soil. Common. Generally distributed.

Native. July-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1845); Keweenaw Co. (F. E. Wood, 1883); Ingham Co. (W. J. Beal, 1887); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Muskegon Co. (C. D. McLouth, 1898); Arenac Co. (C. F. Wheeler, 1900); St. Clair Co. (C. K. Dodge, 1904); Van Buren Co. (H. S. Pepoon, 1905); Emmet Co. (C. W. Fallass, 1894); Charlevoix Co. (E. A. Bessey, 1912); Marquette Co. (A. Dachnowski, 1906); Washtenaw Co. (B. A. Walpole, 1918); Gogebic Co. (H. T. Darlington, 1919); Cheboygan Co. (J. H. Ehlers, 1923); Berrien Co. (C. Billington, 1920); Mackinac Co. (J. H. Ehlers, 1917); Chippewa Co. (C. K. Dodge, 1914);

Houghton Co. (F. J. Hermann, 1926); Kalamazoo Co. (S. E. Wolff, 1923).
Reported from:- Calhoun Co. (C. E. Barr); Dickinson Co. (G. H. Coons, 1909); Bay Co. to Mackinac Co., Schoolcraft Co., Tuscola Co., Charity Islands, Mackinac Islands (C. K. Dodge); Wayne Co. (O. A. Farwell); Manistee Co. (F. P. Daniels); Oceana Co. (M. S. C., 1922).

2. LACTUCA PULCHELLA (Pursh) DC. (beautiful)

Lactuca integrifolia Nutt.

Large-flowered Blue Lettuce.

Apparently introduced into the Lower Peninsula. Probably native to a part of the Upper Peninsula. Rare. June-Sept.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1913. "Apparently introduced").

Reported from:- Cheboygan Co. (H. Gleason, 1911); Isle Royale ("clearings, bare burned ridges", (W. S. Cooper); Keweenaw Co. (O. A. Farwell, "frequent"); "Upper Michigan" (Prof. T. Porter); Wayne Co. (O. A. Farwell).

3. LACTUCA VIROSA L. (fetid)

Lactuca scariola L.

Lactuca scariola L., var. *integrata* Gren. & Godr.

Common in Michigan. Widely distributed across the northern part of the continent. The species and its variety may be found growing together. Naturalized from Europe. Aug.-Sept.

Specimens examined:- Kent Co. (J. Shaddick & H. C. Skeels, 1895); Calhoun Co. (W. J. Beal, 1898); St. Clair Co. (C. K. Dodge, 1904); Ingham Co. (M. Craig, 1905); Cass Co. (H. S. Pepoon, 1905); Cheboygan Co. (F. C. Gates, 1911); Wayne Co. (O. A. Farwell); Berrien Co. (H. T. Darlington, 1917); Washtenaw Co. (B. A. Walpole, 1918); Huron Co. (C. K. Dodge, 1909); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Van Buren Co. (H. S. Pepoon); Muskegon Co. (C. D. McLouth); Bay Co. to Mackinac Co., near Lake Huron shore, Schoolcraft Co., Chippewa Co., Tuscola Co., Charity Islands (C. K. Dodge); Manistee Co., St. Joseph Co. (F. P. Daniels); Emmet Co. (Fallass & Swift); Lenawee Co. (F. L. Stearns); Charlevoix Co. (E. A. Bessey, 1920); Montcalm Co. (E. A. Bessey, 1915); Sanilac Co. (M. S. C.).

4. LACTUCA HIRSUTA Muhl. (hairy)

Lactuca sanguinea Bigel.

Hairy Wood-Lettuce.

Dry open woods or banks. Rare. Size of heads intermediate between *L. virosa* and *L. puchella*. July-Sept.

Specimens examined:- Macomb Co. (D. Cooley, 1845); Emmet Co. (C. F. Wheeler, 1890); St. Clair Co. (C. K. Dodge, 1892); Muskegon Co. (W. J. Beal, 1898); Kent Co. (H. M. Bailey, 1892); Van Buren Co. (H. S. Pepoon, 1905); Oakland Co. (C. Billington, 1917); Ontonagon Co. (E. A. Bessey, 1923); Muskegon Co. (S. E. Wolff, 1927).

Reported from:- Tuscola Co. (C. A. Davis); Wayne Co. (O. A. Farwell, "frequent"); Gratiot Co., Washtenaw Co. (C. A. Davis); Ionia Co. (Wheeler & Smith Catalog).

5. LACTUCA CANADENSIS L.

Wild Lettuce.

Common. In moist or dry, open places. Native. June-Nov.

Specimens examined:- Macomb Co. (D. Cooley, 1845); Keweenaw Co. (O. A. Farwell, 1888); Benzie Co. (C. F. Wheeler, 1888); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1896); Calhoun Co. (W. J. Beal, 1898); Muskegon Co. (C. D. McLouth, 1898); Cheboygan Co. (F. C. Gates, 1911); Charlevoix Co. (E. A. Bessey, 1912); Berrien Co. (L. H. Pennington, 1910); Allegan Co. (C. H. Kauffman, 1910); Delta Co. (A. Dachnowski, 1906); Kent Co. (H. M. Bailey, 1893); Gogebic Co. (H. T. Darlington, 1918); Washtenaw Co. (B. A. Walpole, 1918); Alpena Co., Oscoda Co. (E. A. Bessey, 1918); Wayne Co. (C. Billington, 1918); Kalamazoo Co. (S. E. Wolff, 1923); Chippewa Co. (E. A. Bessey, 1927); Jackson Co. (S. E. Wolff, 1927).

Reported from:- Mackinac Co., Schoolcraft Co., Tuscola Co., Charity Islands, Bay Co. to Mackinac Co. (C. K. Dodge); Manistee Co., St. Joseph Co. (F. P. Daniels); Grand Traverse Co. (W. L. McAtee, 1919); Dickinson Co. (G. H. Coons, 1909; Isle Royale (W. S. Cooper); Emmet Co. (Fallass & Swift); Oakland Co. (M. S. C., 1922).

6. LACTUCA SAGITTIFOLIA Ell. (arrow-leaved)

Lactuca integrifolia Bigel.

Arrow-leaved Lettuce.

In dry, open soil. Rare. Biennial. This does not seem to be distinctly separated from forms of *L. canadensis*. July-Sep.

Specimens examined:- Emmet Co. (C. F. Wheeler, 1890); Emmet Co. (C. W. Fallass, 1894); Cheboygan Co. (F. C. Gates, 1911); Cheboygan Co. (C. W. Fallass, 1924).

Reported from:- Wayne Co. (O. A. Farwell); St. Joseph Co. (F. P. Daniels, "rare").

12. AGOSERIS Raf.

AGOSERIS GLAUCA (Pursh) D. Dietr. (bluish-gray, referring to the bloom)

Troximon glaucum Pursh.

Large-flowered Agoseris.

Only one specimen examined. It should be looked for on the 'Sand-Plains' of the state. A plant of the western prairies. Perennial. May-July.

Specimens examined:- Oscoda Co. (H. T. Darlington, 1918).

13. GREPIS L.

Plant 60-100 cm. high, bristly-hairy, at least below; heads 2.5-3.5 cm. broad; achenes 13-striate, glabrous.....1. *C. biennis*.

Plant 30-80 cm. high, smooth or puberulent; heads

1-2 cm. broad; achenes 10-striate, scabrous or smooth.

Upper leaves linear, revolute-margined; achenes

4 mm. long, narrowed above into a firm short
 beak, the ribs scabrous.....2. *C. tectorum*.
 Upper leaves shorter, lanceolate, not revolute-
 margined; achenes 2.5 mm. long, slightly
 narrowed at both ends, the ribs smooth.....3. *C. capillaris*.

1. *CREPIS BIENNIS* L. (biennial)

Rough Hawksbeard.

Rare. Adventive in clover seed from Europe. Seldom persisting.
 June-Aug.

Specimens examined:- Ingham Co. (C. F. Wheeler, 1900).

Reported from:- Emmet Co. (C. W. Fallass, "clover field")

2. *CREPIS TECTORUM* L. (of dwellings)

Narrow-leaved Hawksbeard.

Rare. In waste places. Adventive from Europe. June-July.

Specimens examined:- Ingham Co. (H. C. Skeels, 1894); Port Huron, St.
 Clair Co. (C. K. Dodge, 1888).

3. *CREPIS CAPILLARIS* (L.) Wallr. (hair-like)

Smooth Hawksbeard.

Rare. In waste places and around dwellings. Adventive from
 Europe. July-Sep.

Specimens examined:- Antrim Co. (C. K. Dodge, Sep. 1915. "A weed in
 gardens, yards and fields, near Kewadin").

(*CREPIS RUNCINATA* (James) T. & G. (saw-toothed). Reported from Dickin-
 son Co. (G. H. Coons, 1909). No other record. Adventive from the
 Great Plains Region. June-July.

14. *HIERACIUM* (Tourn.) L. Hawkweed.

Leaves all basal, or 1-2 also on the stem near its
 base.

Plants with elongated stolons; root-stocks slender,
 creeping.

Leaves tomentose beneath; flowers yellow.....1. *H. pilosella*.

Leaves hairy beneath; flowers orange-red.....2. *H. aurantiacum*.

Plants without elongated stolons; root-stocks
 short, stout, not creeping.

Leaves elliptic-oblong, oblong-spatulate, or ob-
 ovate, usually purple-veined or mottled;

stem glabrous, not glaucous.....3. *H. venosum*.

Leaves narrowly oblanceolate, not purple-veined;
 stem glaucous.....4. *H. florentinum*.

Leaves mostly cauline, scattered, the upper often
 reduced.

Heads small or of medium size, 1-2.3 cm. in diam-
 eter.

Inflorescence elongated, subcylindric, not leafy-
 bracted.

Lower part of stem and leaves covered with
brown, bristly hairs 8-20 mm. long.....5. *H. longipilum*.
Lower part of stem and leaves villous or hirsute with short hairs less than 6 mm. long...6. *H. gronovii*.
Inflorescence a corymbiform panicle, or if sub-cylindric, then leafy-bracted.
Leaves thin, lanceolate, acute, glabrous.....7. *H. paniculatum*.
Leaves thickish, elliptical, oblanceolate or obovate, mostly obtuse, not glabrous.
Stem stout, rough-hairy; leaves hairy on both surfaces.....8. *H. scabrum*.
Stem more slender, setose, at least below, not rough-hairy; leaves glabrous above, hairy at least on the veins beneath.....9. *H. marianum*.
Heads large, 2.5-4.5 cm. in diameter.
Stem with 1-5 leaves, these narrowed to the base..10. *H. vulgatum*.
Stem very leafy to the inflorescence; at least the upper leaves rounded or subcordate at the base.....11. *H. canadense*.

1. *HIERACIUM PILOSELLA* L. (somewhat hairy)

Mouse-ear Hawkweed.

Lawns and fields. Rare. Apparently has not become established in any locality. Introduced from Europe. May-Sep.

Specimens examined:- Oakland Co. (C. Billington, 1922. "Lawn at Cranbrook"); Benzie Co. (G. A. Clark, 1861).

2. *HIERACIUM AURANTIACUM* L. (orange-colored)

Orange Hawkweed.

Well established throughout. Spreading by stolons and by seeds.

Difficult to eradicate. Naturalized from Europe. June-Sep.

Specimens examined:- Alpena Co. (C. F. Wheeler, 1895); Genesee Co. (E. N. Farrar, 1915); Midland Co. (B. D. Lindsey, 1915); Oakland Co. (B. F. Chandler, 1915); Emmet Co. (C. H. Swift, 1914); Alpena to Mackinac City (C. K. Dodge, 1912); Chippewa Co. (Mrs. B. Fisk, 1916); Montcalm Co. (A. J. Holcomb, 1917); Cheboygan Co. (1917); Gogebic Co. (H. T. Darlington, 1919); Clare Co. (S. E. Wolff, 1925); Houghton Co. (F. J. Hermann, 1926); Tuscola Co. (N. Reed, 1927).

Reported from:- Mackinac Island (C. J. Dodge, 1912); Muskegon Co. (C. D. McLouth); Wayne Co. (O. A. Farwell); Keweenaw Co. (F. J. Hermann, 1926); Calhoun Co. (C. C. McDermid); Ogemaw Co. (M. S. C.); Gratiot Co. (M. S. C.); Manistee Co. (M. S. C., 1912); Lapeer Co., Bay Co., Charlevoix Co. (M. S. C., 1918); Benzie Co. (M. S. C., 1916); Lenawee Co., Kent Co. (M. S. C., 1924); Saginaw Co., Newaygo Co. (M. S. C., 1926); Ionia Co. (M. S. C., 1927).

3. *HIERACIUM VENOSUM* L. (veiny)

Rattlesnake-weed. Poor Robin's Plantain.

Generally distributed. In dry woods and thickets. May-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Kent Co. (H. M. Bailey, 1892); Ingham Co. (H. C. Skeels, 1894); Lake Co. (W. J. Beal, 1890); Alpena Co. (C. F. Wheeler, 1895); St. Clair Co. (C. K. Dodge,

1896); Huron Co. (C. A. Davis, 1896); Leelenaw Co. (C. F. Wheeler, 1898); Muskegon Co. (W. J. Beal, 1898); Montcalm Co. (B. Barlow, 1900); Cheboygan Co. (F. C. Gates, 1911); Alpena Co. (E. A. Bessey, 1918); Washtenaw Co. (C. D. LaRue, 1915); Chippewa Co. (C. K. Dodge, 1914); Oakland Co. (C. Billington, 1914); Roscommon Co. (H. T. Darlington, 1916); Emmet Co. (C. W. Fallass, 1920); Grand Traverse Co. (C. W. Fallass, 1924); Jackson Co., Eaton Co. (S. E. Wolff, 1927); Clare Co. (S. E. Wolff, 1925).

Reported from:- Van Buren Co. (H. S. Pepoon); Calhoun Co. (C. E. Barr); Grand Traverse Co., Crawford Co. (W. L. McAtee, 1919); Charity Islands, Bay Co. to Mackinac Co. (C. K. Dodge); Manistee Co., St. Joseph Co. (F. P. Daniels); Tuscola Co. (C. A. Davis).

4. *HIERACIUM FLORENTINUM* All.

King-devil.

Established and becoming common in Houghton and Keweenaw counties.

A troublesome weed. Naturalized from Europe. June-Sep.

Specimens examined:- Houghton Co. (O. A. Farwell, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Keweenaw Co. (F. J. Hermann, 1926).

5. *HIERACIUM LONGIPILUM* Torr. (long-haired)

Long-bearded Hawkweed.

Local in the Lower Peninsula. In dry soil. July-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1827); Jackson Co. (ex. herb. S. H. & D. R. Camp, 1894); Allegan Co. (A. J. Pieters, 1894); Big Charity Island, Huron Co. (C. K. Dodge, 1910); Allegan Co. (C. H. Kauffman, 1910); Kalamazoo Co. (S. E. Wolff, 1923); Kent Co. (Emma J. Cole, 1901).

Reported from:- Tuscola Co. (C. A. Davis); Muskegon Co. (V. O. Graham); St. Clair Co. (W. S. Cooper); Southwestern Mich. (Wright's Catalog).

6. *HIERACIUM GRONOVII* L.

Hairy Hawkweed.

Distribution similar to the preceding. In dry soil. July-Sep.

Specimens examined:- Calhoun Co. (W. J. Beal, 1898); Cass Co., Van Buren Co. (H. S. Pepoon, 1904); Berrien Co. (G. L. Ames, 1867); Charity Islands, Huron Co. (C. K. Dodge, 1908); Ingham Co. (B. A. Walpole, 1922); Washtenaw Co. (B. A. Walpole, 1921); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Calhoun Co. (C. E. Barr); Mackinac Island (C. K. Dodge, 1912); Muskegon Co. (C. D. McLouth); Southwestern Michigan (Wright's Catalog); Ionia Co., Flint, Macomb Co., Alma (Beal's Catalog).

7. *HIERACIUM PANICULATUM* L. (having an open, branched flower-cluster)

Panicked Hawkweed.

In dry woods. Rare. Probably in the Lower Peninsula only.

July-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Washtenaw Co. (M. W. Harrington, 1862); Eaton Co. (C. F. Wheeler, 1895); Allegan Co. (C. F. Wheeler, 1896); Cass Co. (H. S. Pepoon, 1905); Oakland Co. (C. Billington, 1916).

Reported from:- Muskegon Co. (V. O. Graham); Southern Michigan (Wright's catalog); Macomb Co., Ingham Co. (Beal's Catalog); Bay Co. (M. S. C., 1920); Cheboygan Co. (H. A. Gleason).

8. *HIERACIUM SCABRUM* Michx. (rough)

Rough Hawkweed.

In dry woods and clearings throughout the state. Common. July-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1844); Keweenaw Co. (O. A. Farwell, 1888); Gratiot Co. (C. A. Davis, 1889); Emmet Co. (C. F. Wheeler, 1892); Jackson Co. (Ex. herb. S. H. & D. R. Camp, 1893); Arenac Co. (C. F. Wheeler, 1900); Marquette Co. (B. Barlow, 1901); St. Clair Co. (C. K. Dodge, 1902); Huron Co. (C. K. Dodge, 1908); Cass Co. (H. S. Pepoon, 1904); Ottawa Co. (C. H. Kauffman, 1910); Allegan Co. (C. H. Kauffman, 1910); Wayne Co. (C. Billington, 1914); Chippewa Co. (C. K. Dodge, 1914); Baraga Co. (C. K. Dodge, 1916); Washtenaw Co. (B. A. Walpole, 1918); Gogebic Co. (H. T. Darlington, 1919); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Crawford Co., Grand Traverse Co. (W. L. McAtee); Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Manistee Co., St. Joseph Co. (F. P. Daniels); Isle Royale (W. S. Cooper).

9. *HIERACIUM MARIANUM* Willd. (from or of Maryland)

Maryland Hawkweed.

Specimens of this collected by F. C. Gates in Berrien Co. are better placed under *H. gronovii*. Other specimens labeled *H. marianum* are nearer *H. scabrum*. I have seen no good specimens of *H. marianum*. It may be looked for in the southern part of the Lower Peninsula. May-July.

10. *HIERACIUM VULGATUM* Fries. (well known)

Hawkweed.

Specimens from Oakland Co. only. Probably a recent introduction, since Beal's Flora does not mention it. July-Sep.

Specimens examined:- Oakland Co. (B. F. Chandler, 1916); Oakland Co. (B. A. Walpole).

11. *HIERACIUM CANADENSE* Michx.

Canada Hawkweed.

In dry woods and thickets throughout the state. Common. July-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Isle Royale (A. E. Foote, 1868); Keweenaw Co. (F. E. Wood, 1883); Ingham Co. (H. C. Skeels, 1894); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Emmet Co. (C. W. Fallass, 1896); Calhoun Co. (W. J. Beal, 1898); Jackson Co. (Mary J. Fallass, 1894); St. Clair Co. (C. K. Dodge, 1899); Marquette Co. (B. Barlow, 1901); Van Buren Co. (H. S. Pepoon, 1905); Delta Co. (A. Dachnowski, 1906); Mackinac Co. (C. K. Dodge, 1913); Chippewa Co. (C. K. Dodge, 1914); Schoolcraft Co. (C. K. Dodge, 1915); Houghton Co. (C. K. Dodge, 1916); Roscommon Co. (H. T. Darlington, 1916); Oakland Co. (B. A. Walpole, 1918); Clinton Co., Alpena Co. (H. T. Darlington, 1918); Gogebic Co. (H. T. Darlington, 1919); Cheboygan Co. (J. H. Ehlers, 1920); Manistee Co. (E. A. Bessey, 1921); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Muskegon Co. (C. D. McLouth); Charity Island, Tuscola Co., Bay Co. to Mackinac Co. (C. K. Dodge); Huron Co. (C. A. Davis); St. Joseph Co. (F. P. Daniels); Montcalm Co. (M. S. G.).

12. *HIERACIUM PRATENSE* Tausch. has been found in Cheboygan Co. by F. C. Gates, 1911. It should be looked for in other places.

15 *NABALUS* Cass.

- Heads in a long narrow thyrsus, nearly erect; tegules
hirsute; flowers purplish.....1. *N. racemosus*.
Heads in axillary or terminal panicles or both,
drooping; tegules glabrous; flowers greenish-
white or nearly white.
Heads 5-6-flowered; principal bracts of involucre
about 5.....2. *N. altissimus*.
Heads 7-15-flowered; principal bracts of involucre
about 8.....3. *N. albus*.

1. *NABALUS RACEMOSUS* (Michx.) DC. (having racemes)

Prenanthes racemosa Michx.

Glaucous White-Lettuce.

Frequent. Low prairies, moist open places. Aug.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Isle Royale (F. E. Wood, 1886); Ingham Co. (W. J. Beal, 1885); Kent Co. (H. M. Bailey, 1892); St. Clair Co. (C. K. Dodge, 1894); Oakland Co. (C. Billington, 1914); Emmet Co. (J. H. Ehlers, 1916); Berrien Co. (H. T. Darlington, 1917); Chippewa Co. (J. H. & Lois Ehlers, 1920); Mackinac Co. (J. H. Ehlers, 1920); Washtenaw Co. (B. A. Walpole); Kalamazoo Co. (S. E. Wolff, 1924).

Reported from:- Calhoun Co. (C. E. Barr); Cheboygan Co., Schoolcraft Co., Charity Island (C. K. Dodge); St. Joseph Co. (F. P. Daniels); Isle Royale (W. S. Cooper); Bay Co., Jackson Co., Huron Co., Washtenaw Co. (C. A. Davis); Southwestern Michigan (Wright's catalog); Flint (Beal's Catalog); Lenawee Co. (G. F. Comstock).

2. *NABALUS ALTISSIMUS* (L.) Hook. (very tall)

Prenanthes altissima L.

Tall White Lettuce.

Frequent in the lower half of the Lower Peninsula. Reported from two counties of the Upper Peninsula. Moist woods and thickets. July-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Gratiot Co. (C. A. Davis, 1890); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1893); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1899); Cass Co. (H. S. Pepoon, 1906); Wayne Co. (C. Billington, 1914); Washtenaw Co. (C. D. LaRue, 1915); Oakland Co. (C. Billington, 1917); Kent Co. (Emma J. Cole, 1901); Berrien Co. (S. E. Wolff, 1927).

Reported from:- Calhoun Co. (C. E. Barr); Tuscola Co., Mackinac Island (C. K. Dodge); Schoolcraft Co. (W. T. S. Cornell); Muskegon Co. (V. O. Graham); St. Joseph Co. (F. P. Daniels).

3. *NABALUS ALBUS* (L.) Hook. (white)

Prenanthes alba L.

Rattlesnake-root. White Lettuce.

Common. In woods, throughout the state. Aug.-Sep.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1886); Ingham Co. (W. J. Beal, 1887); Gratiot Co. (C. A. Davis, 1893); Kent Co. (J. Shaddick & H. C. Skeels, 1896); St. Clair Co. (C. K. Dodge, 1899); Alger Co. (C. F. Wheeler, 1900); Montcalm Co. (B. Barlow, 1900); Cass Co. (H. S. Pepoon, 1906); Roscommon Co. (H. T. Darlington, 1916); Berrien Co. (H. T. Darlington, 1917); Oakland Co. (C. Billington, 1916); Gogebic Co. (E. A. Bessey, 1923); Livingston Co. (J. H. Ehlers, 1923); Charlevoix Co. (H. L. Wolff, 1922); Kalamazoo Co. (S. E. Wolff, 1923); Washtenaw Co. (B. A. Walpole); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Calhoun Co. (C. E. Barr); Bay Co. to Mackinac Co., Schoolcraft Co., Tuscola Co., Charity Islands (C. K. Dodge); Dickinson Co. (G. H. Coons); Muskegon Co. (C. D. McLouth); St. Joseph Co., Manistee Co. (F. P. Daniels); Wayne Co. (O. A. Farwell); Isle Royale (W. S. Cooper); Sanilac Co. (M. S. C., 1927).

AMBROSIACEAE (Ragweed Family)

Staminate and pistillate flowers in different heads...

Tegules of staminate heads united into a cup; involucre of pistillate heads with 1-8 tubercles near the summit and containing one achene...2. *Ambrosia*.

Tegules of staminate heads distinct; involucre of pistillate heads covered with many hooked spines and containing two achenes.....3. *Xanthium*.

Staminate and pistillate flowers in the same heads;

tegules few and rounded.....1. *Iva*.

1. *IVA* L.

Heads subtended by linear or oblong leaf-like bracts;

fertile flowers with evident corolla.....1. *I. ciliata*.

Heads scarcely bracteate; fertile flowers with a

mere rudiment or no corolla.....2. *I. xanthiifolia*.

1. *IVA CILIATA* Willd. (fringed with hairs)

Rough Marsh Elder.

Rare. Adventive from farther west and south. Aug.-Oct.

Specimens examined:- Wayne Co. (B. F. Chandler, 1916); Wayne Co., near Mulkey Salt Works (C. Billington, 1916).

2. *IVA XANTHIIFOLIA* Nutt. (having leaves like *Xanthium*, the Clotbur)
Marsh Elder.

Infrequent. In moist soil, or in wast places. Introduced from the West. Jul.-Sep.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1888); St. Clair Co. (C. K. Dodge, 1908); Ingham Co. (G. H. Hicks, 1893); Emmet Co. (J. H. Ehlers, 1920).

Reported from:- Schoolcraft Co. (C. K. Dodge); Muskegon Co. (V. O. Graham); Tuscola Co., Kent Co. (M. S. C., 1924); Mason Co. (M. S. C., 1927); Cass Co. (M. S. C., 1921); Wayne Co. (Farwell & Gladewitz); Washtenaw Co. (M. S. C., 1927).

2. *AMBROSIA* (Tourn.) L. Ragweed.

Leaves opposite, palmately 3-5-lobed or undivided;

receptacle naked.....1. *A. trifida*.

Upper leaves alternate, the lower opposite, pinnatifid to bipinnatifid; receptacle chaffy.

Leaves thin, bipinnatifid, smoothish above, paler or hoary beneath; fruit glabrate, armed with 4-6 spines or tubercles near summit; annual.....2. *A. elatior*.

Leaves thickish, pinnatifid, hoary on both sides, not paler beneath; fruit pubescent, unarmed, or with 4 short tubercles near summit; perennial, with slender rootstocks.....3. *A. psilostachya*.

1. *AMBROSIA TRIFIDA* L. (three-cleft)

Giant or Great Ragweed.

Common in some localities in the southern part of the state. Less frequent farther north. River bottoms and moist banks. A coarse and unsightly weed. The var. *integrifolia* (Muhl.) T. & G. (having entire leaves) is occasional with the typical form.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1887); St. Clair Co. (C. K. Dodge, 1893); Ingham Co. (H. C. Skeels, 1894); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Cass Co. (H. S. Pepoon, 1905); Lenawee Co. (C. Billington, 1914); Washtenaw Co. (C. D. LaRue, 1915); Berrien Co. (C. Billington, 1920); Kalamazoo Co. (S. E. Wolff, 1923); Emmet Co. (J. H. Ehlers, 1923); Ottawa Co. (S. E. Wolff, 1927).

Reported from:- Tuscola Co. (C. K. Dodge); Muskegon Co. (V. O. Graham); Gogebic Co. (H. T. Darlington, 1919); Baraga Co. (H. T. Darlington, 1920); Mackinac Co. (E. A. Bessey, 1920); Manistee Co. (F. P. Daniels); Sanilac Co. (M. S. C., 1921); Charlevoix Co. (M. S. C., 1924).

2. *AMBROSIA ELATIOR* L. (taller)

Ambrosia artemisiaefolia L.

Common Ragweed.

Abundant. Throughout the state. One of our commonest weeds. In dry soil. Jul.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1844); Keweenaw Co. (O. A. Farwell, 1886); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1898); Van Buren Co. (H. S. Pepoon, 1905); Cheboygan Co. (F. C. Gates, 1911); Barry Co. (H. W. Payne, 1914); Wayne Co., Oakland Co. (C. Billington, 1914); Washtenaw Co. (B. A. Walpole, 1918); Gogebic Co. (H. T. Darlington, 1919); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Kent Co. (Emma J. Cole, 1901); Grand Traverse Co. (H. T. Darlington, 1919); Calhoun Co. (C. E. Barr); Tuscola Co., Chippewa Co., Schoolcraft Co. (C. K. Dodge); Muskegon Co. (V. O. Graham); Manistee Co., St. Joseph Co. (F. P. Daniels); Emmet Co. (Fallass & Swift); Mackinac Co., Antrim Co. (E. A. Bessey, 1920); Charlevoix Co. (M. S. C., 1922); Midland Co. (M. S. C., 1926).

3. *AMBROSIA PSILOSTACHYA* DC. (bare-spiked)

Western Ragweed.

Frequent in the Upper Peninsula. Gradually spreading into the Lower Peninsula. From the western states. Similar to the Common Ragweed. Perennial. Jul.-Oct.

Specimens examined:- Manistee Co. (F. P. Daniels, 1900); St. Clair Co. (C. K. Dodge, 1903); Van Buren Co. (H. S. Pepoon, 1906); Nawaygo Co. (H. T. Darlington, 1916); Osceola Co. (Miss Bessie Hale, 1916); Mackinac Co. (C. K. Dodge, 1913); Roscommon Co., Gogebic Co. (E. A. Bessey, 1919); Emmet Co. (J. H. Ehlers, 1921); Cheboygan Co. (J. H. Ehlers); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Schoolcraft Co., Mackinac Island (C. K. Dodge); Keweenaw Co. (O. A. Farwell); Baraga Co. (H. T. Darlington); Isle Royale (W. S. Cooper); Kalkaska Co. (M. S. C., 1921); Charlevoix Co. (E. A. Bessey, 1922).

3. XANTHIUM L. Cocklebur.

Axillary spines 3-pronged, yellow; leaves mostly lanceolate, tapering at both ends.....1. X spinosum.

Axillary spines absent; leaves broadly ovate.

Bur glabrous or resinous-glandular and sometimes puberulent, ovoid or fusiform; prickles glabrous or sparingly glandular-pubescent at the base; beaks nearly straight.....2. X. chinense

Bur usually pubescent, cylindrical to ovate-oblong; prickles sparingly pubescent to densely hispid; beaks incurved and hooked.

Body of bur usually cylindrical, resinous-glandular and puberulent; prickles hispid near the base.....3. X. pennsylvanicum.

Body of bur oblong or broader, pubescent; prickles numerous, densely hispid to or above the middle.....4. X. italicum.

1. XANTHIUM SPINOSUM L. (spiny)

Spiny or Thorny Clotbur.

Rare. In waste places. Introduced from Europe or Asia. Aug.-Nov.

Specimens examined:- Wayne Co. (O. A. Farwell, 1893); Emmet Co. ("shore of little Traverse Bay", C. W. Fallass, 1896).

2. XANTHIUM CHINENSE Mill.

Xanthium americanum Walt. Britton & Brown Ill. Fl., ed. 2. ? X.

Americanum Walt. 1788.

Xanthium glabratum Britton

American Clotbur or Cocklebur.

Rare. In moist soil. Aug.-Oct.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1892); Wayne Co. (C. Billington, 1914); Oakland Co. (C. Billington, 1918).

Reported from:- Berrien Co. (H. S. Pepoon).

3. XANTHIUM PENNSYLVANICUM Wallr.

Pennsylvania Clotbur.

Frequent. Moist soil. Aug.-Oct.

Specimens examined:- Ingham Co. (H. T. Darlington, 1918); Kent Co. (Emma J. Cole, 1893); Wayne Co. (O. A. Farwell, 1918); Kalamazoo Co. (S. E. Wolff, 1924); Sanilac Co. (T. B. Poole, 1927); Gratiot Co. (C. A. Davis, 1895).

Reported from:- Calhoun Co. (C. E. Barr); Tuscola Co., Schoolcraft Co. (C. K. Dodge); Muskegon Co. (V. O. Graham); Manistee Co., St. Joseph Co. (F. P. Daniels); St. Clair Co. (Millsbaugh & Sherff).

4. XANTHIUM ITALICUM Moretti

Xanthium commune Britton.

Frequent. Moist grounds. Aug.-Oct.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1892); Manistee Co. (H. T. Darlington, 1918); Wayne Co. (C. Billington, 1918); Kalamazoo Co., Van Buren Co. (S. E. Wolff, 1924); Berrien Co. (C. Billington, 1920); Washtenaw Co. (C. D. LaRue, 1915).

Reported from:- Calhoun Co. (C. E. Barr).

CARDUACEAE (Thistle Family)

1. Heads discoid; corollas tubular.
2. Pappus none or composed of bristles.
3. Pappus composed of bristles.
4. Pappus double(rarely none), the inner of long, the outer of short bristles(or scales), or, the inner of short and the outer of long bristles.
5. Receptacle bristly.
6. Heads subtended by upright spiny leaves; inner tegules tipped with long pinnately branched spines.....53. Cnicus.
6. Heads not subtended by upright spiny leaves; inner tegules not tipped with long pinnately branched spines.....52. Centaurea.
5. Receptacle naked(not bristly).....1. Vernonia.
4. Pappus simple, the bristles of nearly equal length.
7. Pappus-bristles plumose.
8. Receptacle bristly-hairy.....48. Cirsium.
8. Receptacle naked(not bristly-hairy).
9. Corollas rose-color or purple; heads racemose or spicate.....5. Lacinaria.
9. Corollas cream-color; heads corymbose or panicled.....4. Kuhnia.
7. Pappus-bristles smooth or roughened, not plumose.
10. Stem twining.....3. Mikania.
10. Stem not twining.
11. Receptacle naked(not bristly or chaffy).
12. Principal tegules in one rank.
13. Principal tegules 5; receptacle bearing a central projection or nipple.44. Mesadenia.
13. Principal tegules more than 10.
14. Leaves lanceolate or ovate-lanceolate; marginal flowers pistillate; receptacle concave; annual.....43. Erechites.
14. Leaves triangular-lanceolate or hastate; all the flowers perfect; receptacle flat; perennial.....45. Synosma.
12. Principal tegules in 2 or more ranks.
15. Heads 1-flowered, aggregated in dense globular terminal clusters; thistle-like herb.....54. Echinops.
15. Heads 3-many-flowered; plant not thistle-like in appearance.
16. Tegules scarious or conspicuously scarious-tipped; plant woolly.

- 17. Pistillate and perfect flowers in the same head.....19. Gnaphalium.
- 17. Staminate and pistillate flowers on different plants.
 - 18. Plants stoloniferous and forming patches; pappus-bristles of the staminate flowers thickened above; those of the pistillate flowers united in a ring at the base and falling off together.....17. Antennaria.
 - 18. Plant not stoloniferous; pappus-bristles distinct, not thickened above.....18. Anaphalis.
- 16. Tegules herbaceous, not scarious; plant not woolly.
 - 19. Leaves whorled or opposite; flowers perfect....2. Eupatorium.
 - 19. Leaves all alternate; outer flowers of the head pistillate, their corollas filiform.
 - 20. Leaves linear; achenes 2-3-nerved.....12. Brachyactis.
 - 20. Leaves oblong-lanceolate to ovate; achenes 4-5-nerved.....16. Pluchea.
- 11. Receptacle bearing chaff or bristles.
 - 21. Receptacle deeply honeycombed; the margins of the cups chaffy.....51. Onopordon.
 - 21. Receptacle not honeycombed.
 - 22. Leaves prickly.
 - 23. Tegules or some of them armed with huge spreading or recurved spines; leaves not decurrent.....50. Mariana.
 - 23. Tegules very prickly but not armed with large spreading or recurved spines; leaves decurrent.....49. Carduus.
 - 22. Leaves not prickly(in ours), entire, serrate or pinnate.
 - 24. Leaves very large, ovate, entire, floccose-woolly beneath; tegules armed with long hooked prickles; achenes transversely wrinkled.....47. Arctium.
 - 24. Leaves smaller, linear to oblong-lanceolate, entire, serrate or pinnate, not floccose-woolly; tegules armed with straight spines or pectinate; achenes not transversely wrinkled.....52. Centaurea.
- 3. Pappus none.
 - 25. Tegules imbricated in 2 or more ranks, scarious; achenes not glandular, not exceeding the upright involucre.....40. Artemisia.
 - 25. Tegules few, nearly in one rank, not scarious; achenes club-shaped, glandular above and much exceeding the reflexed involucre.....20. Adenocaulon.
- 2. Pappus a short crown or of 2-4 barbed awns.
 - 26. Receptacle naked; pappus a short crown.....39. Tanacetum.
 - 26. Receptacle chaffy; pappus of 2-4 persistent barbed awns.....31. Bidens.

1. Heads radiate, i.e. the marginal flowers or some of them with strap-shaped corollas.
27. Pappus none or of capillary bristles.
28. Pappus of capillary bristles.
29. Bristles in two ranks, the outer much shorter than the inner.
30. Tegules imbricated in 3-5 ranks; disk-flowers white to greenish.....15. Doellingeria.
30. Tegules in 1-2 ranks; disk-flowers yellow.....13. Erigeron.
29. Bristles equal or nearly so, not in two distinct ranks.
31. Rays yellow(white in *Solidago bicolor*).
32. Principal tegules in one rank.
33. Heads solitary at the ends of very scaly scapes.....41. Tussilago.
33. Heads more than one(in ours), corymbose; stem leafy.....46. Senecio.
32. Principal tegules imbricated in three or more ranks.
34. Receptacle hairy; rays usually more numerous than the disk-flowers.....8. Euthamia.
34. Receptacle naked, at least not hairy.
35. Leaves tomentose beneath; involucre 2 cm. or more high.....21. Inula.
35. Leaves glabrous or pubescent, not tomentose; involucre not exceeding 1.2 cm. in height.....7. Solidago.
31. Rays not yellow.
36. Principal tegules in one or two ranks.
37. Basal leaves large(5 cm. or more wide), cordate, woolly; plant with a very scaly scape.....42. Petasites.
37. Basal leaves small, less than 4 cm. wide, not cordate or woolly; plant leafy-stemmed.....13. Erigeron.
36. Principal tegules in three(two in a few species of *Aster*) or more ranks.
38. Rays inconspicuous, in several rows.....14. Leptilon.
38. Rays usually showy, in one row.....11. Aster.
28. Pappus none.
39. Receptacle naked.
40. Tegules imbricated in two ranks, nearly equal, not scarious; achenes flattened.....9. Bellis.
40. Tegules imbricated in usually three or more ranks, scarious; achenes angled or terete.
41. Leaves 2-3-pinnately dissected; achenes 3-5-ribbed; receptacle usually conic in fruit.....38. Matricaria.
41. Leaves(in ours) serrate, lobed or pinnately parted; achenes 5-10-ribbed(often 3-angled in those of the rays); receptacle flat or convex.....37. Chrysanthemum.

39. Receptacle chaffy.
42. Tegules scarious or scarious-margined.
43. Receptacle flat or convex; rays broad(in ours),
orbicular or nearly so; achenes somewhat
flattened and margined.....35. Achillea.
43. Receptacle conic; rays oblong-lanceolate or
narrower; achenes terete and ribbed or
striate.....36. Anthemis.
42. Tegules not scarious-margined.
44. Achenes flat or flattened, winged.
45. Rays pistillate, fertile, imbricated in 2-3
rows; disk-flowers with entire styles,
sterile.....23. Silphium.
46. Leaves alternate; tegules in 2-4 ranks, the
inner not distinctly different from the
outer.....25. Rudbeckia.
46. Leaves opposite; tegules in two distinct
ranks, these different in size and
color.....30. Coreopsis.
44. Achenes not flattened or winged.
47. Leaves alternate; rays neutral; receptacle
columnar to subulate.....26. Ratibida.
47. Leaves opposite; rays pistillate; receptacle
flat, convex or conic.
48. Plant scabrous or smooth; rays persistent;
tegules oblong, rigid, striate at the
base; receptacle convex or conic.....24. Heliopsis.
48. Plant viscid-pubescent(at least above);
rays deciduous; outer tegules ovate,
leaf-like, not striate.....22. Polymnia.
27. Pappus of awns, chaffy scales, teeth, or a crown.
49. Pappus a crown or 2-8 awns, or 2-4 short teeth.
50. Receptacle naked or pitted.
51. Tegules scarious or scarious-margined, upright,
not glutinous.
52. Achenes flattened, winged; pappus of 2-4 slen-
der awns intermixed with short scaly
bristles; leaves entire.....10. Boltonia.
52. Achenes not flattened or winged; pappus a
short crown or none; leaves not entire.
53. Leaves 2-3-pinnately dissected; achenes
3-5 ribbed; receptacle usually conic in
fruit.....38. Matricaria.
53. Leaves(in ours) serrate, lobed or pinnately
parted; achenes 5-10-ribbed(often 3-
angled in those of the rays); receptacle
flat or convex.....37. Chrysanthemum.
51. Tegules glutinous, squarrose, not scarious-
margined.....6. Grindelia.
50. Receptacle chaffy or bristly.
54. Tegules distinctly scarious-margined; pappus
none or a minute crown.....36. Anthemis.
54. Tegules herbaceous, not scarious-margined.

- 55. Pappus of 2-12 awns.
- 56. Chaff of receptacle consisting of bristles;
plant mostly scapose; rays reddish or
purple.....34. Gaillardia.
- 56. Chaff of receptacle broader, not bristly; plant
branched above; rays yellow.
- 57. Leaves opposite; stem not winged; achenes not
winged; awns 2-6, persistent, barbed.....31. Bidens.
- 57. Leaves alternate; stem winged; achenes winged;
awns two, deciduous, smooth.....29. Ridan.
- 55. Pappus a crown(often toothed) or 2-4 teeth, or
none.
- 58. Leaves opposite.
- 59. Rays pistillate, persistent; tegules rigid,
striate at base, not in two distinct
ranks; achenes 3-4-angled.....24. Heliopsis.
- 59. Rays neutral, not persistent; tegules in two
distinct ranks, not rigid or striate;
achenes flat, winged(in ours).....30. Coreopsis.
- 58. Leaves alternate.
- 60. Rays purple, crimson or pink(in ours); pappus
a toothed crown.....27. Echinacea.
- 60. Rays yellow(often brownish or purplish near
the base).
- 61. Receptacle columnar to subulate; achenes
somewhat flattened, margined; tegules
small, not leaf-like.....26. Ratibida.
- 61. Receptacle conic or columnar; achenes
3-4-angled, not margined; tegules
larger, leaf-like.....25. Rudbeckia.
- 49. Pappus of blunt, sharp-pointed or awned chaffy
scales.
- 62. Receptacle naked.....33. Helenium.
- 62. Receptacle chaffy or bristly.
- 63. Rays purple(in ours); receptacle bristly;
pappus-scales distinctly awned.....34. Gaillardia.
- 63. Rays yellow or white(in ours); receptacle
chaffy (not bristly); pappus-scales acute
or acuminate, not awned.
- 64. Rays yellow, neutral, 1 cm. or more long,
usually 10 or more; tegules imbricated in
3-5 ranks; pappus-scales not fimbriate.....28. Helianthus.
- 64. Rays white, 4-5 pistillate, less than 0.5 cm.
long; tegules in two ranks; pappus-scales
fimbriate.....32. Galinsoga.

1. VERNONIA Schreb. Ironweed.

Leaves tomentose beneath, at least along the veins,
acute or rounded at base; heads (30-)34-55-
flowered; involucre 6-8 mm. high; pappus tawny
or purple.....1. *V. missurica*.

Leaves puberulent beneath, or tomentose along the
principal veins, gradually attenuate at base;
heads (13-)18-29-flowered; involucre 4-5 mm.
high; pappus purple.....2. *V. altissima*.

1. VERNONIA MISSURICA Raf.

Vernonia altissima var. *grandiflora* A. Gray.

Vernonia drummondii Shuttlw.

Vernonia illinoensis Gleason.

Drummond's Iron-weed.

Common. In moist or rather dry open places. In the southern
part of the state. No record of it north of Kent Co. and Bay
Co. Often mistaken for *V. noveboracensis* and *V. fasciculata*,
species more southern and eastern in distribution. Aug.-Oct.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1892); Kent Co. (H.
M. Bailey, 1892); Clinton Co. (W. J. Beal, 1893); Calhoun Co. (W. J.
Beal, 1898); Ingham Co. (C. F. Wheeler, 1895); Cass Co. (H. S. Pepoon,
1905); Wayne Co. (C. Billington, 1914); Washtenaw Co. (B. A. Walpole);
Ionia Co. (B. A. Walpole, 1923); Kalamazoo Co. (S. E. Wolff, 1924);
Jackson Co. (S. E. Wolff, 1927).

Reported from:- Tuscola Co. (C. A. Davis); Bay Co. (G. M. Bradford).

2. VERNONIA ALTISSIMA Nutt. (very tall)

Tall Iron-weed.

Apparently rare. Southern part of the state. Aug.-Oct.

Specimens examined:- Ionia Co. (B. A. Walpole, 1924); Washtenaw Co.
(U. of M. herbarium); Cass Co. (H. S. Pepoon, 1905).

Reported from:- Muskegon Co. (V. O. Graham); Wayne Co. (O. A. Farwell).
Other species of *Vernonia* have been reported from Michigan (see Beal's
Catalog). They are probably referable to the two species here given.

2. EUPATORIUM (Tourn.) L. Thoroughwort. Boneset.

Leaves whorled, in 3's-6's.

Florets 9-15; corolla 5 mm. long; stem usually con-
spicuously speckled with purple; leaves finely
crisp-puberulent beneath.....1. *E. maculatum*.

Florets 3-6(7); corolla 5.5-7 mm. long; stem
scarcely speckled with purple, deep purple at
the nodes; leaves with looser pubescence beneath...2. *E. falcatum*.

Leaves opposite.

Leaves connate-perfoliate.....3. *E. perfoliatum*.

Leaves sessile or petioled.

Leaves sessile, lanceolate to oblong-lanceolate....4. *E. sessilifolium*.

Leaves petioled, ovate.....5. *E. urticaefolium*.

1. *EUPATORIUM MACULATUM* L. (spotted) (see *Rhodora* 22:57. 1920)

Eupatorium purpureum L., var. *maculatum* (L.) Darl.

Eupatorium bruneri A. Gray

Spotted Joe-Pye Weed.

Open grounds and borders of thickets, along streams in mucky soil, generally in calcareous regions. Common. Throughout the state. Aug.-Sep.

Specimens examined:- Keweenaw Co. (F. E. Wood, 1883); Kent Co. (H. M. Bailey, 1891); Washtenaw Co. (Lewis Foote, 1862); Macomb Co. (D. Cooley, 1837); Ingham Co. (1871); Ingham Co. (L. J. Cole, 1894); Marquette Co. (B. Barlow, 1901); Van Buren Co. (H. S. Pepoon, 1905); Oakland Co. (ex. Herb. D. A. Pelton, 1905); Chippewa Co. (C. K. Dodge, 1914); St. Clair Co. (C. K. Dodge, 1915); Cheboygan Co. (F. C. Gates, 1911); Clare Co. (Bessey & Darlington, 1916); Mecosta Co. (H. T. Darlington, 1916); Alger Co. (C. K. Dodge, 1916); Mackinac Co. (J. H. Ehlers, 1920); Emmet Co. (J. H. Ehlers, 1921); Berrien Co. (C. Billington, 1920); Gogebic Co. (H. T. Darlington, 1919); Kalamazoo Co. (S. E. Wolff, 1924); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Calhoun Co. (C. E. Barr); Dickinson Co. (G. H. Coons, 1909); Shores of Lake Huron from Bay Co. northward (C. K. Dodge); Schoolcraft Co., Tuscola Co. (C. K. Dodge); Muskegon Co. (V. O. Graham); Isle Royale (W. S. Cooper).

2. *EUPATORIUM FALCATUM* Michx. (sickle-shaped)

Eupatorium purpureum L.

Eupatorium trifoliatum L.

Joe-Pye Weed.

Seemingly not as common as the spotted Joe-Pye Weed. Open woods and borders of thickets. In damp soil. Frequent throughout. Aug. Sep.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1892); Keweenaw Co. (O. A. Farwell, 1886); Genesee Co. (D. Clark); Wayne Co. (C. K. Dodge, 1911); Berrien Co. (C. Billington, 1919); Magician Lake district (H. S. Pepoon, 1906).

Reported from:- It has been reported from other parts of the state; but one cannot be certain that these reports apply to this or to the preceding species.

3. *EUPATORIUM PERFOLIATUM* L. (with leaves meeting around the stem)

Boneset. Common Thoroughwort.

Low open grounds. Common and generally distributed. Jul.-Sep.

Specimens examined:- Kent Co. (A. A. Crozier, 1886); Keweenaw Co. (O. A. Farwell, 1886); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1896); Calhoun Co. (W. J. Beal, 1898); Marquette Co. (B. Barlow, 1901); Cass Co. (H. S. Pepoon, 1901); Cheboygan Co. (F. C. Gates, 1911); Clare Co. (H. T. Darlington, 1916); Gogebic Co. (E. A. Bessey, 1919); Allegan Co. (C. H. Kauffman, 1910); Delta Co. (A. Dachnowski, 1906); Barry Co. (J. M. Sutton, 1914); Kalamazoo Co. (S. E. Wolff, 1923); Chippewa Co. (E. A. Bessey, 1927); Jackson Co. (S. E. Wolff, 1927).

Reported from:- Dickinson Co. (G. H. Coons, 1909); Manistee Co., St. Joseph Co. (F. P. Daniels); Bay Co. to Mackinac Co., Charity Island,

Tuscola Co., Schoolcraft Co. (C. K. Dodge); Baraga Co. (H. T. Darlington, 1920); Emmet Co. (C. W. Fallass); Charlevoix Co. (E. A. Bessey, 1922); Ottawa Co., Oceana Co. (M. S. C., 1922).

4. *EUPATORIUM SESSILIFOLIUM* L.

Upland Boneset.

Dry woods and banks. Scarce. To be looked for in the two southern tiers of counties. Aug.-Sep.

Specimens examined:- Washtenaw Co. (Ann Arbor) (E. C. Allemendinger); Jackson Co. (S. E. Wolff, 1927).

Reported from:- Macomb Co., Southern Michigan (Beal's Catalog).

5. *EUPATORIUM URTICAEFOLIUM* Reichard

Eupatorium ageratoides L.f.

White Snakeroot.

In rich woods. Throughout. Frequent.

Specimens examined:- Macomb Co. (D. Cooley, 1850); Kent Co. (A. A. Crozier, 1886); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1895); Ottawa Co. (ex. Herb. W. E. Mulliken, 1885); Muskegon Co. (C. D. McLouth, 1899); Marquette Co. (B. Barlow, 1901); Cass Co. (H. S. Pepoon, 1904); Allegan Co. (C. H. Kauffman, 1910); Berrien Co. (H. T. Darlington, 1917); Van Buren Co. (S. E. Wolff, 1924); Kalamazoo Co. (S. E. Wolff, 1926).

Reported from:- Tuscola Co. (C. K. Dodge); Huron Co. (C. A. Davis); Gogebic Co. (H. T. Darlington); St. Joseph Co. (F. P. Daniels); Emmet Co. (C. W. Fallas); Calhoun Co. (C. C. McDermid); Genesee Co. (M. S. C., 1923).

EUPATORIUM SEROTINUM Michx. with slender-petioled, lanceolate, 3-5-ribbed leaves has been reported from the Magician Lake region by H. S. Pepoon. It may be in south-western Michigan.

3. *MIKANIA* Willd.

MIKANIA SCANDENS (L.) Willd. (climbing)

Willoughbya scandens Kuntze

Climbing Hempweed or Boneset.

From one locality, the bank of the Muskegon river. Moist soil.

Specimens examined:- Muskegon Co. (C. D. McLouth, 1894).

4. *KUHNIA* L.

KUHNIA EUPATORIODES L. (like *Eupatorium*)

False Boneset.

Frequent. In dry soil. Southern and southwestern part of the state. Aug.-Sep.

Specimens examined:- Kent Co. (H. C. Skeels, 1895); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1896); Berrien Co. (H. T. Darlington, 1917); Ionia Co. (B. A. Walpole, 1923); Kalamazoo Co. (S. E. Wolff, 1924).

Reported from:- St. Joseph Co. (F. P. Daniels); Ionia Co. (Wheeler & Smith Catalog); Southern Michigan (Beal's Catalog).

5. LACINARIA Hill Blazing Star.

- Corolla-lobes hairy within; tegules with short and rounded abruptly-mucronate tips.....1. *L. cylindracea*.
Corolla-lobes smooth within; tegules with rounded and blunt tips, not mucronate.
Heads 25-60-flowered, 12-25 mm. broad; tegules usually with broad scarious margins.....2. *L. scariosa*.
Heads 5-15-flowered, 4-8 mm. broad; tegules without scarious margins or scarious only at the apex.....3. *L. spicata*.

1. LACINARIA CYLINDRACEA (Michx.) Kuntze (cylindric)

Liatris cylindracea Michx.

Cylindric Blazing Star.

In dry soil. Appears to be less common in the Upper Peninsula.
Jul.-Sep.

Specimens examined:- Rawley's Point, Lake Michigan; Keweenaw Co. (O. A. Farwell, 1888); Oakland Co. (G. H. Hicks, 1892); Huron Co. (C. A. Davis, 1896); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Arenac Co. (C. F. Wheeler, 1900); St. Clair Co. (C. K. Dodge, 1907); Newaygo Co. (H. T. Darlington, 1916); Oceana Co. (B. F. Beach, 1916); Washtenaw Co. (B. F. Chandler, 1917); Allegan Co. (E. A. Bessey, 1921); Cheboygan Co. (J. H. Ehlers, 1922); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Calhoun Co. (C. E. Barr); Charity Islands, Presque Isle Co., Montmorency Co., Oscoda Co., Ogemaw Co. (C. K. Dodge); Tuscola Co. (C. A. Davis); Muskegon Co. (V. O. Graham); Lenawee Co. (G. F. Comstock); Macomb Co., Ionia Co. (Beal's Catalog).

2. LACINARIA SCARIOSA (L.) Hill (thin and dry)

Liatris scariosa Willd.

In dry soil. Throughout. Consists of several races. Jul.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1848); Kent Co. (B. E. Livingston, 1894); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1894); St. Clair Co. (C. K. Dodge, 1904); Allegan Co. (F. A. Loew, 1904); Van Buren Co. (H. S. Pepoon, 1905); Wayne Co. (B. F. Chandler, 1914); Lapeer Co. (C. K. Dodge, 1911); Schoolcraft Co. (C. K. Dodge, 1915); Newaygo Co. (E. A. Bessey, 1916); Roscommon Co. (Bessey & Darlington, 1916); Mason Co. (H. T. Darlington, 1918); Washtenaw Co. (B. A. Walpole, 1918); Lenawee Co. (C. Billington, 1920); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Calhoun Co. (C. E. Barr); Grand Traverse Co. (W. L. McAtee); Muskegon Co. (C. D. McLouth); Bay Co. to Mackinac Co. (C. K. Dodge); St. Joseph Co. (F. P. Daniels); Huron Co. (M. S. C., 1925); Montcalm Co. (M. S. C., 1912).

3. LACINARIA SPICATA (L.) Kuntze (spiked)

Liatris spicata Willd.

Dense Button Snakeroot.

In moist soil. Lower Peninsula. Aug.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1844); Washtenaw Co. (C. F. Wheeler, 1892); Kent Co. (J. Shaddick & H. C. Skeels, 1895); St. Clair Co. (C. K. Dodge, 1896); Bay Co. (C. F. Wheeler, 1898); Muskegon Co. (C. D. McLouth, 1901); Cass Co. (H. S. Pepoon, 1905); Berrien Co. (H. T. Darlington, 1917); Oakland Co. (B. A. Walpole, 1920); Kalamazoo Co. (S. E.

Wolff, 1924).

Reported from:- Van Buren Co. (H. S. Pepoon); Tuscola Co., Huron Co. (C. A. Davis); Ionia Co. (Wheeler & Smith Catalog); Calhoun Co. (M. S. C., 1920).

6. GRINDELIA Willd.

GRINDELIA SQUARROSA (Pursh) Dunal (with spreading scales)

Broad-leaved Gum-plant.

Becoming well distributed throughout the state. Introduced in alfalfa seed from the west. Dry soil. June-Sep.

Specimens examined:- Lapeer Co. (Mrs. M. Owen, 1897); St. Clair Co. (C. K. Dodge, 1904); Kent Co. (F. W. Bull, 1912); Ottawa Co. (C. M. Shearer, 1912); Cass Co. (J. Finley, 1914); Oakland Co. (B. F. Chandler, 1914); Roscommon Co. (Minnie L. Love, 1915); Schoolcraft Co., (C. K. Dodge, 1915); Marquette Co. (A. Dachnowski, 1906); Washtenaw Co. (B. A. Walpole, 1918); Tuscola Co. (A. Mac Vittie, 1918); Kalamazoo Co. (L. A. Kenoyer, 1924); Clare Co. (B. A. Walpole, 1924); Cheboygan Co. (J. H. Ehlers, 1923); Wayne Co. (J. M. Sutton, 1916); Bois Blanc Island (C. Billington).

Reported from:- Grand Traverse Co. (W. L. McAtee, 1919); Bay Co. to Mackinac City (C. K. Dodge); Muskegon Co. (V. O. Graham); Gogebic Co. (H. T. Darlington, 1919); Isabella Co. (M. S. C.); Benzie Co., Manistee Co. (M. S. C., 1913); Hillsdale Co., Jackson Co. (M. S. C., 1914); Ingham Co. (M. S. C., 1915); Mecosta Co. (M. S. C., 1921); Charlevoix Co. (M. S. C., 1922); Lapeer Co., Ionia Co., Livingston Co. (M. S. C., 1925).

7. SOLIDAGO L. Goldenrod.

1. Heads in axillary clusters, or in a narrow or dense panicle(thyrse), not secund on the ascending or upright branches.
2. Rays cream-color or white; plant pubescent; heads usually in a narrow thyrse; achenes glabrous....1. *S. bicolor*.
2. Rays yellow.
3. Heads mostly in axillary clusters.
4. Leaves lanceolate to oblong.....2. *S. caesia*.
4. Leaves oval or ovate.
5. Involucre 3-6 mm. high.....3. *S. flexicaulis*.
5. Involucre 8-12 mm. high.....4. *S. macrophylla*.
3. Heads in a narrow or broad dense thyrse, not secund on its branches.
6. Entire plant usually conspicuously pubescent or hirsute.
7. Panicle narrowly thyrseoid(sometimes branched and broadly thyrseoid or pyramidal); leaves obovate, oblanceolate or elliptical, not 3-ribbed; achenes glabrous....5. *S. hispida*.
7. Panicle somewhat pyramidal or corymbiform, the branches ascending, not at all or only slightly recurved; leaves lanceolate, 3-ribbed; achenes pubescent.....6. *S. lepida*, var. *fallax*.
6. Stem and leaves glabrous below (often puberulent in *S. randii*); at least the inflorescence pubescent or puberulent.
8. Pedicels(stalks of heads) short, 2-4 mm. long.
9. Tegules acute or acutish, usually glutinous; achenes appressed-hairy.....7. *S. randii*.
9. Tegules obtuse or the inner acutish; achenes glabrous or rarely sparingly pubescent above.
10. Basal leaves lanceolate or oblong-lanceolate, serrulate; inflorescence wand-like, with appressed branches; tegules somewhat keeled, not glutinous; plants of wet soil....8. *S. uliginosa*.
10. Basal leaves oblong-lanceolate to ovate or oval, serrate or entire; inflorescence pyramidal or thyrseiform, the branches ascending; tegules usually glutinous, yellowish.
11. Stem stout; lower stem and basal leaves ovate or oval, serrulate, much exceeding the lanceolate upper ones; inflorescence densely pubescent.....9. *S. conferta*.

11. Stem more slender; leaves more nearly uniform, oblong-lanceolate to lanceolate, entire; inflorescence sparingly pubescent.....10. *S. speciosa*, var. *angustata*.
8. — Pedicels of mature specimens averaging 5 mm. in length or more.
12. Plant 15-40 cm. tall; leaves 7-12 cm. long; heads about 6 mm. high.....11. *S. racemosa*.
12. Plant 40-90 cm. tall; basal leaves 15-30 cm. long; heads 7-9 mm. high.....12. *S. gillmani*.
1. Heads in a narrow or broad terminal panicle, secund on its spreading or recurved branches, or, crowded at or near the ends of the branches and forming a rounded or flat-topped inflorescence.
13. Heads in a narrow or broad terminal panicle, secund on its spreading or recurved branches, not flat-topped.
14. Basal leaves much exceeding the greatly reduced upper ones.
15. Leaves glabrous and smooth (except the margins).
16. Panicle narrow, its branches pubescent or puberulent; rays 3-8; plants of wet soil.....13. *S. neglecta*.
16. Panicle widely spreading, its branches glabrous or with a few scabrous hairs; rays (7-)8-12; plants of dry soil.....14. *S. juncea*.
15. Leaves very rough above or canescent on both surfaces.
17. Upper surface of leaves very scabrous, the lower glabrous and smooth; stem coarse, angled above, smooth; plants of swamps and wet soil.....15. *S. patula*.
17. Both surfaces of leaves hoary-pubescent, not scabrous; stem slender, terete, canescent; plants of dry soil.....16. *S. nemoralis*.
14. Basal leaves similar in size to the upper stem-leaves.
18. Stem-leaves glabrous below the inflorescence (decurrent hairy lines may be present).
19. Branches of the panicle few, very long and wide-spreading, flowerless toward the base; leaves pinnately-veined; ray 3-5.....17. *S. ulmifolia*.
19. Branches of the panicle usually numerous, not very long nor wide-spreading; leaves 3-ribbed; rays 6-15.

- 20. Involucre 2-3 mm. high; stem never glaucous.....18. *S. canadensis*.
- 20. Involucre 3.2-5 mm. high; stem usually glaucous.....19. *S. serotina*.
- 18. Stem pubescent throughout or glabrate toward the base.
 - 21. Leaves 3-ribbed, not rugose-veined.
 - 22. Leaves thickish, subentire, densely short-hairy beneath; inflorescence a pyramidal panicle; heads secund on the spreading or recurved branches; tegules firm, lanceolate or linear, bluntish.....20. *S. hirsutissima*.
 - 22. Leaves thinner, merely scabrous on the nerves beneath (in forms the lower surface and stems are densely white-pilose); inflorescence somewhat corymbiform or pyramidal, the branches ascending, not at all or only slightly recurved, the lower subtended by elongate leaves; tegules linear-lanceolate, thin, acute, the tips often spreading.....6. *S. lepida*, var. *fallax*.
 - 21. Leaves pinnately-veined, not 3-ribbed, sparingly long-hairy and rugose-veined beneath.....21. *S. altissima*.
- 13. Heads crowded at or near the ends of the branches, forming a rounded or flat-topped inflorescence.
 - 23. Leaves flat, pinnately-veined.
 - 24. Stem and leaves rough; heads more than 30-flowered; plants of dry soil.....22. *S. rigida*.
 - 24. Stem and leaves smooth; heads 16-25-flowered; plants of wet soil.....25. *S. ohioensis*.
 - 23. Some of the stem-leaves somewhat folded, the lower and basal usually 3-nerved.
 - 25. Heads many in a large, dense, corymbose cyme; inflorescence usually densely upwardly scabrous-pubescent; leaves numerous, the cauline clasping or sheathing and mostly recurved.....24. *S. riddellii*.
 - 25. Heads few in a small corymbose cyme; inflorescence sparingly upwardly scabrous-pubescent or glabrous; leaves somewhat scattered, the cauline but little folded or clasping and nearly straight.....25. *S. houghtonii*.

1. SOLIDAGO BICOLOR L. (two-colored)

White Goldenrod.

Scarce. Lower Peninsula only. On dry banks or in dry woods.

Specimens examined were accepted as they were named, because many forms of this species, in the herbaria, were difficult to separate from *S. hispida*.

Specimens examined:— Kent Co. (J. Shaddick & H. C. Skeels, 1896); St. Clair Co. (C. K. Dodge, 1896); Gratiot Co. (C. A. Davis, 1894); Oakland Co. (C. F. Wheeler, 1895); Oscoda Co. (1888); Allegan Co. (C. H. Kauffman, 1910); Macomb Co. (D. Cooley, 1840); Wayne Co. (B. A. Walpole, 1920); Washtenaw Co. (S. E. Wolff, 1927).

Reported from:— Ionia Co. (Wheeler & Smith).

2. SOLIDAGO CAESIA L. (gray of the eyes; bluish-gray)

Solidago caesia L., var. *axillaris* (Pursh) A. Gray

Blue-stemmed Goldenrod.

Common. In woods and thickets. In the Lower Peninsula. Rare or absent in the Upper Peninsula. Aug.—Oct.

Specimens examined:— Macomb Co. (D. Cooley, 1840); St. Joseph Co. (1877); Kent Co. (Helen Sauris, 1892); Washtenaw Co. (A. J. Pieters, 1892); Jackson Co. (ex Herb. S. H. & D. R. Camp, 1893); Gratiot Co. (C. A. Davis, 1888); Ingham Co. (G. H. Hicks, 1892); St. Clair Co. (C. K. Dodge, 1896); Montcalm Co. (B. Barlow, 1900); Van Buren Co. (H. S. Pepoon, 1905); Wayne Co. (B. F. Chandler, 1915); Charlevoix Co. (Henrietta L. Wolff, 1922); Arenac Co. (E. Heim, 1922); Emmet Co. (C. W. Fallas, 1923); Oakland Co. (C. Billington, 1918); Kalamazoo Co. (S. E. Wolff, 1924); Berrien Co. (C. Billington, 1920).

Reported from:— Grand Traverse Co. (H. T. Darlington, 1919); Cass Co. (H. S. Pepoon); Calhoun Co. (C. E. Barr); Dickinson Co. (G. H. Coons); Muskegon Co. (V. O. Graham); Charity Islands, Tuscola Co. (C. K. Dodge); Manistee Co. (F. P. Daniels); Benzie Co. (M. S. C., 1924).

3. SOLIDAGO FLEXICAULIS L. (zigzag-stemmed)

Solidago latifolia L.

Broad-leaved Goldenrod.

In rich woods, throughout the state. Frequent. Jul.—Sep.

Specimens examined:— Macomb Co. (D. Cooley, 1842); Kent Co. (H. M. Bailey, 1891); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1896); Emmet Co. (C. W. Fallas, 1897); Allegan Co. (C. H. Kauffman, 1910); Mackinac Co. (C. K. Dodge, 1912); Washtenaw Co. (C. D. LaRue, 1915); Oakland Co. (B. F. Chandler, 1916); Mecosta Co. (H. T. Darlington, 1916); Baraga Co. (C. K. Dodge, 1916); Berrien Co. (H. T. Darlington, 1917); Gogebic Co. (H. T. Darlington, 1919); Eaton Co. (B. A. Walpole, 1922); Wayne Co. (M. W. Schnute, 1922); Ontonagon Co. (H. T. Darlington, 1923).

Reported from:— Van Buren Co. (H. S. Pepoon); Bay Co., Mackinaw Islands, Tuscola Co. (C. K. Dodge); Huron Co. (C. A. Davis); Beaver Island (H. T. Darlington); Calhoun Co. (G. W. Davis); Manistee Co., St. Joseph Co. (F. P. Daniels); Benzie Co. (E. A. Bessey, 1924).

4. SOLIDAGO MACROPHYLLA Pursh (large-leaved)
Large-leaved Goldenrod.

No specimens seen. Reported from Lake Superior in Gray's Manual, ed. 7 and in Britton & Brown Ill. Fl., ed. 2.

5. SOLIDAGO HISPIDA Muhl. (rough-hairy)
Solidago bicolor concolor T. & G.
Hairy Goldenrod.

In dry woods and on dry banks. Common throughout the state.
Variable in pubescence and outline of inflorescence. Much more common than *S. bicolor*, which it resembles.

Specimens examined:— Macomb Co. (D. Cooley, 1837); Keweenaw Co. (O. A. Farwell, 1888); Crawford Co. (1888); Ingham Co. (G. H. Hicks, 1892); St. Clair Co. (C. K. Dodge, 1895); Arenac Co. (C. F. Wheeler, 1900); Kent Co. (Emma J. Cole, 1901); Montcalm Co. (B. Barlow, 1900); Mackinac Co. (C. K. Dodge, 1912); Wayne Co. (C. Billington, 1914); Marquette Co. (A. Dachnowski, 1906); Oakland Co. (B. F. Chandler, 1915); Cheboygan Co. (J. H. Ehlers, 1920); Gogebic Co. (H. T. Darlington, 1919); Emmet Co. (C. W. Fallas, 1922); Ontonagon Co. (E. A. Bessey, 1923); Ionia Co. (B. A. Walpole, 1924); Jackson Co. (S. E. Wolff, 1927); Muskegon Co. (S. E. Wolff, 1927); Cass Co. (H. S. Pepoon).

Reported from:— Calhoun Co. (C. E. Barr); Dickinson Co. (G. H. Coons, 1909); Grand Traverse Co. (W. L. McAtee, 1919); Charity Islands, Bay Co. to Mackinac Co., Tuscola Co., Chippewa Co., Schoolcraft Co. (C. K. Dodge); Huron Co. (C. A. Davis); Isle Royale (W. S. Cooper); Gratiot Co. (C. A. Davis).

6. SOLIDAGO LEPIDA DC., var. fallax Fernald (scaly)

South shore of Lake Superior. A recently described variety (see Rhodora 17:8. 1915). Aug.—Sep.

Specimens examined:— Keweenaw Co. (O. A. Farwell, 1888); Houghton Co. (C. K. Dodge, 1916); Baraga Co. (C. K. Dodge, 1916).

7. SOLIDAGO RANDII (Porter) Britton
Solidago virgaurea randii Porter
Solidago virgaurea redfieldii Porter
Solidago virgaurea monticola Porter
Solidago virgaurea deanei Porter
Rand's Goldenrod.

In dry, mostly rocky situations. Aug.—Sep. Forms of *S. gillmani* with compact inflorescences and narrow leaves approach this species. A specimen from rocky situations in Keweenaw Co. collected by F. J. Hermann may be *S. randii*. Other specimens labeled *S. randii* are placed under *S. gillmani*.

8. SOLIDAGO HUMILIS Pursh (low)
Solidago uliginosa Nutt.

Bog or Swamp Goldenrod.

In swamps and wet places. Generally distributed. Frequent.

See Rhodora 17:6. 1915, for change of name.

Specimens examined:— Keweenaw Co. (O. A. Farwell, 1888); Ingham Co. (G. H. Hicks, 1891); Jackson Co. (C. F. Wheeler, 1892); Charlevoix Co. (C. F.

Wheeler, 1894); Arenac Co., Alger Co. (C. F. Wheeler, 1900); Marquette Co. (B. Barlow, 1901); Kent Co. (Emma J. Cole, 1901); Tuscola Co. (C. A. Davis, 1902); St. Clair Co. (C. K. Dodge, 1907); Cheboygan Co. (F. C. Gates, 1911); Oakland Co. (O. A. Farwell, 1912); Presque Isle Co. (C. K. Dodge, 1913); Chippewa Co. (C. K. Dodge, 1914); Schoolcraft Co. (C. K. Dodge, 1915); Emmet Co. (C. W. Fallass, 1915); Alcona Co. (H. T. Darlington, 1918); Gogebic Co. (H. T. Darlington, 1919); Mackinac Co. (J. H. Ehlers, 1920).

Reported from:— Magician Lake region (H. S. Pepoon); Calhoun Co. (C. E. Barr); Dickinson Co. (G. H. Coons, 1909); Muskegon Co. (C. D. McLouth); Bay Co. to Mackinac Co. (C. K. Dodge); Isle Royale (W. S. Cooper); Alpena Co., Washtenaw Co. (C. A. Davis).

9. *SOLIDAGO CONFERTA* Mill. (brought together, referring to the upper and compact part of the inflorescence)

Solidago speciosa Nutt. of Gray's Manual, ed. 7 and Britton & Brown Ill. Fl., ed. 2 (see *Rhodora* 29:17. 1927.)

In mostly rich soil. Frequent in the Lower Peninsula. Rare or absent in the Upper Peninsula. Specimens from the Huron and Porcupine mountains may belong here.

Specimens examined:— Oceana Co., Macomb Co. (D. Cooley, 1840); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1894); Ingham Co. (G. H. Hicks, 1891); Oakland Co. (C. K. Dodge, 1913); Kent Co. (Emma J. Cole, 1901); Allegan Co. (C. H. Kauffman, 1910); Wayne Co. (C. Billington, 1914); Washtenaw Co. (C. D. LaRue, 1915); Livingston Co. (J. H. Ehlers, 1923); Ionia Co. (B. A. Walpole, 1924).

Reported from:— Grand Traverse Co. (H. T. Darlington, 1919); Calhoun Co. (C. E. Barr); Muskegon Co. (C. D. McLouth); St. Joseph Co. (F. P. Daniels); Genesee Co. (D. Clark).

10. *SOLIDAGO SPECIOSA* Nutt. (showy), var. *ANGUSTATA* T. & G. (narrow)

Should probably be classified now as a variety of *S. conferta* Mill.

Forms of this are difficult to separate from the species. In mostly dry soil. Aug.-Oct.

Specimens examined:— Ionia Co. (B. A. Walpole); Kent Co. (J. Shaddick & H. C. Skeels, 1895); Montcalm Co. (B. Barlow, 1900); Cheboygan Co. (J. H. Ehlers, 1920); Lake Co. (M. S. C. Herb., 1888); Oakland Co. (B. F. Chandler, 1915).

(*SOLIDAGO RIGIDIUSCULA* Porter (a little stiff))

Solidago speciosa rigidiuscula T. & G.

Slender Showy Goldenrod.

Rare. In dry soil. Aug.-Oct. Many forms of *S. conferta* (*S. speciosa* Nutt.) in the herbaria have been called *S. rigidiuscula*. Only one specimen (Van Buren Co., H. S. Pepoon, 1905) agrees with the description. It should be looked for in the extreme southern or southwestern part of the state.

11. SOLIDAGO RACEMOSA Greene (having racemes)

Solidago humilis Pursh

Solidago purshii Porter

River-bank Goldenrod.

Rare. Only from Keweenaw Co., in rocky places. Small forms of *S. gillmani* from the sandy shores of the Great Lakes have been called this.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1921); Keweenaw Co. (F. J. Hermann, 1926).

12. SOLIDAGO GILLMANI (A. Gray) Steele

Solidago racemosa Greene, var. *gillmani* (A. Gray) Fernald

Solidago humilis gillmani A. Gray

Solidago virgaurea gillmani Porter

Gillman's Goldenrod.

Confined to the sandy shores of Lakes Michigan, Superior and northern Huron. Variable in stature, leaf-form and size of inflorescence. Aug.-Oct.

Specimens examined:- Emmet Co. (C. W. Fallass, 1894); Benzie Co. (C. A. Davis, 1905); Cheboygan Co. (C. K. Dodge, 1913); Chippewa Co. (C. K. Dodge, 1914); Schoolcraft Co. (C. K. Dodge, 1915); Van Buren Co. (S. E. Wolff, 1924); Berrien Co., Oceana Co., Muskegon Co. (S. E. Wolff, 1927); Allegan Co. (C. F. Wheeler, 1896); Delta Co., Chandler's Falls (C. F. Wheeler, 1892).

13. SOLIDAGO UNILIGULATA (DC.) Porter (having one ray-flower), var. *neglecta* (T. & G.) Fernald. (neglected) (see *Rhodora* 23:292. 1921.)

Solidago neglecta T. & G.

Swamp Goldenrod.

In swamps and bogs. Throughout. Infrequent. Aug.-Sep. Forms with heads little second resemble *S. humilis* Pursh.

Specimens examined:- Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1893); Ingham Co. (H. C. Skeels, 1894); Ottawa Co. (Emma J. Cole, 1896); Allegan Co. (C. H. Kauffman, 1910); Van Buren Co. (H. S. Pepoon, 1906); Emmet Co. (Fallass & Swift, 1915); Oakland Co. (C. Billington, 1917); Washtenaw Co. (B. A. Walpole, 1918); Kent Co. (Emma J. Cole, 1901).

Reported from:- Keweenaw Co. (O. A. Farwell, 1914); Marl Lake (O. A. Farwell, 1920); Ionia Co. (Beal's Catalog).

14. SOLIDAGO JUNCEA Ait. (like *Juncus*, the Rush)

Solidago juncea scabrella T. & G.

Solidago juncea ramosa Porter & Britton

Early Goldenrod.

Common. Throughout the state. In dry or rocky soil. June-Oct.

Specimens examined:- Lenawee Co. (W. J. Beal, 1866); Crawford Co. (G. H. Hicks, 1888); Gratiot Co. (C. A. Davis, 1892); Ingham Co. (H. C. Skeels, 1894); Kent Co. (Mary B. Fallass); Jackson Co. (S. H. Camp, 1896); St. Clair Co. (C. K. Dodge, 1896); Calhoun Co. (W. J. Beal, 1898); Muskegon Co. (C. D. McLouth, 1896); Wayne Co. (O. A. Farwell, 1895); Arenac Co. (C. F. Wheeler, 1900); Marquette Co. (A. Dachnowski, 1906); Van Buren Co. (H. S. Pepoon, 1906); Oakland Co. (B. F. Chandler, 1915); Newaygo Co.

(E. A. Bessey, 1916); Clare Co., Roscommon Co. (H. T. Darlington, 1916); Berrien Co. (Dodge & Darlington, 1917); Oscoda Co. (C. K. Dodge, 1913); Allegan Co. (C. H. Kauffman, 1910); Washtenaw Co. (C. D. LaRue, 1915); Alpena Co. (Bessey & Darlington, 1918); Emmet Co. (C. W. Fallass, 1920); Cheboygan Co. (J. H. Ehlers, 1921); Kalamazoo Co. (S. E. Wolff, 1923); Ontonagon Co. (H. T. Darlington, 1923); Genesee Co. (D. Clark).

Reported from:— Isle Royale (W. S. Cooper); Manistee Co., St. Joseph Co. (F. P. Daniels); Chippewa Co., Schoolcraft Co. (C. K. Dodge).

15. *SOLIDAGO PATULA* Muhl. (slightly spreading)

Rough-leaved Goldenrod.

Common. Southern half of the Lower Peninsula. Rare or absent in the remainder of the state. Swamps. Aug.-Oct.

Specimens examined:— Macomb Co. (D. Cooley, 1842); Kent Co. (C. W. Fallass, 1880); Ingham Co. (C. F. Wheeler, 1890); Gratiot Co. (C. A. Davis, 1892); Washtenaw Co. (1877); St. Clair Co. (C. K. Dodge, 1904); Muskegon Co. (1895); Van Buren Co., Cass Co. (H. S. Pepoon, 1905); Allegan Co. (C. H. Kauffman, 1910); Berrien Co. (H. T. Darlington, 1917); Oakland Co. (B. A. Walpole, 1919); Kalamazoo Co. (S. E. Wolff, 1926).

Reported from:— Calhoun Co. (C. E. Barr); Tuscola Co. (C. K. Dodge); Manistee Co. (F. P. Daniels).

16. *SOLIDAGO NEMORALIS* Ait. (sylvan)

Gray Goldenrod.

Common. In dry gravelly or sandy, mostly sterile fields. Jul.-Nov.

Specimens examined:— Macomb Co. (D. Cooley, 1840); Kent Co. (C. W. Fallass, 1886); Crawford Co. (G. H. Hicks, 1889); Clare Co. (W. J. Beal, 1890); Ingham Co. (G. H. Hicks, 1891); Washtenaw Co. (A. J. Pieters, 1892); Ionia Co. (C. F. Wheeler, 1890); St. Clair Co. (C. K. Dodge, 1895); Alger Co. (C. F. Wheeler, 1900); Van Buren Co. (H. S. Pepoon, 1905); Delta Co. (A. Dachnowski, 1906); Allegan Co. (C. H. Kauffman, 1910); Chippewa Co. (C. K. Dodge, 1914); Houghton Co. (C. K. Dodge, 1916); Oakland Co. (J. M. Sutton, 1914); Mason Co. (H. T. Darlington, 1918); Gogebic Co. (H. T. Darlington, 1919); Cheboygan Co. (J. H. Ehlers, 1920); Lake Co. (C. Goodrich, 1922); Kalamazoo Co. (S. E. Wolff, 1924).

Reported from:— Grand Traverse Co. (H. T. Darlington, 1919); Tuscola Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Huron Co. (C. A. Davis); Isle Royale (W. S. Cooper); Magician Lake (H. S. Pepoon).

17. *SOLIDAGO ULMIFOLIA* Muhl. (elm-leaved)

Elm-leaved Goldenrod.

Infrequent. On dry, rocky or gravelly banks, often in thin woods.

Resembles *S. altissima* L. The latter usually grows in moister soil and is more pubescent. Aug.-Sep. Southern half of the Lower Peninsula.

Specimens examined:— Berrien Co. (G. L. Ames, 1867); Kent Co. (Emma J. Cole, 1893); Ingham Co. (H. C. Skeels, 1894); Van Buren Co. (H. S. Pepoon, 1904); Kalamazoo Co. (S. E. Wolff, 1923); Lenawee Co. (C. Billington, 1924); Washtenaw Co. (S. E. Wolff, 1927).

Reported from:— St. Joseph Co. (F. P. Daniels); Flint (D. Clark); Ionia Co. (Beal's Catalog).

18. SOLIDAGO CANADENSIS L.

Solidago canadensis L., var. *hargerii* Fernald
Canada Goldenrod.

Rather common and variable. Throughout the state. The typical specimens are found in the Upper Peninsula. Those of the Lower Peninsula, especially in the southern part and on the heavier soils, are more pubescent and resemble *S. hirsutissima* Mill.

Specimens examined:- Macomb Co. (D. Cooley, 1840); Keweenaw Co. (A. E. Foote, 1868); Kent Co. (H. M. Bailey, 1891); Washtenaw Co. (A. J. Pieters, 1892); St. Clair Co. (C. K. Dodge, 1892); Calhoun Co. (R. L. Brown, 1902); Van Buren Co. (H. S. Pepoon, 1905); Delta Co. (A. Dachnowski, 1906); Marquette Co. (A. Dachnowski, 1906); Cheboygan Co. (F. C. Gates, 1911); Chippewa Co. (C. K. Dodge, 1914); Luce Co. (C. K. Dodge, 1915); Baraga Co. (C. K. Dodge, 1916); Wayne Co. (J. M. Sutton, 1916); Iosco Co., Clare Co. (H. T. Darlington, 1916); Gogebic Co. (H. T. Darlington, 1919); Ontonagon Co. (H. T. Darlington, 1923); Kalamazoo Co. (S. E. Wolff, 1923); Jackson Co., Branch Co. (S. E. Wolff, 1927).

Reported from:- Cass Co., Berrien Co. (H. S. Pepoon); Dickinson Co. (G. H. Coons, 1909); Muskegon Co. (C. D. McLouth); Bay Co. to Mackinac Co., Schoolcraft Co., Tuscola Co. (C. K. Dodge); Huron Co. (C. A. Davis); Beaver Island, (H. T. Darlington, 1923); Manistee Co., St. Joseph Co. (F. P. Daniels); Isle Royale (W. S. Cooper); Emmet Co. (Fallass & Swift); Sanilac Co. (M. S. C., 1915).

19. SOLIDAGO SEROTINA Ait. (late)

Solidago gigantea Ait.

Solidago serotina gigantea A. Gray

Late Goldenrod.

Common. In moist soil. Throughout. The common name is misleading, for it begins blossoming as soon as many of our Goldenrods. Aug.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1847); Kent Co. (C. W. Fallass, 1886); Keweenaw Co. (O. A. Farwell, 1888); Gratiot Co. (C. A. Davis, 1890); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1896); Alger Co. (C. F. Wheeler, 1900); Van Buren Co. (H. S. Pepoon, 1904); Cass Co. (H. S. Pepoon, 1905); Allegan Co. (C. H. Kauffman, 1910); Chippewa Co. (C. K. Dodge, 1915); Muskegon Co. (C. D. McLouth, 1899); Oakland Co. (C. Billington, 1916); Marquette Co., Baraga Co. (C. K. Dodge, 1916); Washtenaw Co. (B. A. Walpole, 1918); Clare Co., Missaukee Co. (C. K. Darlington, 1916); Kalamazoo Co. (Kenoyer & Wolff, 1924); Berrien Co., Jackson Co. (S. E. Wolff, 1927).

Reported from: Grand Traverse Co. (W. L. McAtee); Charity Islands, Bay Co. to Mackinac Co., Tuscola Co. (C. K. Dodge); Huron Co. (C. A. Davis); Wayne Co., (O. A. Farwell); Gogebic Co. (H. T. Darlington, 1919); Manistee Co., St. Joseph Co. (F. P. Daniels); Emmet Co. (C. W. Fallass).

20. SOLIDAGO HIRSUTISSIMA Mill. (very hairy)

Solidago altissima L. of Gray's Manual, ed. 7 and Britton and Brown Ill. Fl., ed. 2. (see *Rhodora* 29:73. 1927.)

Solidago procera Ait.

Tall Goldenrod.

Common. Throughout the state. Resembles *S. canadensis*, but that species has smaller heads and is typically less pubescent. Dry or moist rich soil. Aug.-Nov.

Specimens examined:- Macomb Co. (D. Cooley, 1840); Ottawa Co. (D. Clark, 1867); Keweenaw Co. (O. A. Farwell, 1888); St. Clair Co. (C. K. Dodge, 1896); Montcalm Co. (B. Barlow, 1900); Allegan Co. (C. H. Kauffman, 1910); Schoolcraft Co. (C. K. Dodge, 1915); Washtenaw Co. (C. D. LaRue, 1915); Marquette Co., Baraga Co. (C. K. Dodge, 1916); Ingham Co., Manistee Co. (H. T. Darlington, 1918); Mackinac Co. (J. H. Ehlers, 1920); Berrien Co. (C. Billington, 1920); Emmet Co. (C. W. Fallass, 1922); Ontonagon Co. (H. T. Darlington, 1923); Kalamazoo Co. (S. E. Wolff, 1924); Chippewa Co. (E. A. Bessey, 1926).

Reported from:- Charity Islands, Bay Co., Tuscola Co. (C. K. Dodge); Isle Royale (W. S. Cooper).

21. *SOLIDAGO ALTISSIMA* L. (very tall)

Solidago rugosa Mill. of Gray's Manual, ed. 7 and of Britton & Brown, Ill. Fl., ed. 2. (see *Rhodora* 29:73. 1927.)

Solidago aspera Ait.

Wrinkle-leaved Goldenrod.

Common. Throughout the state. In rather dry or moist soil.

Very variable, the specimens differing in leaf-form, leaf-thickness, pubescence and in shape and leafiness of inflorescence.

Aug.-Nov.

Specimens examined:- St. Joseph Co. (1877); Kent Co. (C. W. Fallass, 1884); Gratiot Co. (C. A. Davis, 1890); Ingham Co. (G. H. Hicks, 1891); St. Clair Co. (C. K. Dodge, 1896); Alger Co. (C. F. Wheeler, 1900); Emmet Co. (C. W. Fallass, 1897); Delta Co. (A. Dachnowski, 1906); Ottawa Co. (C. H. Kauffman, 1910); Huron Co. (C. K. Dodge, 1912); Luce Co. (C. K. Dodge, 1915); Oakland Co. (C. Billington, 1915); Cheboygan Co. (J. H. Ehlers, 1916); Washtenaw Co. (B. A. Walpole, 1918); Berrien Co. (C. Billington, 1920); Mackinac Co. (C. Goodrich, 1922); Kalamazoo Co. (S. E. Wolff, 1924); Chippewa Co. (E. A. Bessey, 1926); Jackson Co. (S. E. Wolff, 1927); Cass Co. (H. S. Pepon).

Reported from:- Bay Co. to Mackinac Co., Tuscola Co. (C. K. Dodge); Muskegon Co. (C. D. McLouth); Manistee Co. (F. P. Daniels).

22. *SOLIDAGO RIGIDA* L. (stiff)

Oligoneuron canescens Rydb.

Stiff Goldenrod.

Frequent. In dry sandy or gravelly soil. Confined to the lower half of the Lower Peninsula. Aug.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1827); Kent Co. (H. M. Bailey, 1892); Washtenaw Co. (A. J. Pieters, 1892); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1894); St. Clair Co. (C. K. Dodge, 1896); Monroe Co. (B. F. Chandler, 1915); Oakland Co. (C. Billington, 1918); Kalamazoo (S. E. Wolff, 1923); Lenawee Co. (C. Billington, 1924).

Reported from:- St. Joseph Co., Manistee Co. (F. P. Daniels); Van Buren Co. (H. S. Pepon); Calhoun Co. (G. W. Davis); Ionia Co., Flint, (Beal's Catalog).

23. *SOLIDAGO OHIOENSIS* Riddell

Ohio Goldenrod.

Frequent. Lower Peninsula, mostly in the southern half. In swamps or wet prairies. Aug.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1842); Genesee Co. (D. Clark, 1870); Kent Co. (H. M. Bailey, 1891); Jackson Co. (C. F. Wheeler, 1892); St. Clair Co. (C. K. Dodge, 1894); Emmet Co. (C. W. Fallass, 1897); Tuscola Co. (C. A. Davis, 1902); Cass Co. (H. S. Pepoon, 1905); Charlevoix Co. (1927); Oakland Co. (B. F. Chandler, 1916); Washtenaw Co. (B. A. Walpole, 1919); Kalamazoo Co. (S. E. Wolff, 1924).

Reported from:- Calhoun Co. (C. E. Barr); Ionia Co., Bay Co. (Beal's Catalog); Bay Co. to Mackinac Co. (C. K. Dodge); Huron Co. (C. A. Davis).

24. SOLIDAGO RIDDELLII Frank
Riddell's Goldenrod.

Frequent. Southern part of the state only. Wet grassy prairies.
Aug.-Sep.

Specimens examined:- Washtenaw Co. (M. W. Harrington, 1866); Ionia Co. (C. F. Wheeler, 1890); Ingham Co. (G. H. Hicks, 1891); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1893); Kent Co. (B. Livingston, 1894); St. Clair Co. (C. K. Dodge, 1899); Ottawa Co. (Emma J. Cole, 1899); Tuscola Co. (C. A. Davis, 1902); Oakland Co. (J. M. Sutton, 1914); Kalamazoo Co. (S. E. Wolff, 1926).

Reported from:- Magician Lake region (H. S. Pepoon); Calhoun Co. (C. E. Barr); Wayne Co. (O. A. Farwell); St. Joseph Co. (F. P. Daniels); Flint (D. Clark, in Wheeler & Smith Catalog).

25. SOLIDAGO HOUGHTONII T. & G.
Houghton's Goldenrod.

Rare. In swamps and on sandy beaches. In the state apparently limited to the northern part of the Lower Peninsula and to the eastern end of the Upper Peninsula. Jul.-Oct.

Specimens examined:- Schoolcraft Co. (C. K. Dodge, 1915); Emmet Co. (J. H. Ehlers, July 20, 1920).

Reported from:- Mackinac Co., Bois Blanc Island, sandy beach of Lake Superior (C. K. Dodge); Drummond's Island (Winchell's Catalog).

8. EUTHAMIA Greene

Leaves distinctly 3-5-ribbed, linear-lanceolate;
heads 20-32-flowered; involucre 4-5 mm. high.....1. E. graminifolia.
Leaves 1-ribbed or indistinctly 3-ribbed, narrowly
linear; heads 10-18-flowered; involucre 3-4 mm.
high.....2. E. tenuifolia.

1. EUTHAMIA GRAMINIFOLIA (L.) Nutt. (grass-leaved)
Solidago graminifolia (L.) Salisb.
Bushy Goldenrod.

Common. Throughout the state. In moist or dry soil. In some places it is a weed. The variety, E. graminifolia nuttallii, with more pubescent leaves and branches is as common as the species. Aug.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1837); Isle Royale (University Party, 1868); Hillsdale Co. (H. B. Crosby, 1885); Keweenaw Co. (O. A. Farwell, 1886); Shiawassee Co. (G. H. Hicks, 1890); Cheboygan Co.

(C. A. Kofoid, 1890); Washtenaw Co. (A. J. Pieters, 1892); Ingham Co. (H. C. Skeels, 1894); Kent Co. (W. E. Mulliken, 1897); Marquette Co. (B. Barlow, 1901); St. Clair Co. (C. K. Dodge, 1903); Cass Co. (H. S. Pepoon, 1905); Luce Co. (C. K. Dodge, 1915); Roscommon Co. (H. T. Darlington, 1916); Mackinac Co. (J. H. Ehlers, 1916); Gogebic Co. (H. T. Darlington, 1919); Ontonagon Co. (E. A. Bessey, 1923); Kalamazoo Co. (S. E. Wolff, 1924); Chippewa Co. (E. A. Bessey, 1926); Muskegon Co. (S. E. Wolff, 1927).
Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Manistee Co. (F. P. Daniels); Bay Co., Charity Islands, (C. K. Dodge).

2. EUTHAMIA TENUIFOLIA (Pursh) Greene (narrow-leaved)

Solidago tenuifolia Pursh

Slender Fragrant Goldenrod.

Rare. Sandy shores of lakes. Now limited to the southwestern counties. Forms intermediate between this and the preceding are not uncommon farther north. They have been placed with *E. graminifolia*. Aug.-Oct.

Specimens examined:- Cass Co. (H. S. Pepoon, 1906); Cass Co. (F. C. Gates, 1906); Kalamazoo Co. (S. E. Wolff, 1924).

9. BELLIS (Tourn.) L.

BELLIS PERENNIS L. (perennial)

European or Garden Daisy.

Occasional on lawns. Apr.-Nov.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1897); Washtenaw Co. (B. A. Walpole).

Reported from:- Manistee Co. (F. P. Daniels).

10. BOLTONIA L'Her.

BOLTONIA ASTEROIDES (L.) L'Her. (aster-like)

Aster-like Boltonia.

Rare. Mostly as an escape. Aug.-Oct.

Specimens examined:- Cass Co., Dowagiac Swamp (H. S. Pepoon, Aug. 1905); Wayne Co. (C. Billington, Oct. 1918); Washtenaw Co. (B. A. Walpole); Monroe Co., Monroe Piers (B. A. Walpole).

Reported from:- Detroit (A. Alexander, 1911).

11. ASTER L.

1. Basal and lower stem-leaves cordate and petioled.
2. Plant glandular; heads corymbose.
3. Glands abundant on the stem and leaves; growing plant clammy; leaves of inflorescence ovate and conspicuous.....1. *A. roscidus*.
3. Glands confined to the inflorescence; growing plant usually harsh, always so when dry; leaves of inflorescence various, rarely conspicuous.....2. *A. macrophyllus*.
2. Plants not glandular; heads paniculate.
4. Leaves thickish, entire or nearly so; tegules abruptly acute(rarely tapering), with conspicuous green rhomboid tips.
5. Leaves harsh above, sparingly pubescent beneath, those of the middle and upper stem lanceolate and tapering to the base; inflorescence and tegules glabrous.....3. *A. azureus*.
5. Leaves smooth above, densely and finely pubescent beneath, all heart-shaped or rounding at the base, with slender petioles; inflorescence and tegules finely pubescent.....4. *A. shortii*.
4. Leaves thin or thickish, the lower serrate or dentate; tegules merely acute, without conspicuous green tips.
6. Involucre 4-6 mm. high, the tegules appressed, often with purplish or green tips; heads numerous, paniculate, on leafy branchlets.
7. Leaves minutely scabrous above, pubescent or glabrate beneath, thin, the lower on slender or narrowly margined petioles.....5. *A. cordifolius*.
7. Leaves smooth, often greasy to the touch, thickish, the lower and middle on mostly winged petioles.....6. *A. lowrieanus*.
6. Involucre 6-10 mm. high, the tegules loosely imbricated, acute, acuminate or subulate.
8. Rays 10-14 mm. long, blue or violet; the tegules acute or somewhat acuminate, the tips appressed.....7. *A. lindleyanus*.
8. Rays 6-10 mm. long, light blue or white; tegules tapering into awl-shaped, spreading tips.....8. *A. sagittifolius*.
1. None of the stem leaves at the same time cordate and definitely petioled.

9. Leaves all sessile; some of the stem-leaves more or less auriculate-clasping or cordate.
10. Stem hispid or hirsute-pubescent.
 11. Leaves conspicuously cordate-clasping; inner tegules subulate.
 12. Stem densely hirsute-pubescent; inflorescence and tegules glandular or viscid; rays purple or rose.....9. *A. novae-angliae*.
 12. Stem hispid; inflorescence hispid in lines, not glandular; tegules glabrous on the back, ciliate on the margins; rays blue or violet.....10. *A. puniceus*.
11. Leaves obscurely cordate-clasping; inflorescence glandular-pubescent; inner tegules linear, acute.....11. *A. oblongifolius*.
10. Stem glabrous or essentially so.
 13. Stem glaucous; leaves smooth, glaucous; tegules ^{with} green rhomboid acute (sometimes acuminate) tips.....12. *A. laevis*.
 13. Stem and leaves not glaucous; tegules without green rhomboid tips.
 14. Tegules about equal, in 2 ranks, the outer usually herbaceous, rarely foliaceous.
 15. Leaves numerous, crowded, lanceolate, to oblong, thick, often glossy above, with conspicuous auricled bases.....13. *A. lucidulus*.
 15. Leaves scattered, thin, elongate-lanceolate or narrowly lanceolate, slightly cordate or narrowed to the base....14. *A. longifolius*.
 14. Tegules in 3-4 ranks, imbricated, unequal (sometimes equal in *A. junceus*), rarely herbaceous.
 16. Heads terminating minutely foliose slender branchlets; tegules linear-spatulate to linear, the outer obtusish; leaves of the inflorescence linear-oblong to oblong.....15. *A. dumosus*.
 16. Heads not terminating minutely foliose branchlets; tegules acute or acuminate; leaves of inflorescence linear or lanceolate.
 17. Leaves oblong to ovate-lanceolate, contracted below the middle and again dilated at the base, clasping, strongly serrate.....16. *A. prenanthoides*.
 17. Leaves linear or elongate-linear, not contracted, only slightly cordate, entire or nearly so.....17. *A. junceus*.
 9. Leaves sessile or somewhat petioled, not cordate nor auriculate-clasping.

- 18. Leaves densely silvery-white pubescent on both sides.....18. *A. sericeus*.
- 18. Leaves merely pubescent or glabrous.
- 19. Heads mostly racemosely unilateral on the branches.
- 20. Tegules subulately green-tipped; leaves of inflorescence spinose-tipped.
- 21. Rays short, scarcely exceeding the disk; local around salt mines or in salt marshes.....19. *A. subulatus*.
- 21. Rays showy; plants of sandy or dry, not salty soil.
- 22. Involucre (5-)6-7 mm. high; rays 6-10 mm. long; plant glabrous; inflorescence somewhat thyrsoïd.....20. *A. faxoni*.
- 22. Involucre 5 mm. high; rays about 6 mm. long; plant glabrous to villous; inflorescence with spreading branches...21. *A. ericoides*.
- 20. Tegules obtuse or acute; leaves of inflorescence obtuse or acute, not spinose-tipped.
- 23. Tegules obtuse (sometimes acute in *A. dumosus*).
- 24. Plant hoary-pubescent; heads numerous, crowded; tegules herbaceous, bristly-ciliate, spreading.....22. *A. multiflorus*.
- 24. Plant glabrous, rarely pubescent; heads terminating minutely foliose slender branchlets, not crowded; tegules with only the tips green, not spreading.....15. *A. dumosus*.
- 23. Tegules acute.
- 25. Leaves elongate-linear or linear-lanceolate, scarcely serrate; tegules narrowly linear.....23. *A. vimineus*.
- 25. Leaves lanceolate to oblong-lanceolate, serrate at least in the middle; tegules linear, the midrib dilated and green.
- 26. Plant glabrous or sparingly pubescent; leaves broadly lanceolate or oblong-lanceolate; inflorescence broad, the lateral branches wide-spreading.....24. *A. lateriflorus*.
- 26. Plant hirsute or woolly-pubescent; leaves lanceolate; inflorescence narrow, the lateral branches short, with few heads.....25. *A. hirsuticaulis*.
- 19. Heads paniculate or corymbed, not racemosely unilateral on the branches.
- 27. Heads corymbed or corymbose.

28. Lower leaves shining, 3-5 ribbed; heads 1.6-2.4
cm. broad; rays white; achenes glabrous.....26. *A. ptarmicoides*.
28. Leaves green, pinnately-veined; heads 2-3.5 cm.
broad; rays violet-purple to rose-pink.
29. Leaves 2-4 cm. long, lanceolate, revolute-
margined.....27. *A. nemoralis*.
29. Leaves 5-15 cm. long, oblong to linear-
lanceolate, not revolute-margined.....28. *A. novae-belgii*.
27. Heads definitely paniculate.
30. Rays short, scarcely exceeding the disk; tegules
subulate-tipped; plant local, around salt
mines or in salt marshes.....19. *A. subulatus*.
30. Rays showy, much exceeding the disk; tegules ob-
tuse to acuminate, not subulate-tipped.
31. Tegules linear, acute or acuminate; rays
usually white.
32. Tegules acute, green down the back; heads
(including rays) mostly less than 1.6 cm.
broad.....29. *A. tradescanti*.
32. Tegules acuminate, green chiefly near the
tip; heads mostly more than 1.6 cm.
broad.....30. *A. paniculatus*.
31. Tegules linear-oblong, with conspicuous ellip-
tic green tips, acute or obtusish; rays
bluish-violet.....31. *A. salicifolius*.

1. ASTER ROSCIDUS Burgess

Dewy-leaf Aster.

Rare or not recognized. Perhaps a race of *A. macrophyllus*.

Specimens examined:- Wayne Co. (B. A. Walpole. #844).

Reported from:- "Flint, ex. coll. D. Clarke" (Burgess, in Mem. Torr. Bot. Club 13:348. 1906).

2. ASTER MACROPHYLLUS L. (large-leaved)

Large-leaved Aster.

Common. Throughout the state. In mostly dry shaded places. Aug.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1840); Lenawee Co. (W. J. Beal, 1866); Kent Co. (C. W. Fallass, 1886); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1895); Ottawa Co. (ex. Herb. W. E. Mulliken, 1895); Calhoun Co. (W. J. Beal, 1898); Alger Co. (C. F. Wheeler, 1900); Montcalm Co. (B. Barlow, 1900); Cass Co. (H. S. Pepoon, 1904); Marquette Co. (A. Dachnowski, 1906); Allegan Co. (C. H. Kauffman, 1910); Chippewa Co. (C. K. Dodge, 1914); Cheboygan Co. (F. C. Gates, 1911); Huron Co. (C. A. Davis); Newaygo Co. (E. A. Bessey, 1916); Gogebic Co. (H. T. Darlington, 1919); Washtenaw Co. (Miss Allmendinger); Mackinac Co. (J. H. Ehlers, 1920); Berrien Co., Oakland Co. (C. Billington, 1920); Emmet Co. (C. W. Fallass, 1923); Kalamazoo Co. (S. E. Wolff, 1923); Houghton Co. (F. J. Hermann, 1926); Sanilac Co. (T. B. Poole, 1927).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Dickinson Co. (G. H. Coons, 1909); Muskegon Co. (C. D. McLouth); Manistee Co.,

St. Joseph Co. (F. P. Daniels); Bay Co., Schoolcraft Co., Tuscola Co. (C. K. Dodge); Isle Royale (W. S. Cooper); Wayne Co. (J. M. Sutton).

3. ASTER AZUREUS Lindl. (sky-blue)

Sky-blue Aster.

More common in the Lower Peninsula. Borders of woods. Aug.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1837); Kent Co. (C. W. Fallass, 1886); Ingham Co. (G. H. Hicks, 1891); Washtenaw Co. (A. J. Pieters, 1892); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1893); Muskegon Co. (C. D. McLouth, 1898); Van Buren Co. (H. S. Pepoon, 1906); Oakland Co. (C. Billington, 1914); Chippewa Co. (C. K. Dodge, 1914); Osceola Co. (H. T. Darlington, 1916); Lake Co. (C. Goodrich, 1922); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Magician Lake region (H. S. Pepoon); Tuscola Co., Charity Island (C. K. Dodge); St. Joseph Co. (F. P. Daniels); Cheboygan Co. (F. C. Gates); Bay Co. (G. M. Bradford); Flint, Ionia (Beal's Catalog).

4. ASTER SHORTII Hook.

Short's Aster.

Rare. Southern half of the Lower Peninsula. On banks and along edges of woods. Sep.-Oct.

Specimens examined:- Ionia Co., near Pewamo (C. F. Wheeler, 1890); Kent Co. (Emma J. Cole, 1901); Monroe Co. (C. Billington, 1918); Lenawee Co. (C. Billington, 1920).

Reported from:- Oakland Co. (W. A. Brotherton).

5. ASTER CORDIFOLIUS L. (having heart-shaped leaves)

Blue Wood Aster.

Common, in the southern half of the Lower Peninsula. In woods and thickets. Sep.-Nov.

Specimens examined:- Macomb Co. (D. Cooley, 1845); Kent Co. (C. W. Fallass, 1881); Three Rivers, St. Joseph Co. (Ypsilanti ^{Herb. S. H. & D. R. Camp}, 1877); Ingham Co. (G. H. Hicks, 1892); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1893); Van Buren Co. (L. H. Pennington, 1910); St. Clair Co. (C. K. Dodge, 1913); Allegan Co. (C. H. Kauffman, 1913); Wayne Co., Muskegon Co. (C. Billington, 1914); Berrien Co. (C. Billington, 1920); Washtenaw Co. (C. O. Erlanson, 1921); Kalamazoo Co. (S. E. Wolff, 1923); Eaton Co. (Edith Spaulding, 1926); Gratiot Co. (C. A. Davis, 1890).

Reported from:- Cass Co. (H. S. Pepoon); Tuscola Co. (C. K. Dodge); Oakland Co. (O. A. Farwell); Bay Co. (Beal's Catalog).

6. ASTER LOWRIEANUS Porter.

Lowrie's Aster.

Rare. Sep.-Nov.

Specimens examined:- Oakland Co. (C. Billington, 1918).

7. ASTER LINDLEYANUS T. & G.

Lindley's Aster.

Common, in the Upper Peninsula. Range extending into the northern part of the Lower Peninsula. In open places. Aug.-Oct.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1888); Mackinac Co. (C. F. Wheeler, 1892); Marquette Co. (A. Dachnowski, 1906); Emmet Co.

(C. W. Fallass); Alger Co. (C. F. Wheeler, 1900); Schoolcraft Co. (C. K. Dodge, 1915); Mackinac Co. (J. H. Ehlers, 1920); Gogebic Co. (H. T. Darlington, 1919); Alcona Co. (H. T. Darlington, 1918); Chippewa Co. (J. H. Ehlers, 1921); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Chippewa Co., Presque Isle Co. to Mackinac Island (C. K. Dodge); Isle Royale (W. S. Cooper).

8. ASTER SAGITTIFOLIUS Wedemeyer

Arrow-leaved Aster.

Common, in localities. Dry, open places.

Specimens examined:- Macomb Co. (D. Cooley, 1837); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1895); Genesee Co. (D. Clark); Berrien Co., Cass Co. (H. S. Pepoon, 1906); Washtenaw Co. (S. Alexander, 1907); Allegan Co. (C. H. Kauffman, 1910); Emmet Co. (Fallass & Swift, 1914); Oakland Co. (C. Billington, 1914); Kalamazoo Co. (S. E. Wolff, 1923); Crawford Co. (W. Heim, 1922).

Reported from:- Kent Co. (Emma J. Cole); Calhoun Co. (C. E. Barr); Bay Co. to Mackinac Island, Charity Islands (C. K. Dodge); Dickinson Co. (G. H. Coons, 1909); Van Buren Co. (H. S. Pepoon); Tuscola Co. (C. A. Davis); Wayne Co. (O. A. Farwell); St. Joseph Co. (F. P. Daniels).

9. ASTER NOVAE-ANGLIAE L.

New England Aster.

Frequent. Fields and roadsides. In moist, often mucky soil.

Aug.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1847); Berrien Co. (G. L. Ames, 1867); Lake Co. (H. T. Blodgett, 1890); Kent Co. (H. M. Bailey, 1892); Ingham Co. (H. C. Skeels, 1894); Huron Co. (C. A. Davis, 1896); St. Clair Co. (C. K. Dodge, 1908); Oakland Co. (C. Billington, 1914); Washtenaw Co. (C. D. LaRue, 1915); Kalamazoo Co. (S. E. Wolff, 1923); Jackson Co. (S. E. Wolff, 1927).

Reported from:- Magician Lake region (H. S. Pepoon); Calhoun Co. (C. E. Barr); Bay Co. to Mackinac Co., Tuscola Co. (C. K. Dodge); Saginaw Co. (C. A. Davis); Wayne Co. (O. A. Farwell); St. Joseph Co. (F. P. Daniels); Cheboygan Co. (F. C. Gates); Emmet Co. (Fallass & Swift).

10. ASTER PUNICEUS L. (crimson)

Red-stalk Aster.

Common. In wet, usually open places. Variable. Aug.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1840); Ingham Co. (M. S. C. herb., 1871); Keweenaw Co. (O. A. Farwell, 1888); Gratiot Co. (C. A. Davis, 1889); Clinton Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1894); Jackson Co. (Mary B. Fallass, 1894); Alger Co. (C. F. Wheeler, 1900); Marquette Co. (B. Barlow, 1901); Kent Co. (Emma J. Cole, 1901); Van Buren Co. (H. S. Pepoon, 1905); Ottawa Co. (C. H. Kauffman, 1910); Chippewa Co. (C. K. Dodge, 1914); Schoolcraft Co., Luce Co. (C. K. Dodge, 1915); Washtenaw Co. (C. D. LaRue, 1915); Mackinac Co. (J. H. Ehlers, 1916); Missaukee Co. (E. A. Bessey, 1916); Gogebic Co. (H. T. Darlington, 1919); Emmet Co. (C. W. Fallass, 1922); Kalamazoo Co. (S. E. Wolff, 1923); Wayne Co. (M. W. Schnute, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Dickinson Co. (G. H. Coons, 1909); Grand Traverse Co. (H. T. Darlington, 1919); Crawford Co. (W. L. McAtee, 1919); Muskegon Co.

(C. D. McLouth); Bay Co. to Mackinac Co., Tuscola Co. (C. K. Dodge); Huron Co. (C. A. Davis); Manistee Co., St. Joseph Co. (F. P. Daniels); Beaver Island (H. T. Darlington, 1923); Isle Royale (W. S. Cooper).

11. ASTER OBLONGFOLIUS Nutt. (oblong-leaved)

Aromatic Aster.

No specimens examined. Reported from Detroit by O. A. Farwell.

It is to be looked for in the southern tiers of counties, on dry prairies and bluffs.

12. ASTER LAEVIS L. (smooth)

Smooth Aster.

Common, in the Lower Peninsula. Infrequent in the Upper Peninsula. Sep.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1837); Kent Co. (C. W. Fallass, 1886); Crawford Co. (G. H. Hicks, 1888); St. Clair Co. (C. K. Dodge, 1892); Mackinac Co. (C. F. Wheeler, 1890); Ingham Co. (H. C. Skeels, 1894); Van Buren Co. (H. S. Pepoon, 1905); Benzie Co. (C. A. Davis, 1905); Marquette Co. (A. Dachnowski, 1906); Allegan Co., Ottawa Co. (C. H. Kauffman, 1910); Presque Isle Co. (C. K. Dodge, 1913); Cheboygan Co. (J. H. Ehlers, 1916); Berrien Co. (H. T. Darlington, 1917); Washtenaw Co. (B. A. Walpole, 1919); Oakland Co. (C. Billington, 1920); Lake Co. (C. Goodrich, 1922); Saginaw Co. (W. Heim, 1922); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Bay Co. to Mackinac Co., Tuscola Co., Schoolcraft Co., Charity Islands (C. K. Dodge); Huron Co. (C. A. Davis); Beaver Island (H. T. Darlington, 1923); Manistee Co., St. Joseph Co. (F. P. Daniels); Wayne Co. (O. A. Farwell).

13. ASTER LUCIDULUS (A. Gray) Wieg. (shining)

Aster puniceus L., var. lucidulus A. Gray

This is distinctive enough in Michigan to warrant specific rank.

The stems are usually smooth and angled above. The leaves are very numerous, even in the inflorescence. Rays are lilac. Tegules rather straight. Frequent throughout the state. In moist open soil. Aug.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1840); Shiawassee Co. (G. H. Hicks, 1889); Gratiot Co. (C. A. Davis, 1890); Ingham Co. (M. S. C. Herb., 1887); St. Clair Co. (C. K. Dodge, 1894); Montcalm Co. (B. Barlow, 1900); Lenawee Co. (W. J. Beal); Ingham Co. (B. A. Walpole, 1923); Kalamazoo Co. (S. E. Wolff, 1923); Kent Co. (Emma J. Cole, 1893).

Reported from:- Manistee Co. (F. P. Daniels); Emmet Co. (C. W. Fallass); Wayne Co. (O. A. Farwell).

14. ASTER LONGIFOLIUS Lam. (long-leaved)

Long-leaved Aster.

This has been reported from various parts of the state. Specimens labeled this belong under A. junceus. It should be looked for in the Upper Peninsula.

Specimens examined:- Chippewa Co. (C. K. Dodge, Aug. 1914). "Low open ground, frequent".)

Reported from:- Upper Peninsula (Whitney Catalog); Bois Blanc Island (C. K. Dodge).

15. ASTER DUMOSUS L. (bushy)

Bushy Aster.

Frequent, in the southern half of the Lower Peninsula. Sandy soil. Jul.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1837); Oceana Co. (D. Cooley, 1840); Emmet Co. (D. Clark, 1878); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1893); Oakland Co. (O. A. Farwell, 1895); Montcalm Co. (C. A. Davis, 1897); Calhoun Co. (C. F. Wheeler, 1896); Kent Co. (Emma J. Cole, 1901); Cass Co. (H. S. Pepoon, 1905); Van Buren Co. (H. S. Pepoon, 1906); St. Clair Co. (C. K. Dodge, 1908); Kalamazoo Co. (S. E. Wolff, 1924).

Reported from:- Manistee Co. (F. P. Daniels); Gratiot Co., Ionia Co., Cheboygan Co. (Beal's Catalog).

16. ASTER PRENANTHOIDES Muhl. (like Prenanthes, the Rattlesnakeroot)

Very rare. In moist soil.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1890).

17. ASTER JUNCEUS Ait. (like Juncus, the Rush)

Rush Aster.

Frequent. Throughout. In moist soil and swamps. Jul.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1842); Ionia Co. (D. Cooley, 1847); Ingham Co. (L. H. Bailey jr., 1886); Gratiot Co. (C. A. Davis, 1892); Cass Co. (H. S. Pepoon, 1905); Allegan Co. (C. H. Kauffman, 1910); Kent Co. (Emma J. Cole, 1901); Huron Co. (C. K. Dodge, 1913); Chippewa Co. (C. K. Dodge, 1914); Schoolcraft Co. (C. K. Dodge, 1915); Washtenaw Co. (B. A. Walpole, 1918); Gogebic Co. (H. T. Darlington, 1919); Mackinac Co. (J. H. Ehlers, 1920); Emmet Co. (C. W. Fallass, 1922); Kalamazoo Co. (S. E. Wolff, 1924).

Reported from:- Magician Lake region (H. S. Pepoon); Bay Co. to Mackinac Co., Tuscola Co., Charity Islands (C. K. Dodge); Cheboygan Co. (F. C. Gates); Isle Royale (W. S. Cooper); Oakland Co. (O. A. Farwell).

18. ASTER SERICEUS Vent. (silky)

Silvery or Silky Aster.

Rare. In dry, sterile soil. Aug.-Sep.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1885); Kent Co. (Emma J. Cole, 1896).

Reported from:- Southern Michigan (Winchell's Catalog); Van Buren Co. ("Dry sandy ridges, Keeler", H. S. Pepoon).

19. ASTER SUBULATUS Michx. (awl-shaped)

Salt-marsh Aster.

Local. Around salt mines. Sep.

Specimens examined:- Wayne Co. (B. F. Chandler, 1915); Wayne Co. (B. A. Walpole, 1918).

20. ASTER FAXONI Porter

Aster polyphyllus Willd.

Faxon's Aster.

Locally common. Chiefly confined to the shores of the Great Lakes. On sandy ground and moist cliffs. Jul.-Sep. Often mistaken for A. ericoides.

Specimens examined:-- Oceana Co. (Mary B. Fallass, 1893); Bois Blanc Island (ex. Herb. S. H. & D. R. Camp); Alpena Co. (C. F. Wheeler, 1895); Muskegon Co. (C. D. McLouth, 1896); Emmet Co. (C. W. Fallass, 1897); Allegan Co. (C. F. Wheeler); Cass Co. (H. S. Pepoon, 1904); Berrien Co. (H. C. Skeels, 1905); Huron Co. (C. K. Dodge, 1908); Cheboygan Co. (C. K. Dodge, 1913); Schoolcraft Co. (C. K. Dodge, 1915); Mackinac Co. (J. H. Ehlers, 1916); Roscommon Co. (H. T. Darlington, 1916); Chippewa Co. (J. H. Ehlers, 1921); Ontonagon Co. (H. T. Darlington, 1922); Van Buren Co. (S. E. Wolff, 1927).

Reported from:-- Charity Islands (C. K. Dodge).

21. ASTER ERICOIDES L. (like Erica, the Heath)
Aster ericoides L., var. villosus T. & G.
Aster ericoides L., var. platyphyllus T. & G.
Aster ericoides L., var. pringlei A. Gray
White Heath Aster.

Rare. In dry soil. Sep.-Oct.

Specimens examined:-- Huron Co., Charity Islands (C. J. Dodge); St. Clair Co. (C. K. Dodge, 1895); Washtenaw Co. (A. Alexander, 1906); Kalamazoo Co. (S. E. Wolff, 1923); Ingham Co. (B. A. Walpole, 1924).

Reported from:-- Van Buren Co. (H. S. Pepoon); Calhoun Co. (C. E. Barr); Tuscola Co. (C. A. Davis); Wayne Co. (O. A. Farwell).

22. ASTER MULTIFLORUS Ait. (many-flowered)

White Wreath Aster.

Frequent. In dry, open places. Southern half of the Lower Peninsula. Local. Aug.-Nov.

Specimens examined:-- Macomb Co. (D. Cooley, 1837); St. Clair Co. (C. K. Dodge, 1894); Livingston Co. (Emma J. Cole, 1897); Kent Co. (Mary B. Fallass, 1900); Van Buren Co. (H. S. Pepoon, 1905); Wayne Co. (B. F. Chandler, 1915); Washtenaw Co. (B. A. Walpole, 1919); Kalamazoo Co. (S. E. Wolff, 1924).

Reported from:-- Magician Lake region (H. S. Pepoon).

23. ASTER VIMINEUS Lam. (bearing long flexible twigs)

Small White Aster.

Rare. In moist soil. Perhaps not distinct from narrow-leaved forms of A. lateriflorus. Aug.-Oct.

Specimens examined:-- Macomb Co. (D. Cooley, 1840); Oceana Co. (D. Cooley, 1840); St. Clair Co. (C. K. Dodge, 1884); Kent Co. (Mary B. Fallass, 1893); Berrien Co. (C. Billington, 1920).

Reported from:-- Magician Lake region (H. S. Pepoon); Wayne Co. (O. A. Farwell).

24. ASTER LATERIFLORUS (L.) Britton (bearing one-sided flower-clusters)

Starved Aster.

Common. Throughout. In moist soil. Very variable in leaf-form, inflorescence and pubescence. Forms seem to intergrade with A. paniculatus and A. tradescanti. Aug.-Oct.

Specimens examined:-- Keweenaw Co. (O. A. Farwell, 1888); Wayne Co. (O. A. Farwell, 1892); Delta Co., Charlevoix Co. (C. F. Wheeler, 1892); Washtenaw Co. (A. J. Pieters, 1892); St. Clair Co. (C. K. Dodge, 1892);

Menominee Co. (C. F. Wheeler, 1893); Ingham Co. (H. C. Skeels, 1894); Kent Co. (Mary J. Fallass, 1894); Gratiot Co. (C. A. Davis, 1895); Ottawa Co. (Emma J. Cole, 1896); Emmet Co. (C. W. Fallass, 1897); Allegan Co. (C. H. Kauffman, 1913); Chippewa Co. (C. K. Dodge, 1914); Alger Co., Houghton Co., Marquette Co. (C. K. Dodge, 1916); Oakland Co. (O. A. Farwell, 1918); Cass Co. (H. S. Pepoon); Muskegon Co. (C. D. McLouth); Berrien Co. (C. Billington, 1920); Gogebic Co. (H. T. Darlington, 1919); Mackinac Co. (J. H. Ehlers, 1916); Eaton Co. (Edith Spaulding, 1926); Jackson Co. (S. E. Wolff, 1927).

Reported from:— Bay Co. to Mackinac Co., Tuscola Co., Schoolcraft Co. (C. K. Dodge); Isle Royale (W. S. Cooper); Dickinson Co. (G. H. Coons, 1909); Calhoun Co. (C. E. Barr).

25. *ASTER HIRSUTICAULIS* Lindl. (hairy-stemmed)

Aster lateriflorus hirsuticaulis Porter

Damp woods and thickets. Frequent. In Michigan this is better placed as a variety of *A. lateriflorus*. It intergrades with that species. Sep.-Oct.

Specimens examined:— Gratiot Co. (C. A. Davis, 1891); Wayne Co. (O. A. Farwell, 1892); Delta Co. (C. F. Wheeler, 1892); Alger Co. (C. F. Wheeler, 1900); Washtenaw Co. (B. A. Walpole, 1919); Cheboygan Co. (J. H. Ehlers, 1920); Ontonagon Co. (H. T. Darlington, 1923); Ingham Co. (S. E. Wolff, 1927).

26. *ASTER PTARMICOIDES* (Nees) T. & G. (like *Ptarmica*, the Sneezewort)
Unamia alba Rydb.

Upland Aster.

Rather rare. In dry sandy or rocky soil. Throughout the state. Jul.-Sep.

Specimens examined:— Macomb Co. (D. Cooley, 1827); Oakland Co. (D. Clark, 1880); Keweenaw Co. ("rocky shores, rare", O. A. Farwell); Lake Co. (D. Cok, 1888); Agate Bay, Lake Superior (L. H. Bailey, jr., 1888); Delta Co. (C. F. Wheeler, 1892); Tuscola Co. (C. A. Davis, 1897); Lake Superior (Herb., W. J. Beal); Ogemaw Co., Oscoda Co. (C. K. Dodge, 1913); Washtenaw Co. (C. Billington, 1919); Oakland Co. (C. Billington, 1920); Wayne Co. (B. A. Walpole, 1920).

Reported from:— Isle Royale (W. S. Cooper).

27. *ASTER NEMORALIS* Ait. (sylvan)

Bog Aster.

In sandy bogs. In the eastern counties of the Upper Peninsula.

Through a mistake it has been reported as common in the state.

(see Beal's Catalog, 1904.) Aug.-Sep.

Specimens examined:— Chippewa Co., vicinity of Whitefish Point, (Andrews, 1915, in C. Billington Herb.); Chippewa Co. ("south of Emerson in open sphagnum swamp, abundant throughout", C. K. Dodge, 1914).

Reported from:— Schoolcraft Co. ("bogs and swamps, often abundant", C. K. Dodge).

28. *ASTER NOVI-BELGI* L.

New York Aster.

Rare. Damp open ground. Sep.

Specimens examined:- Chippewa Co. ("Damp open ground near Emerson, plentiful", C. K. Dodge, Sep. 1914).

29. *ASTER TRADESCANTI* L.

No sharp lines can be drawn between this and the next species.

Both are reported as common throughout the state. The specimens examined form a series from which it is difficult to separate the two species. Moist meadows or low grounds. Sep.-Oct.

Specimens examined:- Kent Co. (Emma J. Cole, 1901); Ingham Co. (H. T. Darlington); Ingham Co. (C. F. Wheeler, 1899); Van Buren Co. (H. S. Pepoon, 1905); Wayne Co. (B. F. Chandler, 1916); Delta Co. (C. F. Wheeler, 1892); Alger Co. (C. F. Wheeler, 1900); Kalamazoo Co. (S. E. Wolff, 1924); Emmet Co. (C. W. Fallass); Houghton Co. (F. J. Hermann, 1926); St. Clair Co. (C. K. Dodge); Macomb Co. (D. Cooley, 1848).

Reported from:- Calhoun Co. (C. E. Barr); Mackinac Island (C. K. Dodge, 1912); Bay Co. to Mackinac Co., Tuscola Co., Chippewa Co., Schoolcraft Co., Charity Islands (C. K. Dodge); Gogebic Co. (H. T. Darlington, 1919); Manistee Co., St. Joseph Co. (F. P. Daniels).

30. *ASTER PANICULATUS* Lam. (panicled)

Tall White Aster.

Common. Throughout. In moist soil. Sep.-Oct.

Specimens examined:- Van Buren Co. (L. H. Bailey, jr., 1880); Oceana Co., Macomb Co. (D. Cooley, 1840); Keweenaw Co. (O. A. Farwell, 1886); Ingham Co. (G. H. Hicks, 1891); St. Clair Co. (C. K. Dodge, 1892); Alger Co. (C. F. Wheeler, 1900); Marquette Co. (B. Barlow, 1901); Gogebic Co. (H. T. Darlington, 1919).

Reported from:- Magician Lake region (H. S. Pepoon); Calhoun Co. (C. E. Barr); Bay Co. to Mackinac Co., Tuscola Co., Chippewa Co., Schoolcraft Co. (C. K. Dodge); Wayne Co. (O. A. Farwell); Manistee Co., St. Joseph Co. (F. P. Daniels); Oakland Co. (O. A. Farwell); Emmet Co. (C. W. Fallass).

31. *ASTER SALICIFOLIUS* Lam. (willow-leaved)

Willow Aster.

Apparently rare. Sep.-Oct. Swamps and moist soil.

Specimens examined:- Ionia Co. (C. F. Wheeler, 1890); Macomb Co. (D. Cooley, 1846); Washtenaw Co. (C. D. LaRue, 1915).

Reported from:- Magician Lake region ("Swamps, bogs", H. S. Pepoon); Cheboygan Co., Schoolcraft Co. (C. K. Dodge); Muskegon Co. (C. D. McLouth).

(*Aster undulatus* L. has been reported as common in Michigan (Beal's Catalog, 1904) but no specimens were seen answering description.

(*Aster multiformis* Burgess. There are thin-leaved forms corresponding to this species in Michigan herbaria. In the present study they are referred to *A. macrophyllus*.

(*Aster schreberi* Nees is reported from Michigan in Britton & Brown Ill. Fl. ed. 2. and by Burgess in Torr. Bot. Club Mem. 13:279. 1906. No specimens were seen answering the description.

(*Aster divaricatus* L. is reported from Michigan in Beal's Flora, 1904. No specimens that could be referred to it were seen.

12. BRACHYACTIS Ledeb.

BRACHYACTIS ANGUSTA (Lindl.) Britton (narrow)

Aster Angustus T. & G.

Rayless Aster.

Rare. In yards and waste places. Native farther west. Jul-Oct.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1900); Wayne Co. (B. F. Chandler, 1915); St. Clair Co. (B. A. Walpole, Oct. 1923); Wayne Co. (C. Billington, Oct. 1914).

13. ERIGERON L. Fleabane.

- Rays inconspicuous or short; a row of tubular pistillate flowers inside the row of rays.....1. *E. acris*.
Rays conspicuous, usually equalling or longer than the diameter of the disk.
Some of the stem-leaves oblong, partly clasping; pappus simple; perennials.
Stem simple; heads 2.5-3.8 cm. broad; rays about 50, 1-1.5 mm. wide.....2. *E. pulchellus*.
Stem branched above; heads 1.2-2.5 cm. broad; rays very numerous, 100-150, about 0.5 mm. wide.....3. *E. philadelphicus*.
None of the stem-leaves oblong or clasping; pappus double; annuals or biennials.
Stem and leaves green, pubescent with spreading hairs or nearly glabrous; all the leaves usually sharply serrate; involucre glabrous or with a few long hairs.....4. *E. annuus*.
Stem and leaves usually hoary with short stiff appressed hairs; middle and upper stem leaves entire or nearly so; involucre appressed-pubescent.....5. *E. ramosus*.

1. ERIGERON ACRIS L. (acid or biting)
Erigeron droebachianus O. F. Mueller
Erigeron acris droebachianus Blytt
Blue Fleabane.

Very rare. A northern species found in the Upper Peninsula.

Specimens examined:- Isle Royale (A. E. Foote, 1868); Marquette Co. (B. Barlow, 1901); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Upper Peninsula (A. B. Lyons); Portage river, Houghton Co. (W. L. McAtee, Aug. 1865).
T. Porter

2. ERIGERON PULCHELLUS Michx. (beautiful)
Erigeron bellidifolius Muhl.
Robin's Plantain.

Frequent. Lower Peninsula. In dry woods and on dry banks.

Apr.-June.

Specimens examined:- Kalamazoo Co. (R. M. Gibbs, 1877); Cass Co. (C. F. Wheeler, 1890); Ingham Co. (G. H. Hicks, 1891); Kent Co. (L. J. Cole, 1895); St. Clair Co. (C. K. Dodge, 1896); Van Buren Co. (H. S. Pepoon, 1906); Oakland Co. (C. Billington, 1914); Washtenaw Co. (J. H. Ehlers, 1918); Ionia Co. (B. A. Walpole, 1924); Kalamazoo (S. E. Wolff, 1923).

Reported from:- Berrien Co. (H. S. Pepoon); Calhoun Co. (C. E. Barr); Bay Co. ("frequent", C. K. Dodge); Tuscola Co. (C. A. Davis); St. Joseph Co. (F. P. Daniels); Cheboygan Co. (F. C. Gates).

3. ERIGERON PHILADELPHICUS L.
Fleabane.

Common. In fields and woods, in rather moist soil. Apr.-Jul.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Keweenaw Co. (O. A. Farwell, 1888); Cass Co. (C. F. Wheeler, 1890); Gratiot Co. (C. A. Davis, 1890); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1896); Van Buren Co. (H. S. Pepoon, 1906); Kent Co. (Emma J. Cole, 1895); Cheboygan Co. (F. C. Gates, 1911); Oakland Co. (C. Billington, 1914); Shiawassee Co. (J. Smith, 1915); Wayne Co. (C. Billington, 1915); Emmet Co. (J. H. Ehlers, 1917); Berrien Co. (H. T. Darlington, 1917); Alpena Co. (H. T. Darlington, 1918); Washtenaw Co. (B. A. Walpole, 1919); Mackinac Co. (J. H. Ehlers, 1920); Cheboygan Co. (J. H. & Lois Ehlers, 1920); Gogebic Co. (H. T. Darlington, 1920); Kalamazoo Co. (S. E. Wolff, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Calhoun Co. (C. E. Barr); Muskegon Co. (C. D. McLouth); Charity Islands, Schoolcraft Co., Tuscola Co., Bay Co. to Mackinac Co. (C. K. Dodge); Huron Co. (C. A. Davis); Sanilac Co. (M. S. C., 1914); Allegan Co. (M. S. C., 1913); Alcona Co. (M. S. C., 1920); Livingston Co. (M. S. C., 1915); Saginaw Co. (M. S. C., 1926).

4. *ERIGERON ANNUUS* (L.) Pers. (annual)

Sweet Scabious. White-top.

Very common. A weed in fields. This and the following are found growing together. May-Nov.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Keweenaw Co. (O. A. Farwell, 1888); Kent Co. (G. D. Sones, 1889); St. Clair Co. (C. K. Dodge, 1896); Marquette Co. (B. Barlow, 1901); Van Buren Co. (H. S. Pepoon, 1905); Cheboygan Co. (F. C. Gates, 1911); Charlevoix Co. (E. A. Bessey, 1912); Ontonagon Co. (H. T. Darlington, 1923); Kalamazoo Co. (S. E. Wolff, 1924); Houghton Co. (F. J. Hermann, 1926); Chippewa Co. (E. A. Bessey, 1927); Wayne Co. (C. Billington, 1914).

Reported from:- Calhoun Co. (C. E. Barr); Magician Lake region (H. S. Pepoon); Tuscola Co., Schoolcraft Co., Charity Island, Bay Co. to Mackinac Co. (C. K. Dodge); Emmet Co. (Fallass & Swift); Manistee Co., St. Joseph Co. (F. P. Daniels); Clare Co. (M. S. C., 1920); Mecosta Co. (M. S. C., 1921).

5. *ERIGERON RAMOSUS* (Walt.) B.S.P. (branching)

Erigeron strigosus Muhl.

Daisy Fleabane.

Very common. A weed in fields everywhere. May-Nov.

Specimens examined:- Macomb Co., Oceana Co. (D. Cooley, 1843); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1896); Muskegon Co. (W. J. Beal, 1898); Keweenaw Co. (O. A. Farwell, 1888); Menominee Co. (C. F. Wheeler, 1892); Marquette Co. (B. Barlow, 1901); Kent Co. (Emma J. Cole, 1901); Cass Co. (H. S. Pepoon, 1906); Wayne Co. (C. Billington, 1914); Cheboygan Co. (F. C. Gates, 1911); Allegan Co. (C. H. Kauffman, 1910); Roscommon Co. (H. T. Darlington, 1916); Gogebic Co. (H. T. Darlington, 1919); Emmet Co. (J. H. Ehlers, 1921); Washtenaw Co. (B. A. Walpole, 1919); Allegan Co. (E. A. Bessey, 1921); Ontonagon Co. (E. A. Bessey, 1923); Kalamazoo Co. (S. E. Wolff, 1922); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Crawford Co. (W. L. McAtee, 1919); Isabella Co. (M. S. C., 1912); Manistee Co. (F. P. Daniels); Tuscola Co., Chippewa Co., Schoolcraft Co., Bay to Mackinac Co. (C. K. Dodge).

14. LEPTILON Raf.

LEPTILON CANADENSE (L.) Britton

Erigeron canadensis L.

Horseweed.

Everywhere in the state. Common throughout nearly all of North America. June-Nov.

Specimens examined:- Isle Royale (E. A. Foote, 1868); Keweenaw Co. (O. A. Farwell, 1886); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1896); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Van Buren Co. (H. S. Pepoon, 1905); Cheboygan Co. (F. C. Gates, 1911); Marquette Co. (A. Dachnowski, 1906); Washtenaw Co. (B. A. Walpole, 1919); Lake Co. (C. Goodrich, 1922); Kalamazoo Co. (S. E. Wolff, 1922); Jackson Co., Branch Co., Berrien Co. (S. E. Wolff, 1927); Wayne Co. (C. Billington, 1914); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Tuscola Co., Schoolcraft Co., Chippewa Co., Charity Islands, Bay Co. to Mackinac Co. (C. K. Dodge); Huron Co. (C. A. Davis); Manistee Co. (F. P. Daniels); Emmet Co. (Fallass & Swift); Isabella Co. (M. S. C., 1912); Dickinson Co. (G. H. Coons, 1909).

15. DOELLINGERIA Nees.

DOELLINGERIA UMBELLIATA (Mill.) Nees (umbellate)

Aster umbellatus Hook.

Flat-top Aster.

Common. In moist soil, especially in rich woods and thickets.

Suitable for cultivation. Jul.-Oct.

Specimens examined:- Hillsdale Co. (H. B. Crosby, 1885); Keweenaw Co. (O. A. Farwell, 1888); Ingham Co. (H. C. Skeels, 1894); Montcalm Co. (B. Barlow, 1900); Marquette Co. (A. Dachnowski, 1906); St. Clair Co. (C. K. Dodge, 1900); Newaygo Co., Osceola Co. (E. A. Bessey, 1916); Berrien Co. (H. T. Darlington, 1917); Alcona Co. (H. T. Darlington, 1918); Gogebic Co. (H. T. Darlington, 1919); Washtenaw Co. (B. A. Walpole, 1918); Van Buren Co. (H. S. Pepoon, 1905); Mackinac Co. (J. H. Ehlers, 1920); Ontonagon Co. (E. A. Bessey, 1923); Arenac Co. (W. Heim, 1922); Kalamazoo Co. (S. E. Wolff, 1923); Chippewa Co. (E. A. Bessey, 1926); Wayne Co. (C. Billington, 1914).

Reported from:- Kent Co. (Emma J. Cole, 1901); Calhoun Co. (C. E. Barr); Muskegon Co. (C. D. McLouth); Charity Islands, Tuscola Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge).

16. PLUCHEA Cass.

PLUCHEA CAMPHORATA (L.) DC. (having the odor of camphor)

Salt-marsh Fleabane.

Local. Around salt mines in Wayne Co. Sep.

Specimens examined:- Wayne Co. (B. F. Chandler, 1914); Wayne Co. (B. A. Walpole).

17. ANTENNARIA Gaertn.

Basal leaves and those of the tips of the stolons bright green and glabrous or glabrate above from the first.

Basal leaves small, less than 5 cm. long, spatulate, with 1 nerve prominent; stem, stolons and leaves not bearing purple glandular hairs; middle and upper cauline leaves terminated by an involute or flat scarious appendage; styles brownish or cream-color.....1. *A. canadensis*.

Basal leaves large, 5-12 cm. long, broadly obovate or obovate-spatulate, definitely 3-nerved; stems, stolons and leaves bearing purplish glandular hairs; middle and upper cauline leaves subulate-tipped or mucronate; styles crimson.....2. *A. parlinii*.

Basal leaves and those of the tips of the stolons more or less arachnoid or tomentose, only the oldest becoming glabrate.

Basal leaves rather large, 0.7-5.5 cm. wide, oblong to obovate, 3-7-nerved beneath; staminate plants often common.....3. *A. plantaginifolia*.

Basal leaves smaller, 0.2-2.2 cm. wide, cuneate-spatulate to obovate, with only 1 nerve prominent, or a pair of lateral nerves conspicuous near the base.

Middle and upper stem-leaves terminated by an involute or flattened scarious appendage; rosette-leaved cuneate-spatulate to spatulate-oblongate; stolons flagelliform, creeping, their leaves small; staminate plants common.....4. *A. neglecta*.

Middle and upper stem-leaves subulate-tipped or mucronate; rosette-leaves broadly oblongate to obovate; stolons short, assurgent, their leaves conspicuous; staminate plants rare.....5. *A. neodioica*.

1. ANTENNARIA CANADENSIS Greene

Cat's-foot.

In dry soil. Infrequent or local. May-Jul.

Specimens examined:- Leelanaw Co., shores of Grand Traverse Bay (C. E. Wheeler, 1898); Crawford Co. (C. F. Wheeler, 1899); Emmet Co. (C. W. Fallas, 1922); Gogebic Co. (H. T. Darlington, 1920).

Reported from:- Charity Islands, Tuscola Co., Mackinac Island, Bay Co. to Mackinac Co. (C. K. Dodge); Muskegon Co. (V. O. Graham); Iosco Co. (H. C. Hilton, 1919).

2. ANTENNARIA PARLINII Fernald

Parlin's Cat's-foot.

Rare.

Specimens examined:- Washtenaw Co. (A. J. Pieters, 1892).

3. ANTENNARIA PLANTAGINIFOLIA (L.) Richards (plantain-leaved)
Plantain-leaved Everlasting.

Includes *A. occidentalis* Greene and *A. fallax* Greene.

Frequent. In dry soil, sterile pastures, fields and open woods.

Staminate plants often common. May-June.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Mecosta Co. (C. W. Fallass, 1881); Ingham Co. (H. C. Skeels, 1894); Calhoun Co., Muskegon Co. (W. J. Beal, 1898); Kent Co. (J. Shaddick & H. C. Skeels, 1895); Charlevoix Co. (C. F. Wheeler, 1900); Van Buren Co. (H. S. Pepoon, 1905); St. Clair Co. (C. K. Dodge, 1908); Washtenaw Co. (B. A. Walpole, 1920); Emmet Co. (C. W. Fallass, 1923); Kalamazoo Co. (S. E. Wolff, 1923); Cheboygan Co. (J. H. Ehlers, 1923); Wayne Co. (J. M. Sutton).

Reported from:- Magician Lake region (H. S. Pepoon); Manistee Co., St. Joseph Co. (F. P. Daniels); Lenawee Co. (F. L. Stearns).

4. ANTENNARIA NEGLECTA Greene (neglected)

Antennaria petaloidea Fernald

Field Cat's-foot.

Rather common throughout the state. In fields and pastures.

Staminate plants common. A distinctive species. Apr.-June.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Keweenaw Co. (O. A. Farwell, 1884); Washtenaw Co. (Eva Ferguson, 1885); Gratiot Co. (C. A. Davis, 1890); Kent Co. (L. J. Cole, 1895); Livingston Co. (Wheeler & Longyear, 1898); Muskegon Co. (C. F. Wheeler, 1900); St. Clair Co. (C. K. Dodge, 1901); Marquette Co. (B. Barlow, 1901); Oakland Co. (C. Billington, 1915); Ingham Co. (H. T. Darlington, 1816); Houghton Co. (F. J. Hermann, 1926); Clinton Co. (S. E. Wolff, 1927).

Reported from:- Calhoun Co. (C. E. Barr); Tuscola Co., Schoolcraft Co., Bay Co. to Mackinac Co. ("plentiful, often abundant", C. K. Dodge); Wayne Co. ("common", O. A. Farwell); Manistee Co. (F. P. Daniels).

5. ANTENNARIA NEODIOICA Greene

Antennaria rupicola Fernald

Cat's-foot.

Frequent. In dry open places. Apr.-Jul.

Specimens examined:- Isle Royale (A. E. Foote, Aug. 1868); Keweenaw Co. (O. A. Farwell, 1887); Muskegon Co. (W. J. Beal, 1898); Ingham Co. (C. F. Wheeler, 1898); Clinton Co. (C. F. Wheeler, 1901); Kent Co. (Emma J. Cole, 1901); St. Clair Co. (C. K. Dodge, 1902); Marquette Co. (A. Dachnowski, 1906); Berrien Co. (Dodge & Darlington, 1917); Wayne Co. (J. M. Sutton, 1916); Washtenaw Co. (B. A. Walpole, 1918); Gogebic Co. (E. A. Bessey, 1920); Ontonagon Co. (H. T. Darlington, 1922); Cheboygan Co. (J. H. Ehlers, 1923); Emmet Co. (C. W. Fallass, 1924); Houghton Co. (F. J. Hermann, 1926); Allegan Co. (S. E. Wolff, 1927).

Reported from:- Van Buren Co. (H. S. Pepoon); Chippewa Co., Schoolcraft Co., Bay Co. to Mackinac Island (C. K. Dodge); Baraga Co. (H. T. Darlington, 1920); St. Joseph Co. (E. L. Greene, 1909).

18. ANAPHALIS DC. Everlasting.

ANAPHALIS MARGARITACEA (L.) Benth. & Hook. (pearly)
Pearly Everlasting.

Rare in the southern tiers of counties, but more common as one goes northward. Very common in the Upper Peninsula. Often mistaken for *Gnaphalium obtusifolium*. Jul.-Sep.

Specimens examined:- Isle Royale (A. E. Foote, Aug. 1868); Keweenaw Co. (O. A. Farwell, 1888); Cheboygan Co. (C. F. Wheeler, 1890); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Emmet Co. (C. W. Fallass, 1896); St. Clair Co. (C. K. Dodge, 1898); Alger Co. (C. F. Wheeler, 1900); Muskegon Co. (C. D. McLouth, 1901); Marquette Co. (B. Barlow, 1901); Chippewa Co. (M. H. Rogers, 1907); Wayne Co. (E. M. Starkweather, 1910); Oakland Co. (B. F. Chandler, 1916); Roscommon Co. (E. A. Bessey, 1916); Missaukee Co. (Bessey & Darlington, 1916); Iosco Co. (H. T. Darlington, 1918); Bois Blanc Island (C. Billington, 1914); Washtenaw Co. (B. A. Walpole, 1918); Gogebic Co. (H. T. Darlington, 1919); Baraga Co. (S. R. Bailey, 1893); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Dickinson Co. (G. H. Coons, 1909); Magician Lake region (H. S. Pepoon); Tuscola Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Beaver Island (H. T. Darlington, 1923); Montcalm Co. (Wheeler & Smith Catalog); Newaygo Co., Kalamazoo Co. (M. S. C.); Manistee Co. (M. S. C., 1912); Charlevoix Co. (E. A. Bessey, 1922).

19. GNAPHALIUM L. Cudweed.

Pappus-bristles united at the base into a ring; outer
tegules tawny, the inner purplish; heads spicate....1. *G. purpureum*.
Pappus-bristles distinct; tegules not purplish; heads
not spicate.

Plant 5-25 cm. high, diffuse; heads about 4 mm.

high, in capitate clusters subtended by leaves;

tegules brown or brownish.....2. *G. uliginosum*.

Plant 30-70 cm. high, erect; heads about 5 mm. high,

not in leafy capitate clusters; tegules white
or yellowish-white.

Leaves decurrent; plant glandular-viscid; tegules
yellowish-white.....3. *G. decurrens*.

Leaves sessile, not decurrent; plant not glandular-
viscid; tegules white.....4. *G. obtusifolium*.

1. GNAPHALIUM PURPUREUM L. (purple)
Purplish Cudweed.

Rare. Lower half of the Lower Peninsula. May-Sep.

Specimens examined:- Washtenaw Co. (ex. Coll. Mary H. Clark, 1869); St. Clair Co. (C. K. Dodge, 1895); Cass Co. (H. S. Pepoon, 1904); Oakland Co. (C. Billington, 1915); Ionia Co. (B. A. Walpole, 1921).

Reported from:- Tuscola Co. (C. K. Dodge); Wayne Co. ("rare", O. A. Farwell); Macomb Co. (D. Cooley, in Wheeler & Smith Catalog); Eaton Co. (H. L. Clark); Monroe Co. (Farwell & Gladewitz).

2. *GNAPHALIUM ULIGINOSUM* L. (growing in marshes)
Low Cudweed.

Frequent. Throughout the state. In ditches, along roadsides in the heavier soils. Jul.-Sep.

Specimens examined:- Ingham Co. (H. C. Skeels, 1894); Kent Co. (H. C. Skeels, 1895); Cass Co. (H. S. Pepoon, 1904); Cheboygan Co. (F. C. Gates, 1911); St. Clair Co. (B. F. Chandler, 1915); Missaukee Co. (H. T. Darlington, 1916); Roscommon Co. (Bessey & Darlington, 1916); Gogebic Co. (E. A. Bessey, 1919).

Reported from:- Muskegon Co. (C. D. McLouth); Tuscola Co., Chippewa Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Wayne Co. (O. A. Farwell); Manistee Co., St. Joseph Co. (F. P. Daniels); Emmet Co. (Fallass & Swift); Newaygo Co. (M. S. C., 1919).

3. *GNAPHALIUM DECURRENS* Ives (decurrent)
Clammy Everlasting.

Common. In dry, open soil. Throughout. Jul.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Keweenaw Co. (O. A. Farwell, 1887); Ingham Co. (G. D. Sones, 1891); Kent Co. (H. C. Skeels, 1895); St. Clair Co. (C. K. Dodge, 1898); Marquette Co. (B. Barlow, 1901); Cass Co. (H. S. Pepoon, 1905); Van Buren Co. (F. C. Gates, 1906); Cheboygan Co. (F. C. Gates, 1911); Oakland Co. (B. F. Chandler, 1915); Berrien Co. (H. T. Darlington, 1917); Gogebic Co. (H. T. Darlington, 1919); Lake Co. (C. Goodrich, 1922); Kalamazoo Co. (S. E. Wolff, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Calhoun Co. (C. E. Barr); Muskegon Co. (C. D. McLouth); Charity Islands, Tuscola Co., Chippewa Co., Schoolcraft Co., Bay to Mackinac Co. (C. K. Dodge); St. Joseph Co., Manistee Co. (F. P. Daniels); Isle Royale (W. S. Cooper); Antrim Co. ("abundant", E. A. Bessey, 1920); Ottawa Co. (M. S. C., 1925).

4. *GNAPHALIUM OBTUSIFOLIUM* L. (blunt-leaved)
Gnaphalium polycephalum Michx.
Sweet Everlasting.

Common in the Lower Peninsula; less common in the Upper. Aug.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1843); St. Clair Co. (C. K. Dodge, 1893); Ingham Co. (H. C. Skeels, 1894); Kent Co. (J. Shaddick & H. C. Skeels, 1895); Montcalm Co. (B. Barlow, 1900); Marquette Co. (A. Dachnowski, 1906); Allegan Co. (C. H. Kauffman, 1913); Oakland Co. (C. Billington, 1914); Berrien Co. (H. T. Darlington, 1917); Washtenaw Co. (B. A. Walpole, 1918); Cheboygan Co. (J. H. Ehlers, 1920); Kalamazoo Co. (S. E. Wolff, 1924).

Reported from:- Cass Co. (H. S. Pepoon); Calhoun Co. (C. E. Barr); Muskegon Co. (C. D. McLouth); Schoolcraft Co., Tuscola Co., Bay Co. to Mackinac Co. (C. K. Dodge); Wayne Co. (O. A. Farwell); St. Joseph Co., Manistee Co. (F. P. Daniels); Emmet Co. (Fallass & Swift); Newaygo Co. (M. S. C., 1919); Oscoda Co. (M. S. C., 1921); Van Buren Co., Hillsdale Co. (M. S. C., 1925).

20. ADENOCAULON Hook.

ADENOCAULON BICOLOR Hook. (two-colored, referring to the green upper surface of the leaves and to the white-wooly lower surface)

Rare. Confined to the northern side of the Upper Peninsula. An interesting plant, with club-shaped achenes beset with glands near the apex. In moist woods. May-Jul.

Specimens examined:- Marquette Co. (A. E. Foote, 1868); Huron Mts., Marquette Co. (C. K. Dodge, 1916); Grand Marais, Alger Co. (R. Ford, 1921); Ontonagon Co. (H. T. Darlington, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Chippewa Co., 6 miles southwest of Sault St. Marie (Thomas Porter, 1865); Ontonagon River (Beal's Catalog).

21. INULA L.

INULA HELENIUM L. (classical name)

Elecampane.

Not uncommon. Along roadsides in the Lower Peninsula. Often cultivated. Naturalized from Europe. Native also in Asia. Summer.

Specimens examined:- Ingham Co. (J. Shaddick & H. C. Skeels, 1890); St. Clair Co. (C. K. Dodge, 1895); Calhoun Co. (W. J. Beal, 1898); Kent Co. (Emma J. Cole, 1901); Berrien Co. (H. S. Pepoon, 1906); Wayne Co. (C. Billington, 1914); Washtenaw Co. (C. D. LaRue, 1915); Kalamazoo Co. (S. E. Wolff, 1924).

Reported from:- Van Buren Co. ("rare", H. S. Pepoon); Bay Co., Tuscola Co., Chippewa Co. (C. K. Dodge); Beaver Island (H. T. Darlington, 1923); Osceola Co. (E. A. Bessey, 1927); Muskegon Co. (V. O. Graham).

22. POLYMNIA L.

Leaves abruptly narrowed into winged petioles; rays

10-15, yellow, 1.2-2.5 cm. long; achenes many-

striate.....1. *P. uvedalia*.

Leaves slender-petioled, the petioles wingless ex-

cept at base of blade; rays 5, whitish-yellow,

1 cm. or less long; achenes 3-ribbed, not many-

striate.....2. *P. canadensis*.

1. POLYMNIA UVEDALIA L.

Yellow Leaf-cup.

Rare. Southern half of the Lower Peninsula. In rich, moist woods.

Jul.-Aug.

Specimens examined:- Kent Co. (Emma J. Cole, 1897); Montcalm Co. (C. A. Davis, 1898).

Reported from:- Lapeer Co. (W. A. Brotherton); Southern Michigan (Wright's Catalog).

2. POLYMNIA CANADENSIS L.

Leaf-cup.

Rich shaded banks. Rare. June-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1840); Ingham Co. (G. H. Hicks, 1892); Muskegon Co. (C. D. McLouth, 1899); Oakland Co. (B. F. Chandler, 1917); Washtenaw Co. (B. A. Walpole, 1918); Oakland Co. (J. M. Sutton, 1918); Kent Co. (Emma J. Cole, 1901).

Reported from:- Ionia, Flint (Beal's Catalog).

23. SILPHIUM L. Rosin-weed.

Stem leafy throughout; leaves alternate, opposite or verticillate.

Leaves connate-perfoliate; stem square.....1. *S. perfoliatum*.

Leaves not connate-perfoliate, sessile or petioled; stem terete or slightly 4-angled.

Leaves alternate, pinnatifid or bipinnatifid, the basal 30 cm. long or more.....2. *S. laciniatum*.

Leaves opposite or verticillate, entire or dentate, the basal less than 20 cm. long.

Leaves opposite, sessile, often partly clasping, ovate or ovate-lanceolate.....3. *S. integrifolium*.

Leaves mostly verticillate in 3's or 4's, petioled, lanceolate or oblong-lanceolate...4. *S. trifoliatum*.

Stem leafless except toward base.....5. *S. terebinthinaceum*.

1. *SILPHIUM PERFOLIATUM* L. (having leaves that meet around the stem)
Cup-plant.

Rare. Mostly in the southern counties. Jul.-Sep.

Specimens examined:- Monroe Co. (C. K. Dodge, 1911); Wayne Co. (B. F. Chandler, 1914); Washtenaw Co. (B. A. Walpole, 1919).

Reported from:- Cass Co. ("rare", H. S. Pepoon); Muskegon Co. (V. O. Graham); Southern Michigan (Wright's Catalog).

2. *SILPHIUM LACINIATUM* L. (slashed)
Compass-plant.

Rare. Along railroads. Distributed from the prairies of the West. Jul.-Sep.

Specimens examined:- Ingham Co. (B. A. Walpole, 1926); Washtenaw Co. (B. A. Walpole, 1919).

Reported from:- Southern Michigan (Wright's Catalog); St. Clair Co. (J. W. Stacy); Berrien Co. (M. S. G., 1923); Eloise, Wayne Co. (B. Gladewitz).

3. *SILPHIUM INTEGRIFOLIUM* Michx. (entire-leaved)
Entire-leaved Rosin-weed.

Becoming frequent in the southwestern counties. Aug.-Sep.

Specimens examined:- Van Buren Co. (H. S. Pepoon, 1906); Berrien Co. (H. T. Darlington, 1917); Cass Co. (C. Billington, 1917); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Southwestern Michigan (Beal's Catalog).

4. *SILPHIUM TRIFOLIATUM* L. (three-leaved)
Whorled Rosin-weed.

Rare. Southern part of the state. In woods. Jul.-Oct.

Specimens examined:- Ionia Co. (B. A. Walpole, 1923); Washtenaw Co. (B. A. Walpole, 1919).

Reported from:- Avon (W. A. Brotherton, in Beal's Catalog).

5. *SILPHIUM TEREBINTHINACEUM* Jacq. (resinous)
Prairie Dock.

Frequent. Roadsides and prairies. Lower Peninsula. Conspicuous for its large leaves and tall slender, nearly naked stem. Jul.-Sep.

Specimens examined:- Washtenaw Co. (D. Cooley, 1827); Macomb Co. (D. Cooley, 1840); Ionia Co. (C. F. Wheeler, 1890); Kent Co. (B. Livingston, 1894); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1894); Tuscola Co. (C. A. Davis, 1897); Cass Co. (H. S. Pepoon, 1903); Monroe Co. (B. F. Chandler, 1915); Roscommon Co. (H. T. Darlington, 1916); Lenawee Co. (C. Billington, 1917); St. Joseph Co. (Gladys Lloyd, 1927); Ingham Co. (S. E. Wolff, 1927).

Reported from:- Van Buren Co. (H. S. Pepoon); Calhoun Co. (C. E. Barr); Tuscola Co. (C. K. Dodge); Huron Co. (C. A. Davis); Wayne Co. (O. A. Farwell); Livingston Co. (M. S. C.); Saginaw Co. (M. S. C., 1924).

24. *HELIOPSIS* Pers.

Stem glabrous; leaves smooth or somewhat scabrous, acuminate; achenes glabrous when young; pappus none, or of 2-4 stout teeth.....1. *H. helianthoides*.
Stem rough-pubescent above; leaves rough, acute or short-acuminate; achenes pubescent on the margins when young; pappus a short crown, or of 1-3 sharp teeth.....2. *H. scabra*.

1. *HELIOPSIS HELIANTHOIDES* (L.) Sweet. (like *Helianthus*, the Sunflower)
Ox-eye.

Infrequent. Alluvial bottoms, stream banks and open places.
Southern counties. Jul.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1837); Lenawee Co. (W. J. Beal, 1866); Kent Co. (H. M. Bailey, 1892); St. Clair Co. (C. K. Dodge, 1904); Wayne Co. (C. Billington, 1915); Oakland Co. (C. Billington, 1916); Ingham Co. (M. W. Schmude, 1922); Washtenaw Co. (F. G. Gustafson, 1923); Washtenaw Co. (E. Beach & S. E. Wolff, 1924).

2. *HELIOPSIS SCABRA* Dunal (rough)
Rough Ox-eye.

Infrequent. Thickets, dry soil. Throughout. In these two species the ray-flowers are persistent on the achenes.

Specimens examined:- Menominee Co. (C. A. Davis, 1905); Marquette Co. (A. Dachnowski, 1906); Oakland Co. (B. F. Chandler, 1916); Clare Co. (E. A. Bessey, 1916); Gogebic Co. (H. T. Darlington, 1919); Cheboygan Co. (J. H. Ehlers, 1920); Emmet Co. (J. H. Ehlers, 1922); Keweenaw Co. (F. J. Hermann, 1926).

Reported from:- Van Buren Co. (H. S. Pepoon); Wayne Co. (O. A. Farwell); Wexford Co. (M. S. C., 1920).

25. RUDBECKIA L.

Disk globose or ovoid, purple or dark brown in fruit;
lower leaves entire, dentate or lobed.

Lower leaves deeply 3-lobed; chaff awn-pointed.....1. *R. triloba*.

Lower leaves not three-lobed; chaff acute or
obtusish.

Plant hispid; pappus none; chaff hairy at the tip..2. *R. hirta*.

Plant not hispid, pubescent; pappus a short crown;
chaff smooth.....3. *R. speciosa*.

Disk elongated or cylindric in fruit, yellowish or
gray; lower leaves pinnately divided or pinnati-

fid.....4. *R. laciniata*.

1. RUDBECKIA TRILOBA L. (three-lobed)

Thin-leaved Cone-flower.

Rare. Lower Peninsula. In moist soil. June-Oct.

Specimens examined:- St. Clair Co. (O. A. Farwell); Kent Co. (W. E. Mulliken, 1897); Ionia (B. A. Walpole, 1921).

Reported from:- Muskegon Co. (V. O. Graham); Jackson Co. (M. S. C.); Alpena Co. ("common on the shores of Thunder Bay", C. F. Wheeler); Macomb Co. (D. Cooley, in Beal's Catalog).

2. RUDBECKIA HIRTA L. (hairy)

Black Eyed Susan.

A weed in cultivated fields, along roadsides and in low places.

Once thought to have been introduced from the west. May-Sep.

Specimens examined:- Lenawee Co. (W. J. Beal, 1866); Isle Royale (University Party, 1868); Macomb Co. (D. Cooley, 1829); Keweenaw Co. (O. A. Farwell, 1888); Cheboygan Co. (C. F. Wheeler, 1890); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1896); Muskegon Co., Calhoun Co. (W. J. Beal, 1898); Montcalm Co. (B. Barlow, 1900); Arenac Co. (C. F. Wheeler, 1900); Kent Co. (Emma J. Cole, 1901); Marquette Co. (B. Barlow, 1901); Van Buren Co. (H. S. Pepoon, 1905); Wayne Co. (C. Billington, 1914); Oakland Co. (C. Billington, 1916); Osceola Co. (E. A. Bessey, 1916); Newaygo Co. (H. T. Darlington, 1916); Gogebic Co. (H. T. Darlington, 1919); Emmet Co. (J. H. Ehlers, 1917); Chippewa Co. (J. H. & Lois Ehlers, 1920); Kalamazoo Co. (S. E. Wolff, 1922); Ontonagon Co. (H. T. Darlington, 1923); Grand Traverse Co. (J. H. Ehlers); Houghton Co. (F. J. Hermann, 1926); Washtenaw Co. (F. J. Hermann, 1927).

Reported from:- Magician Lake region (H. S. Pepoon); Dickinson Co. (G. H. Coons, 1909); St. Joseph Co., Manistee Co. (F. P. Daniels); Huron Co. (C. A. Davis); Schoolcraft Co., Tuscola Co. (C. K. Dodge).

3. RUDBECKIA SPECIOSA Wenderoth (showy)

Rudbeckia sullivanti Boynton & Beadle

Showy Cone-flower.

Frequent. In the four southern tiers of counties. In low
meadows and moist thickets. Aug.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1844); Ionia Co. (C. F. Wheeler, 1890); Ingham Co. (G. H. Hicks, 1891); Kent Co. (J. Shaddick & H. C. Skeels, 1895); Berrien Co. (H. S. Pepoon, 1904); Oakland Co.

(O. A. Farwell, 1917); Kalamazoo Co. (Kenoyer & Wolff, 1924).

Reported from:- Calhoun Co. (C. E. Barr); Flint, Ann Arbor, Alma (Beal's Catalog).

4. *RUDBECKIA LACINIATA* L. (slashed)

Tall Cone-flower.

Frequent. Throughout. In moist thickets. Jul.-Sep. A double-flowered form in cultivation is called "golden-glow".

Specimens examined:- Macomb Co. (D. Cooley, 1849); Gratiot Co. (C. A. Davis, 1890); Ingham Co. (H. C. Skeels, 1894); Kent Co. (J. Shaddick & H. C. Skeels, 1895); Washtenaw Co. (Ypsilanti Normal College Herb., 1894); St. Clair Co. (C. K. Dodge, 1896); Muskegon Co. (C. D. McLouth, 1899); Van Buren Co. (H. S. Pepoon, 1905); Cass Co. (F. C. Gates, 1906); Wayne Co. (C. Billington, 1915); Clare Co. (H. T. Darlington, 1916); Berrien Co. (H. T. Darlington, 1917); Gogebic Co. (E. A. Bessey, 1919); Kalamazoo Co. (S. E. Wolff, 1924); Keweenaw Co. (F. J. Hermann, 1926).

Reported from:- Calhoun Co. (C. E. Barr); Tuscola Co. (C. A. Davis); Chippewa Co. (C. K. Dodge); Carp river, Mackinac Co. (Whitney Catalog, 1849); Baraga Co. (H. T. Darlington, 1920); St. Joseph Co. (F. P. Daniels); Antrim Co. (E. A. Bessey, 1920); Oceana Co. (E. A. Bessey, 1922).

26. *RATIBIDA* Raf.

Rays 2.5-7 cm. long; leaf-segments lanceolate.....1. *R. pinnata*.

Rays 1 cm. or less long; leaf-segments narrowly

linear.....2. *R. tagetes*.

1. *RATIBIDA PINNATA* (Vent.) Barnhart (pinnate)

Lepachys pinnata T. & G.

Gray-headed Cone-flower.

Frequent and local. Throughout. On dry plains. June-Sep.

Specimens examined:- Kent Co. (J. Shaddick & H. C. Skeels, 1895); Calhoun Co. (W. J. Beal, 1898); Lenawee Co. (W. J. Beal); Van Buren Co. (H. S. Pepoon, 1903); Mackinac Co. (J. H. Ehlers, 1916); Berrien Co. (H. T. Darlington, 1917); Washtenaw Co. (B. A. Walpole, 1918); Kalamazoo Co. (S. E. Wolff, 1922); Keweenaw Co. (F. J. Hermann, 1926).

Reported from:- St. Joseph Co. (F. P. Daniels); Ionia Co. (Beal's Catalog).

2. *RATIBIDA TAGETES* (James) Barnhart

Lepachys tagetes A. Gray

Short-rayed Cone-flower.

Only along railroads. Native of the Great Plains.

Specimens examined:- Shanghai Pit, Washtenaw Co. (B. A. Walpole, 1919).

(*RATIBIDA COLUMNARIS* (Sims) D. Don. has been reported from the Upper Peninsula by W. Cornell. It has the long cylindric or elongated-conic disk.

27. ECHINACEA Moench

Leaves ovate or ovate-lanceolate, mostly dentate.....1. *E. purpurea*.

Leaves oblong-lanceolate, lanceolate or linear,
entire.

Rays 2-3 cm. long, purplish to white, spreading.....2. *E. angustifolia*.

Rays 3-7 cm. long, rose-purple, narrow, drooping....3. *E. pallida*.

1. ECHINACEA PURPUREA (L.) Moench (purple)

Brauneria purpurea Britton

Purple Cone-flower.

Rare. Southwestern counties. In rich soil. Jul.-Oct.

Reported from:- Kent Co., St. Joseph Co. (Beal's Catalog).

2. ECHINACEA ANGUSTIFOLIA DC. (narrow-leaved)

Brauneria angustifolia Heller

Purple Cone-flower.

Rare. In dry soil. A species of the western prairies. Jul.-Oct.

Specimens examined:- Emmet Co. (J. H. Ehlers, 1920).

3. ECHINACEA PALLIDA (Nutt.) Britton (somewhat pallid)

Brauneria pallida Britton

Pale Purple Cone-flower.

Rare. In dry open places.

Specimens examined:- Keweenaw Co. (O. A. Farwell); Cass Co. (Ruth Jones, 1916).

Reported from:- Muskegon Co. (V. O. Graham).

28. HELIANTHUS L. Sunflower.

- A. Lobes of the disc-florets red or purple.
Involucral bracts ovate, either obtusish or acuminate.
Bracts obtusish, glabrous, appressed; disc not more than 2.0 cm. wide; perennial.....1. *H. rigidus*.
Bracts acuminate, pubescent, loose; disc usually more than 2.5 cm. wide; annuals.
Leaves and young parts white-lanate, the latter densely so.....2. *H. argophyllus*.
Leaves and young parts pubescent, but not lanate.....3. *H. annuus*.
Involucral bracts lanceolate.
Chaff toward the center of the disc long-bearded at the tip.....4. *H. petiolaris*.
Chaff not so bearded.....5. *H. debilis*.
- A. Lobes of the disc-florets yellow.
Disc more than 3.0 cm. wide (cultivated annual).3. *H. annuus*.
Disc not more than 2.5 cm. wide; perennials.
Leaf-blade contracted to a long, narrowly margined petiole as long as, and usually longer than the blade.....6. *H. occidentalis*.
Leaf-blade tapering below, or if abruptly contracted, the petiole much shorter than the blade. (B)
- B. Leaves round or subcordate at the base, sessile or subsessile.
Leaves ovate, sessile and more or less clasping.....7. *H. mollis*.
Leaves broadly lanceolate, subsessile, the apparent petiole not more than 1-3.0 mm. long.....8. *H. divaricatus*.
- B. Leaves acute or pointed at the base. (C)
- C. Leaves prevailingly ovate or broadly ovate-lanceolate.
Involucral bracts linear, much longer than the disc and very loose.....9. *H. decapetalus*.
Bracts lanceolate, only a little longer than the disc and not conspicuously loose.
Stems smooth; main branches of the inflorescence opposite10. *H. strumosus*.
Stems rough; main branches of the inflorescence alternate.
Leaves short-hirsute beneath, smooth to the touch; rhizomes with tubers.....11. *H. tuberosus*.
Leaves scabrous beneath, rough to the touch; rhizomes without tubers.....12. *H. laetiflorus*.
- C. Leaves lanceolate or elliptic.
Heads very small; disc less than 1.0 cm. wide..13. *H. glaucus*.
Disc more than 1.0 cm. wide. (D)

- D. Leaves with a short distinct petiole, or else the blade so narrowly decurrent that the leaf appears petioled.
 Leaves opposite, distinctly petioled; involucre bracts scabrous and recurved.....14. *H. hirsutus*.
 Leaves alternate, ^{the} blade briefly decurrent below the confluence of the lateral nerves, apparently petiolate; bracts subglabrous, not recurved.
 Leaves deeply serrate, usually more than 4.0 cm. wide.....15. *H. grosse-serratus*.
 Leaves serrulate, usually less than 3.0 cm. wide.....16. *H. instabilis*.
- D. Leaves not even apparently petiolate, the blade decurrent to the base of the petiole. (E).
- E. Inflorescence racemose from the axils of the upper leaves; peduncles normally less than 5.0 cm. long and rarely more than 1-flowered; leaves slightly conduplicate.....17. *H. maximiliani*.
- E. Inflorescence paniculate; peduncles more than 5.0 cm. long, often 3-4-flowered; leaves flat. Leaves broadest toward the base, gradually acuminate toward the tip, either opposite or alternate.....18. *H. ambiguus*.
 Leaves broadly linear-elliptic, acute or abruptly acuminate at the tip.
 Leaves 3-5 cm. wide, 5-15.0 cm. long.....19. *H. altissimus*.
 Leaves 2-3 cm. wide, 5-12.0 cm. long.
 Involucre bracts linear, very long and loose; leaves remotely long-hispid beneath.....20. *H. giganteus*.
 Bracts lanceolate, a little longer than the disc; leaves evenly short-pubescent beneath.....21. *H. borealis*.

1. *HELIANTHUS RIGIDUS* Desf. (rigid)

Helianthus scaberrimus Ell.

Stiff Sunflower.

Infrequent. In dry open soil. Throughout. Aug.-Sep.

Specimens examined:- Lapeer Co. (C. K. Dodge, 1911); Van Buren Co. (H. S. Pepoon, 1906); Wayne Co. (B. F. Chandler, 1915); Ontonagon Co. (H. T. Darlington, 1923); Washtenaw Co. (E. E. Watson, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Calhoun Co. (C. E. Barr); Muskegon Co. (C. D. McLouth); Ann Arbor (Winchell's Catalog); Houghton Co. (O. A. Farwell, 1912); Monroe Co. (Farwell & Gladewitz, 1927).

2. *HELIANTHUS ARGOPHYLLUS* T. & G.

Rare. Along railroads. A southern plant.

Specimens examined:- Ingham Co. (B. A. Walpole).

3. *HELIANTHUS ANNUUS* L. (annual)

Common Sunflower.

Rare. Mostly as an escape. Jul.-Sep.

Specimens examined:- Emmet Co. (C. W. Fallass, 1908); Gratiot Co. (C. A. Davis, 1895); Kent Co. (J. Shaddick & H. C. Skeels, 1895); Washtenaw Co. (B. A. Walpole, 1919); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Manistee Co. (F. P. Daniels); Wayne Co. (Farwell & Gladewitz).

4. *HELIANTHUS PETIOLARIS* Nutt. (provided with leaf-stalks)

Prairie Sunflower.

Rare. Mostly along railroads or as an escape. In dry soil.

June-Sep. Native to the western prairies. A pretty species.

Specimens examined:- St. Clair Co. (C. K. Dodge, Sep. 6, 1908); Grand Rapids (C. W. Fallass, Oct. 8, 1894).

Reported from:- Wayne Co. (O. A. Farwell, Sep. 15, 1918); Hubbardston, Ionia Co. (Beal's Catalog).

5. *HELIANTHUS DEBILIS* Nutt. (weak)

Only along railroads. Fugitive from the south.

Specimens examined:- Lansing (B. A. Walpole).

6. *HELIANTHUS OCCIDENTALIS* Riddell

Few-leaved Sunflower.

Frequent. Lower Peninsula. In dry soil, often along railroads.

Aug.-Sep.

Specimens examined:- Oceana Co. (D. Cooley, 1847); Lenawee Co. (W. J. Beal, 186-); Crawford Co., Lake Co. (M. S. C. Herb., 1888); Ionia Co. (C. F. Wheeler, 1890); Kent Co. (G. D. Sones, 1891); Oakland Co. (G. H. Hicks, 1892); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1894); Montcalm Co. (B. Barlow, 1900); Arenac Co. (C. F. Wheeler, 1900); Allegan Co. (F. A. Loew, 1904); Oscoda Co. (C. K. Dodge, 1913); Berrien Co. (Dodge & Darlington, 1917); Mason Co. (H. T. Darlington, 1918); Washtenaw Co. (B. A. Walpole, 1918); Cheboygan Co. (J. H. Ehlers, 1920); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Van Buren Co. (H. S. Pepoon); Calhoun Co. (C. E. Barr); Flint, Macomb Co. (Beal's Catalog); St. Joseph Co. (F. P. Daniels).

7. *HELIANTHUS MOLLIS* Lam. (soft hairy)

Rare. Along railroads.

Specimens examined:- Manistee Co. (F. P. Daniels, 1900).

Reported from:- Wayne Co. ("fence rows in dry ground near Wayne", O. A. Farwell, 1924).

8. *HELIANTHUS DIVARICATUS* L. (widely diverging)

Woodland Sunflower.

Common. Throughout. In dry woodlands and dry thickets. Jul.-Sep.

Specimens examined:- Lenawee Co. (W. J. Beal, 1866); Macomb Co. (D. Cooley, 1867); Kent Co. (H. M. Bailey, 1892); St. Clair Co. (C. K. Dodge, 1895); Gratiot Co. (C. A. Davis, 1895); Calhoun Co. (W. J. Beal, 1898); Genesee Co. (D. Clark); Cass Co. (H. S. Pepoon, 1904); Ingham Co. (M. Craig, 1905); Ottawa Co. (C. H. Kauffman, 1910); Wayne Co. (C. Billington,

1915); Newaygo Co. (E. A. Bessey, 1916); Roscommon Co. (Bessey & Darlington, 1916); Berrien Co. (Dodge & Darlington, 1917); Washtenaw Co. (B. A. Walpole, 1918); Gogebic Co. (H. T. Darlington, 1919); Jackson Co. (Kanouse & Kauffman, 1923); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Van Buren Co. (H. S. Pepoon); Muskegon Co. (C. D. McLouth); Tuscola Co., Oscoda Co., Ogemaw Co. (C. K. Dodge); St. Joseph Co., Manistee Co. (F. P. Daniels); Bay Co. (M. S. C., 1920).

9. *HELIANTHUS DECAPETALUS* L. (having ten petals)

Wild Sunflower.

Frequent. Throughout, but seemingly less common in the Upper Peninsula. In moist rich woods. Aug.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1867); Gratiot Co. (C. A. Davis, 1890); Muskegon Co. (C. D. McLouth, 1899); Ionia Co. (C. F. Wheeler, 1900); Kent Co. (Emma J. Cole, 1901); Cass Co. (H. S. Pepoon, 1905); Van Buren Co. (F. C. Gates, 1916); St. Clair Co. (C. K. Dodge, 1907); Berrien Co. (H. T. Darlington, 1917); Gogebic Co. (H. T. Darlington, 1920); Ingham Co. (E. E. Watson, 1923); Kalamazoo Co. (S. E. Wolff, 1925).

Reported from:- Tuscola Co. (C. A. Davis).

10. *HELIANTHUS STRUMOSUS* L. (bearing wens or swellings)

Wild Sunflower.

Frequent. In thickets and dry woods. Variable. Jul.-Sep.

Specimens examined:- Oakland Co. (D. A. Pelton, 1885); Washtenaw Co. (A. J. Pieters, 1892); Jackson Co. (S. H. Camp, 1897); St. Clair Co. (C. K. Dodge, 1896); Kent Co. (Emma J. Cole, 1901); Roscommon Co. (Bessey & Darlington, 1916); Berrien Co. (Dodge & Darlington, 1917); Kalamazoo Co. (E. E. Watson, 1923).

Reported from:- Tuscola Co. (C. K. Dodge); St. Joseph Co. (F. P. Daniels).

11. *HELIANTHUS TUBEROSUS* L. (bearing tubers)

Jerusalem Artichoke.

Frequent. Roadsides and waste places, seldom far from cultivated fields. Now grown for its edible tubers. Sep.-Oct.

Specimens examined:- Ingham Co. (G. H. Hicks, 1892); St. Clair Co. (C. K. Dodge, 1894); Kent Co. (Mary B. Fallass, 1894); Washtenaw Co. (E. E. Watson, 1923); Livingston Co. (E. E. Watson, 1923); Kalamazoo Co. (S. E. Wolff, 1923).

12. *HELIANTHUS LAETIFLORUS* Pers. (showy-flowered)

Showy Sunflower.

Rare. On prairies and shores. Southwestern counties. Aug.-Sep.

Specimens examined:- Van Buren Co. (E. E. Watson); Kent Co. (E. E. Watson, 1922).

13. *HELIANTHUS GLAUCOUS* Small (covered with bloom)

Rare.

Specimens examined:- Van Buren Co. (H. S. Pepoon, Aug. 1903), "verging on *H. microcephalus*", E. E. Watson, 7/12/26.

14. *HELIANTHUS HIRSUTUS* Raf. (hairy)
 Stiff-haired Sunflower.
 Rare. In dry soil. Southern counties. Jul.-Oct.
Specimens examined:- Washtenaw Co. (B. A. Walpole, 1921); Ionia Co. (B. A. Walpole, 1924); Jackson Co. (S. E. Wolff, 1927).
Reported from:- Wayne Co. (O. A. Farwell).

15. *HELIANTHUS GROSSE-SERRATUS* Martens (coarsely toothed)
 Saw-tooth Sunflower.
 Rare. In dry soil. Southern counties. Aug.-Oct.
Specimens examined:- Kent Co. (E. E. Watson, 1922); St. Clair Co. (C. K. Dodge, 1896).

16. *HELIANTHUS INSTABILIS* E. E. Watson (unstable)
 Infrequent. In the southern counties. In dry soil.
Specimens examined:- St. Clair Co. (C. K. Dodge, 1896); Ionia Co. (B. A. Walpole, 1921); Ingham Co., Cass Co. (E. E. Watson).

17. *HELIANTHUS MAXIMILIANI* Schrad.
 Rare. In dry soil. A plant mainly of the Great Plains. Aug.-Oct.
Specimens examined:- Washtenaw Co. (B. A. Walpole, 1920); Kent Co. (E. E. Watson, 1922); Emmet Co. (J. H. Ehlers, Aug. 11, 1926).
Reported from:- Wayne Co. (O. A. Farwell); Washtenaw Co. (Farwell & Gladewitz, July 20, 1928).

18. *HELIANTHUS AMBIGUUS* (A. Gray) Britton
 Southern counties. Rare.
Specimens examined:- Clinton Co. (E. E. Watson, 1922); Ingham Co., Washtenaw Co., Kalamazoo Co. (E. E. Watson, 1923).

19. *HELIANTHUS ALTISSIMUS* L. (very tall)
 Rare. Southern counties.
Specimens examined:- Kent Co. (H. C. Skeels, 1895); Washtenaw Co. (B. A. Walpole).
Reported from:- Washington, Macomb Co. (Farwell & Gladewitz, 1927).

20. *HELIANTHUS GIGANTEUS* L. (gigantic)
 Tall Sunflower.
 Common. Throughout. In swamps and wet meadows. Aug.-Oct.
Specimens examined:- Macomb Co. (D. Cooley, 1847); Kent Co. (H. M. Bailey, 1891); Washtenaw Co. (A. J. Pieters, 1892); Gratiot Co. (C. A. Davis, 1895); Genesee Co. (D. Clark); Cass Co. (F. C. Gates, 1906); St. Clair Co. (C. K. Dodge, 1902); Allegan Co. (C. H. Kauffman, 1913); Wayne Co. (J. M. Sutton, 1916); Newaygo Co., Mecosta Co. (H. T. Darlington, 1916); Berrien Co. (Dodge & Darlington, 1917); Oakland Co. (B. A. Walpole, 1920); Ingham Co. (E. E. Watson, 1923); Kalamazoo Co. (S. E. Wolff, 1923); Ontonagon Co. (H. T. Darlington, 1922); Clinton Co. (E. E. Watson).
Reported from:- Calhoun Co. (C. E. Barr); Muskegon Co. (C. D. McLouth); Tuscola Co., Chippewa Co. (C. K. Dodge); St. Joseph Co. (F. P. Daniels); Ionia Co. (Beal's Catalog).

21. *HELIANTHUS BOREALIS* E. E. Watson (northern)
Rare. Dry open soil.
Specimens examined:- Cass Co. (H. S. Pepoon, 1905).
Reported from:- Ingham Co. (E. E. Watson).

29. RIDAN Adams

- RIDAN *ALTERNIFOLIUS* (L.) Britton (alternate-leaved)
Verbesina alternifolia Britton
Actinomeris alternifolia DC.
Yellow Ironweed.
Rare. In rich soil. Confined to the two tiers of counties
farthest south. Aug.-Sep.
Specimens examined:- Washtenaw Co. (M. W. Harrington, 1866); Along
Huron river, Wayne Co. (C. K. Dodge, 1911); Lenawee Co. (C. Billington,
1915); Berrien Co. (Dodge & Darlington, 1917); Washtenaw Co. (B. A.
Walpole, 1918).
Reported from:- Southern Michigan (Wright's Catalog).

30. COREOPSIS L. Tickseed.

- Leaves entire; achenes broadly winged.....1. *C. lanceolata*.
Leaves 3-lobed or divided; achenes narrowly winged.
Leaves sessile, 3-lobed to about the middle, the
lobes broadly linear; rays toothed.....2. *C. palmata*.
Leaves petioled, all but the uppermost 3-divided,
the divisions lanceolate; rays entire.....3. *C. tiptensis*.

1. COREOPSIS LANCEOLATA L. (lance-shaped)
Tickseed.

Local, but frequent. On the sandy shores of Lake Huron and Lake
Michigan, also on sand hills and sandy plains in the interior.
A pretty species. May-Aug.

Specimens examined:- Oceana Co. (D. Cooley, 1837); Emmet Co. (C. W.
Fallass, 1879); Iosco Co. (Beal & Wheeler, 1888); Grand Traverse Co. (C.
F. Wheeler, 1892); Muskegon Co. (C. F. Wheeler, 1900); Kent Co. (Emma J.
Cole, 1901); Antrim Co. (W. S. Cooper, 1902); Mackinac and Bois Blanc
Islands (C. K. Dodge, 1914); Alpena Co. (E. A. Bessey, 1918); Allegan
Co. (E. A. Bessey, 1921); Emmet Co. (J. H. Ehlers, 1920).

Reported from:- Cheboygan Co. (C. K. Dodge).

2. COREOPSIS PALMATA Nutt. (palmately lobed or divided)
Stiff Tickseed.

Rare. In the southwestern counties. In thickets and on plains.
June-Jul.

Specimens examined:- Cass Co. (C. F. Wheeler, 1890); Berrien Co.
(Dodge & Darlington, 1917); Cass Co. ("Silver Creek valley & Dowagiac
Swamp", H. S. Pepoon).

Reported from:- Southern Michigan (Wright's Catalog); Gull Prairie
(Dr. Houghton, 1838, in Beal's Catalog).

3. COREOPSIS TRIPTERIS L. (three-winged)

Tall Tickseed.

Frequent. In thickets and open places. Southern part of the state. Jul.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1840); Lenawee Co. (W. J. Beal, 1862); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1894); Kent Co. (A. Rogers & H. C. Skeels, 1895); Calhoun Co. (W. J. Beal, 1898); Cass Co. (H. S. Pepoon, 1905); Berrien Co. (Dodge & Darlington, 1917); Washtenaw Co. (B. A. Walpole, 1918); Kalamazoo Co. (S. E. Wolff, 1922).

Reported from:- Magician Lake region (H. S. Pepoon); Wayne Co. (O. A. Farwell); Southern Michigan, Oakland Co., Ionia (Beal's Catalog); Eaton Co. (H. L. Clark); St. Joseph Co. (F. P. Daniels).

(COREOPSIS TINCTORIA Nutt., the Garden Tickseed, has been reported in Beal's Catalog as an escape from Bay City; also from Wayne Co. by Farwell & Gladewitz, 1927.

(COREOPSIS VERTICILLATA L., the Whorled Tickseed, has been reported from Macomb Co. and Grand Rapids in Beal's Catalog. This species has a more southern distribution.

31. BIDENS L.

- Plant aquatic; submerged leaves finely dissected;
 rays showy.....1. *B. beckii*.
- Plant terrestrial; leaves toothed, lobed or compound, not finely dissected.
 Rays large and showy, usually much exceeding the disk.
 Leaves simple, the upper often connate at the base; heads nodding; achenes 4-angled, 4-awned.....2. *B. cernua*.
- Leaves pinnately divided; heads not nodding;
 achenes flat, 2-awned.....3. *B. trichosperma*.
- Rays inconspicuous or wanting.
 Leaves distinctly pinnatifid or ternatifid;
 margins of achenes upwardly barbed, except rarely toward the top.
 Outer tegules 4-8, ciliate; inner tegules oblong, equaling the disk; ray-achenes, when present, hairy, minutely awned; disk-achenes narrow, hairy, the margins warty, upwardly barbed to base of awns.
 Leaf-divisions 3, long-acuminate; heads small, about 6 mm. high; achenes 4-5.5 mm. long; awns upwardly barbed; outer tegules 4.....4. *B. discoidea*.
- Leaf-divisions 3-5, pinnately arranged, acute or short-acuminate; heads larger, 12 mm. high; achenes 0.8-1.2 cm. long; awns downwardly barbed; outer tegules 6-8.....5. *B. frondosa*.
- Outer tegules 10-16, more ciliate; the inner tegules ovate-triangular, short; ray-achenes, when present, glabrous, awnless; disk-achenes broad, flat (one-half as broad as long), nearly smooth and glabrous, the uppermost fourth of margin downwardly barbed.....6. *B. vulgata*.
- Leaves simple or irregularly lobed; margins of achenes downwardly barbed, or with mixed ascending and reflexed barbs.
 Corolla 4-toothed, stamens included; achenes broad, flat, 8-11 mm. long, 3-awned, the margins downwardly barbed; outer tegules very foliaceous, 2-4 times the length of the disk.....7. *B. comosa*.
- Corolla 5-toothed, stamens exserted; achenes 4-6 mm. long, warty, the outer ones 3-awned, the inner 4-awned, the margins with mixed ascending and reflexed barbs; outer tegules rarely twice exceeding the disk.....8. *B. connata*.

1. *BIDENS BECKII* Torr.

Megalodonta beckii (Torr.) Greene
Water Marigold.

Frequent. In ponds and streams. Throughout the state. Aug.-Sep.

Specimens examined:- Muskegon Co. (1868); Cheboygan Co. (C. F. Wheeler, 1890); Washtenaw Co. (W. H. Rush, 1891); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1893); Kent Co. (R. Matteson, 1894); Manistee Co. (F. P. Daniels, 1900); St. Clair Co. (C. K. Dodge, 1903); Lenawee Co. (C. Billington, 1914); Iosco Co. (H. T. Darlington, 1918); Gogebic Co. (H. T. Darlington, 1919); Cheboygan Co. (J. H. Ehlers, 1920); Mackinac Co. (C. Goodrich, 1922).

Reported from:- Isle Royale (W. S. Cooper); Wexford Co., Orion (Beal's Catalog).

2. *BIDENS CERNUA* L. (stooping)

Nodding Bur-Marigold.

Common. In wet soil, ditches and muddy shores. Throughout. A closely related species, *B. laevis*, with a more southern distribution, has been confused with this. Variable. Jul.-Sep.

Specimens examined:- Montcalm Co. (C. F. Wheeler); Keweenaw Co. (O. A. Farwell, 1887); Shiawassee Co. (G. H. Hicks, 1889); Ionia Co. (C. F. Wheeler, 1890); Gratiot Co. (C. A. Davis, 1890); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1893); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1895); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Alger Co. (C. F. Wheeler, 1900); Marquette Co. (B. Barlow, 1901); Van Buren Co. (H. S. Pepoon, 1903); Wayne Co. (C. Billington, 1914); Baraga Co. (C. K. Dodge, 1916); Gogebic Co. (E. A. Bessey, 1919); Chippewa Co. (J. H. & Lois Ehlers, 1920); Emmet Co. (J. H. Ehlers, 1921); Washtenaw Co. (E. W. Erlanson, 1923); Kalamazoo Co. (S. E. Wolff, 1923); Livingston Co. (F. J. Hermann, 1927).

Reported from:- Magician Lake region (H. S. Pepoon); Calhoun Co. (C. E. Barr); Dickinson Co. (G. H. Coons, 1909); Grand Traverse Co. (W. L. McAtee, 1919); Muskegon Co. (C. D. McLouth); Tuscola Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); St. Joseph Co., Manistee Co. (F. P. Daniels); Montcalm Co. (M. S. C., 1912); Newaygo Co. (M. S. C., 1919).

3. *BIDENS TRICHOSPERMA* (Michx.) Britton (with hairy seeds)

Bidens trichosperma tenuiloba Britton

Coreopsis trichosperma Michx.

Coreopsis trichosperma var. *tenuiloba* A. Gray

Tall Tickseed-Sunflower.

Rather common. In wet meadows and swamps. Lower Peninsula, especially the southern half. Aug.-Oct.

Specimens examined:- Ottawa Co. (C. K. Dodge, 1892); Ingham Co. (H. C. Skeels, 1894); Oakland Co. (O. A. Farwell, 1895); St. Clair Co. (C. K. Dodge, 1896); Emmet Co. (C. W. Fallass, 1896); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Montcalm Co. (B. Barlow, 1900); Cass Co. (H. S. Pepoon, 1906); Van Buren Co. (F. C. Gates, 1906); Calhoun Co. (C. E. Barr, 1906); Lenawee Co. (C. Billington, 1914); Newaygo Co. (H. T. Darlington, 1916); Wayne Co. (J. M. Sutton, 1916); Berrien Co. (Dodge & Darlington, 1917); Washtenaw Co. (B. A. Walpole, 1918); Oakland Co. (C. Billington,

1920); Kalamazoo Co. (S. E. Wolff, 1924); St. Joseph Co. (Gladys Lloyd, 1927).

Reported from:- Muskegon Co. (C. D. McLouth); Tuscola Co., Charity Islands (C. K. Dodge); Flint (Beal's Catalog).

4. *BIDENS DISCOIDEA* (T. & G.) Britton (having only disk-flowers)

Coreopsis discoidea T. & G.

Small Beggar-ticks.

Rare. Perhaps not recognized. In swampy thickets and wet woods.
Jul.-Sep.

Specimens examined:- Muskegon Co. (C. W. Fallass, 1894); St. Clair Co. (C. K. Dodge, 1894); Kent Co. (Emma J. Cole, 1901); Ingham Co. (M. Craig, 1904); Huron Co. (C. K. Dodge, 1912); Berrien Co. (C. Billington, 1920); Ionia Co. (B. A. Walpole, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Manistee Co. (F. P. Daniels).

5. *BIDENS FRONDOSA* L. (leafy)

Beggar-ticks. Stick-tight.

Common. In moist soil, along roadsides, cultivated ground and waste places. Throughout. Jul.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Ingham Co. (C. F. Wheeler, 1899); Kent Co. (Emma J. Cole, 1901); St. Clair Co. (C. K. Dodge, 1903); Van Buren Co., Cass Co. (H. S. Pepoon, 1905); Gogebic Co. (H. T. Darlington, 1919); Emmet Co. (C. W. Fallass, 1920); Wayne Co. (C. Billington, 1914); Cheboygan Co. (J. H. Ehlers, 1923); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Muskegon Co. (C. D. McLouth); Charity Islands, Tuscola Co., Chippewa Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); St. Joseph Co., Manistee Co. (F. P. Daniels); Ottawa Co. (M. S. C., 1922).

6. *BIDENS VULGATA* Greene (common)

Tall Beggar-ticks.

Frequent. In moist soil. Aug.-Sep. Similar to the preceding species. Perhaps confused with it.

Specimens examined:- Kent Co. (C. W. Fallass, 1880); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1904); Washtenaw Co. (C. D. LaRue, 1915); Ingham Co. (B. A. Walpole, 1921); Emmet Co. (C. W. Fallass, 1919).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Cass Co. (H. S. Pepoon); Muskegon Co. (V. O. Graham); Cheboygan Co. (F. C. Gates); Genesee Co. (M. S. C., 1920).

7. *BIDENS COMOSA* (A. Gray) Wieg. (bearing a tuft of hairs)

Bidens connata, var. *comosa* A. Gray

Leafy-bracted Tickseed.

Infrequent. Possibly throughout the state. In wet soil. Aug.-Sep.

Specimens examined:- Ingham Co. (C. F. Wheeler, 1891); Kent Co. (Mary B. Fallass, 1893); St. Clair Co. (C. K. Dodge, 1894); Gratiot Co. (C. A. Davis, 1895); Alger Co. (C. F. Wheeler, 1900); Berrien Co. (H. S. Pepoon, 1906); Wayne Co. (C. Billington, 1916); Gogebic Co. (H. T. Darlington, 1919).

Reported from:- Chippewa Co., Tuscola Co., Bay Co. to Mackinac Co. (C. K. Dodge); Ottawa Co. (M. S. C., 1922).

8. *BIDENS CONNATA* Muhl. (born organically united)

Purple-stemmed Beggar-ticks.

Frequent. Throughout the state. On muddy shores, in swamps and moist soil. Aug.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Montcalm Co. (B. Barlow, 1900); Kent Co. (Emma J. Cole, 1901); Ingham Co. (H. C. Skeels, 1894); Keweenaw Co. (O. A. Farwell, 1887); Ionia Co. (C. F. Wheeler, 1890); St. Clair Co. (C. K. Dodge, 1892); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1893); Emmet Co. (C. W. Fallass, 1895); Van Buren Co. (H. S. Pepoon, 1904); Huron Co. (C. K. Dodge, 1909); Berrien Co. (Dodge & Darlington, 1917); Oakland Co. (C. Billington, 1922); Kalamazoo Co. (S. E. Wolff, 1924).

Reported from:- Tuscola Co., Bay Co. to Mackinac Co. (C. K. Dodge); Wayne Co. (O. A. Farwell); Manistee Co. (F. P. Daniels); Cheboygan Co. (Mr. Loew, 1910).

32. *GALINSOGA* Cav.

GALINSOGA PARVIFLORA Cav. (small-flowered)

In door-yards and waste places, only in towns and cities. Naturalized from tropical America. June-Nov.

Specimens examined:- Wayne Co. (W. S. Cooper, 1901); Port Huron (C. K. Dodge, 1914); Ann Arbor (C. D. LaRue, 1915); Newaygo Co. (H. T. Darlington, 1916); Gogebic Co. (H. T. Darlington, 1919); Ingham Co. (S. E. Wolff, 1925).

Reported from:- Calhoun Co. (M. S. C., 1925); Kalamazoo (L. A. Kenoyer).

33. *HELENIMUM* L.

Leaves oblong- or ovate-lanceolate.

Leaves dentate; rays fertile; disk yellow.....1. *H. autumnale*.

Leaves mainly entire; rays neutral; disk brown

or purple.....2. *H. nudiflorum*.

Leaves linear-filiform, entire.....3. *H. tenuifolium*.

1. *HELENIMUM AUTUMNALE* L. (autumnal)

Sneezeweed.

In swamps, wet meadows and on moist river-banks. Frequent.

Throughout. Aug.-Oct.

Specimens examined:- Macomb Co. (D. Cooley, 1847); Gratiot Co. (C. A. Davis, 1892); Ingham Co. (H. C. Skeels, 1894); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Ottawa Co. (ex. Herb. W. E. Mulliken, 1895); Osceola Co. (H. T. Darlington, 1916); Washtenaw Co. (B. A. Walpole, 1918); Gogebic Co. (H. T. Darlington, 1919); Ontonagon Co. (Bessey & Darlington, 1923).

Reported from:- Berrien Co. (H. S. Pepoon); Dickinson Co. (G. H. Coons, 1909); Muskegon Co. (C. D. McLouth); Tuscola Co. (C. K. Dodge); Wayne Co., Oakland Co. (O. A. Farwell); Manistee Co. (F. P. Daniels); Alger Co. (M. S. C.).

2. *HELENIMUM NUDIFLORUM* Nutt. (naked-flowered)
Purple-head Sneezeweed.

A plant of the southern states from the Atlantic Seaboard west to Texas. Found only as stray plants in waste places farther north.

Specimen examined:- Wayne Co., on Detroit Golf Club sub-division (Mrs. Morten Noble, Aug. 1, 1920).

3. *HELENIMUM TENUIFOLIUM* Nutt. (fine-leaved)
Fine-leaved Sneezeweed.

A plant of the southern states. Specimens found had probably escaped from cultivation.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1899).

Reported from:- Wayne Co., waste ground in Detroit (O. A. Farwell, Sep. 3, 1919).

34. *GAILLARDIA* Foug.

(*Gaillardia aristata* Pursh (awned) has been reported from Oakland Co. along railroad right-of-way by B. F. Chandler, 1916). The specimen was probably a stray from the West.

(*Gaillardia pulchella* Foug. has been collected from Allegan Co. (M. S. C., 1914).

35. ACHILLEA (Vaill.) L. Yarrow.

Leaves bipinnately parted.

Tegules with dark-brown or almost black margins;
involucre 5-6 mm. high, 4-5 mm. broad.....1. *A. borealis*.

Tegules with light brown to whitish margins; in-
volucre 4-4.5 mm. high, 2.5-4 mm. broad.

Ultimate leaf-segments linear; leaf-segments
ascending, crowded.....2. *A. lanulosa*.

Ultimate leaf-segments ovate or lanceolate, not
crowded.

Stem-leaves linear to lance-oblong in outline,
the pairs of primary divisions numerous;
outer tegules obtuse.....3. *A. millefolium*.

Stem leaves oval or ovate in outline, with 6-8
pairs of primary divisions; outer tegules
acute.....4. *A. ligustica*.

Leaves simple, serrate.....5. *A. ptarmica*.

1. ACHILLEA BOREALIS Bong. (northern)

Northern Yarrow.

Rare. Keweenaw Co. only. On rocks.

Specimens examined:- Keweenaw Co. (F. J. Hermann, 1926).

Reported from:- Keweenaw Co. (O. A. Farwell, Aug. 1921).

2. ACHILLEA LANULOSA Nutt. (woolly)

Woolly Yarrow.

In dry soil. Upper Peninsula. No specimens have been seen.

June-Sep.

Reported from:- Upper Peninsula (O. A. Farwell, in Beal's Catalog).

3. ACHILLEA MILLEFOLIUM L. (thousand-leaved)

Common Yarrow.

Common. A weed in fields everywhere. There is some question
whether this species is native or naturalized. June-Nov.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1886); Ingham Co.
(H. C. Skeels, 1894); Kent Co. (H. C. Skeels, 1895); St. Clair Co. (C.
K. Dodge, 1896); Calhoun Co. (W. J. Beal, 1898); Marquette Co. (B.
Barlow, 1901); Van Buren Co. (H. S. Pepoon, 1905); Cheboygan Co. (F. C.
Gates, 1911); Jackson Co. (O. S. Ludlow, 1914); Alger Co. (C. K. Dodge,
1916); Washtenaw Co. (B. A. Walpole, 1918); Emmet Co. (J. H. Ehlers,
1920); Gogebic Co. (H. T. Darlington, 1919); Kalamazoo Co. (S. E. Wolff,
1923).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Magician
Lake region (H. S. Pepoon); Dickinson Co. (G. H. Coons, 1909); Bay Co.
to Mackinac Co., Tuscola Co., Chippewa Co., Schoolcraft Co. (C. K. Dodge);
Huron Co. (C. A. Davis); Antrim Co. (E. A. Bessey, 1913); Montcalm Co.
(E. A. Bessey, 1915); Roscommon Co. (M. S. C., 1917); Isle Royale (W. S.
Cooper); St. Joseph Co., Manistee Co. (F. P. Daniels); Wayne Co. (O. A.
Farwell).

4. *ACHILLEA LIGUSTICA* All. (referring to the Ligurians)

Reported from Michigan by Rydberg in N. Amer. Fl. 34: 226. 1916. No specimens have been seen. Adventive from Europe.

5. *ACHILLEA PTARMICA* L.

Sneezewort.

In moist soil. Naturalized from Europe.

Reported from: Michigan (Gray's Manual, ed. 7; Britton & Brown Ill. Fl., ed. 2; N. Amer. Fl. 34: 226. 1916). No specimens have been seen.

36. ANTHEMIS (Micheli) L.

Rays white, 10-18.

Plant ill-scented; leaves 1-3-pinnately dissected into narrow or almost filiform lobes; rays neutral; chaff not subtending outer disk-flowers; achenes tuberculate-roughened on the ribs.....1. *A. cotula*.

Plant not ill-scented; leaves 1-2-pinnately parted into lanceolate or broadly linear lobes; rays pistillate; chaff subtending all the disk-flowers; achenes nearly smooth on the ribs.....2. *A. arvensis*.

Rays yellow, 20-30; leaves pinnately divided; pappus a distinct crown.....3. *A. tinctoria*.

1. ANTHEMIS COTULA L. (like *Cotula*, the Buck's-horn)

Maruta cotula (L.) DC.

Mayweed.

Everywhere in dooryards and waste places. Except for the fetid odor it would be worthy of cultivation. Naturalized from Europe. June-Nov.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1888); Gratiot Co. (C. A. Davis, 1891); Ingham Co. (H. C. Skeels, 1894); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Van Buren Co. (H. S. Pepoon, 1905); St. Clair Co. (C. K. Dodge, 1906); Cheboygan Co. (F. C. Gates, 1911); Otsego Co. (E. A. Bessey, 1912); Oakland Co. (B. F. Chandler, 1913); Jackson Co. (O. S. Ludlow, 1914); Wayne Co. (C. Billington, 1914); Saginaw Co. (H. T. Darlington, 1916); Washtenaw Co. (B. A. Walpole, 1918); Gogebic Co. (H. T. Darlington, 1919); Kalamazoo Co. (S. E. Wolff, 1925); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Magician Lake region (H. S. Pepoon); Tuscola Co., Chippewa Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Dickinson Co. (G. H. Coons, 1909); Huron Co. (C. A. Davis); Baraga Co. (H. T. Darlington, 1920); St. Joseph Co., Manistee Co. (F. P. Daniels); Muskegon Co. (C. D. McLouth); Eaton Co., Branch Co. (M. S. C., 1913); Montcalm Co. (E. A. Bessey, 1915); Emmet Co. (Fallass & Swift); Alger Co. (M. S. C., 1917); Osceola Co. (M. S. C., 1927).

2. ANTHEMIS ARVENSIS L. (of cultivated ground)

Corn Camomile.

Becoming common. A weed resembling Mayweed. Begins blossoming nearly a month earlier than the preceding May-Aug. Naturalized from Europe.

Specimens examined:- St. Joseph Co. (C. F. Wheeler, 1890); St. Clair Co. (C. K. Dodge, 1902); Berrien Co. (H. S. Pepoon, 1906); Kent Co. (Emma J. Cole, 1901); Washtenaw Co. (E. Penfield, 1909); Jackson Co. (O. S. Ludlow, 1912); Oakland Co. (B. F. Chandler, 1913); Ingham Co. (B. W. Cade, 1914); Barry Co. (R. A. Carpenter, 1915); Cass Co. (E. D. McKenzie, 1915); Wayne Co. (J. M. Sutton, 1916); Kalamazoo Co. (S. E. Wolff, 1922).

Reported from:- Muskegon Co. (C. D. McLouth).

3. ANTHEMIS TINCTORIA L. (used for dyeing)

Cota tinctoria (L.) J. Gay

Rarely an escape from cultivation. Native of Europe and Asia. May-Aug.

Specimens examined:- Emmet Co. ("margin of Little Traverse Bay", C. W. Fallass, 1922).

37. CHRYSANTHEMUM (Tourn.) L.

Rays present, white.

Stem-leaves pinnately-divided; heads numerous;
rays 5-8 mm. long; outer tegules lance-linear,
rigid; pappus a short dentate crown.....1. *C. parthenium*.

Stem-leaves somewhat pinnatifid near the base to
serrate-dentate; heads few, solitary at the
ends of the branches; rays 1-1.5 cm. long;
outer tegules oblong, scarious, with a brown
line inside the margins.....2. *C. leucanthemum*.

Rays none; heads numerous, corymbed; leaves oblong,
crenate or crenate-dentate, often deeply lobed
near the base.....3. *C. balsamitae*, var.
tanacetoides.

1. CHRYSANTHEMUM PARTHENIUM (L.) Bernh.

Matricaria parthenium L. (ancient name of some plant)

Common Feverfew.

Rare as an escape from cultivation. Adventive from Europe.

Summer.

Specimens examined:- Keweenaw Co. (F. E. Wood, 1883); Van Buren Co. (L. D. Foster, 1915); Berrien Co. (Dodge & Darlington, 1917); Cheboygan Co. (J. H. Ehlers, 1920).

Reported from:- Emmet Co. (C. E. Barr); Bay to Mackinac Co., ("waste places in villages and cities", C. K. Dodge); Manistee Co. (F. P. Daniels); Keweenaw Co. (O. A. Farwell, 1925).

2. CHRYSANTHEMUM LEUCANTHEMUM L. (white-flowered)

Leucanthemum vulgare Lam.

Ox-dye Daisy.

Common. Throughout. Meadows and pastures. Naturalized from Europe. Native also of Asia. May-Nov.

Specimens examined:- Wayne Co. (Lewis Foote, 1870); Keweenaw Co. (O. A. Farwell, 1888); St. Clair Co. (C. K. Dodge, 1892); Ingham Co. (H. C. Skeels, 1894); Alger Co. (C. F. Wheeler, 1900); Marquette Co. (B. Barlow, 1901); Cheboygan Co. (F. C. Gates, 1911); Sanilac Co. (B. Elder, 1914); Van Buren Co. (L. D. Foster, 1915); Osceola Co. (H. T. Darlington, 1916); Washtenaw Co. (B. A. Walpole, 1918); Gogebic Co. (E. A. Bessey, 1919); Emmet Co. (J. H. Ehlers, 1920); Kalamazoo Co. (S. E. Wolff, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Cass Co. (H. S. Pepoon); Tuscola Co., Chippewa Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Baraga Co. (H. T. Darlington, 1920); Dickinson Co. (G. H. Coons, 1909); Muskegon Co. (C. D. McLouth); Kent Co. (Emma J. Cole); St. Joseph Co., Manistee Co. (F. P. Daniels); Isle Royale (W. S. Cooper); Calhoun Co. (C. C. McDermid); Ottawa Co. (M. S. C., 1921); Clare Co. (M. S. C., 1924).

3. CHRYSANTHEMUM BALSAMITA L., var. tanacetoides Boiss. (like tanacetum)
Balsamita balsamita (L.) Rydb.

Costmary. Mint Geranium.

A frequent escape from cultivation, along roadsides and in fields.

Native of the Old World. Summer.

Specimens examined:- Kent Co. (J. Shaddick & H. C. Skeels, 1897); Keweenaw Co. (O. A. Farwell, 1889); St. Clair Co. (C. K. Dodge, 1904); Cheboygan Co. (F. C. Gates, 1911); Wayne Co. (O. A. Farwell, 1915); Oakland Co. (B. F. Chandler, 1916); Mecosta Co. (H. T. Darlington, 1916); Berrien Co. (Dodge & Darlington, 1917); Washtenaw Co. (B. A. Walpole, 1918); Chippewa Co. (E. A. Bessey, 1927).

Reported from:- Tuscola Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Huron Co. (C. A. Davis); Manistee Co. (F. P. Daniels).

38. MATRICARIA (Tourn.) L.

Rays none; disk corollas 4-lobed; receptacle conic;

bruised heads emitting the odor of pineapple.....1. *M. matricarioides*.

Rays present, white; disk-corollas 5-lobed.

Receptacle hemispheric or slightly elongated,

solid; achenes 3-ribbed on the inner side;

pappus-crown distinct, entire.....2. *M. inodora*.

Receptacle conic, acute, hollow; achenes 5-ribbed

on the inner side; pappus none or a minute

crown.....3. *M. chamomilla*.

1. MATRICARIA MATRICARIOIDES (Less.) Porter (like Matricaria)

Matricaria suaveolens (Pursh) Buchenau

Chamomilla suaveolens (Pursh) Rydb.

Pineapple-weed.

Uncommon as yet. Introduced from farther west. A weed along roadsides, in yards and waste places. Resembles *Anthemis arvensis* and *Anthemis cotula*, except it has no ray-flowers.

June-Aug.

Specimens examined:- Houghton Co. (O. A. Farwell, 1921); Houghton Co. (F. J. Hermann, 1926); Ingham Co. (S. E. Wolff, 1927).

Reported from:- Commeŕce, Oakland Co. ("along railway tracks where it gave evidence of becoming plentiful", Farwell & Gladewitz, #7382, June 8, 1925).

2. MATRICARIA INODORA L. (odorless)

Chamomilla inodora (L.) Gilib.

Scentless Camomile.

Roadsides, fields and waste places. Recorded from Michigan in Gray's Manual, ed. 7 and Britton & Brown Ill. Fl. ed. 2. No specimens have been seen.

Reported from:- Flint (Beal's Catalog).

3. MATRICARIA CHAMOMILLA L. (classical name for this plant)
Chamomilla chamomilla (L.) Rydb.
Wild Camomile.

Rare. Waste ground, roadsides. May be mistaken for the preceding or for Anthemis cotula and Anthemis arvensis. Summer.

Specimens examined:- Keweenaw Co. (F. E. Wood, June 1883); Clifton, Keweenaw Co. (O. A. Farwell, 1886); Marquette Co. (B. Barlow, 1901).

39. TANACETUM L. Tansy.

Stem glabrous or nearly so; heads numerous, dense,

6-10 mm. broad.....1. T. vulgare.

Stem villous-pubescent; heads 1-8, 12-16 mm. broad...2. T. huronense.

1. TANACETUM VULGARE L. (common)
Tanacetum vulgare crispum DC.
Tansy.

Rather common along roadsides as an escape from cultivation.

Naturalized from Europe. Jul.-Sep.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1886); St. Clair Co. (C. K. Dodge, 1893); Ingham Co. (H. C. Skeels, 1894); Kent Co. (J. Shaddick & H. C. Skeels, 1895); Calhoun Co. (W. J. Beal, 1898); Marquette Co. (B. Barlow, 1901); VanBuren Co. (H. S. Pepoon, 1905); Oakland Co. (C. Billington, 1914); Roscommon Co. (H. T. Darlington, 1916); Houghton Co. (C. K. Dodge, 1916); Macomb Co. (C. K. Dodge, 1911); Chippewa Co. (J. H. Ehlers, 1917); Grand Traverse Co. (J. H. Ehlers); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Dickinson Co. (G. H. Coons, 1909); Tuscola Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Huron Co. (C. A. Davis); Wayne Co. (O. A. Farwell); Gogebic Co. (H. T. Darlington, 1920); St. Joseph Co., Manistee Co. (F. P. Daniels); Isle Royale (W. S. Cooper); Emmet Co. (C. W. Fallass); Lapeer Co. (M. S. C., 1921); Oceana Co., Charlevoix Co. (M. S. C., 1922).

2. TANACETUM HURONENSE Nutt.
Lake Huron Tansy.

Shores of Lake Superior, Lake Huron and Lake Michigan, north of Benzie and Alcona counties. Jul.-Sep.

Specimens examined:- Emmet Co. (C. F. Wheeler, 1890); Antrim Co. (W. S. Cooper, 1902); Alpena Co. (C. K. Dodge, 1912); Schoolcraft Co. (C. K. Dodge, 1915); Alger Co. (E. C. Mandenburg, 1917); Mackinac Co. (C. K. Dodge, 1914); Presque Isle Co. (C. K. Dodge, 1913); Alger Co. (R. Ford, 1921); Charlevoix Co. (H. T. Darlington, 1922).

Reported from:- Chippewa Co. (C. K. Dodge).

40. ARTEMISIA* L. Wormwood.

Ovaries developed in the marginal(pistillate) flowers(rays) of the heads, abortive or undeveloped in the central(perfect) flowers.

Heads 2-3 mm. broad; leaf-divisions narrowly linear to thread-form; racemes in a wand-like long panicle.

Plant glabrous or nearly so; rays 7-8.....1. *A. caudata*.

Plant decidedly pubescent; rays 15-20.....2. *A. forwoodii*.

Heads 4-6 mm. broad; leaf-divisions linear to linear-lanceolate.

Leaf-divisions linear; heads in panicle racemes; involucre green, glabrous; rays 10-15.....3. *A. canadensis*.

Leaf-divisions linear-lanceolate; heads subracemose; involucre brownish, somewhat silky; rays 15-25.....4. *A. borealis*.

Ovaries developed in both the marginal(pistillate) flowers and in the central(perfect) flowers.

Receptacle hairy; plant shrubby at the base.....5. *A. absinthium*.

Receptacle naked(not hairy).

Plant shrubby at the base; leaves 1-3-pinnately parted into revolute linear-filiform segments; involucre 5 mm. broad, arachnoid.....6. *A. abrotanum*.

Plant herbaceous throughout; leaves dissected into lanceolate or broader segments.

Plant glabrous throughout.

Heads drooping, about 2 mm. broad, in a loose spreading panicle; rays 5-6.....7. *A. annua*.

Heads erect, about 3 mm. broad, in axillary clusters, forming a leafy spike-like panicle; rays 10-15.....8. *A. biennis*.

Plant woolly-pubescent(only on the lower surface of the leaves in *A. vulgaris*).

Stem and leaves hoary with a thin wool or densely white-woolly throughout.

Leaves white-woolly, lanceolate, entire, on the lower oblanceolate and with 2-4 teeth.....9. *A. gnaphalodes*.

Leaves broader, pinnatifid or dissected.

Heads 6-8 mm. broad, erect; leaves white-woolly, obovate to spatulate, pinnatifid into oblong, blunt lobes; rays about 10.....10. *A. stellariana*.

Heads 3-4 mm. broad, drooping; leaves hoary with a thin wool, 2-3-pinnately dissected into short sharp lobes; rays 10-15.....11. *A. pontica*.

Stem glabrous; leaves green above, densely white-woolly beneath, all, except the upper, deeply pinnatifid.....12. *A. vulgaris*.

*Although not with developed ligules, the marginal(pistillate) flowers in this genus are functionally considered and called rays in this key.

1. ARTEMISIA CAUDATA Michx. (tailed)

Tall Wormwood.

Frequent or rather common locally. In sandy, mostly sterile soil.

On the sand dunes near Lake Michigan it was observed that this species was apparently perennial and had a woody root. It was also more or less pubescent under those conditions, hence not readily separable from the next. July-Sep.

Specimens examined:- Kent Co. (C. W. Fallass, 1884); Keweenaw Co. (F. E. Wood, 1883); Benzie Co. (C. A. Davis, 1895); Ottawa Co. (L. J. Cole, 1895); Huron Co. (C. A. Davis, 1896); Menominee Co. (C. K. Dodge, 1905); St. Clair Co. (C. K. Dodge, 1897); Emmet Co. (C. W. Fallass, 1922); Kalamazoo Co. (S. E. Wolff, 1923); Cheboygan Co. (J. H. Ehlers, 1921); Mackinac Co. (J. H. Ehlers, 1920); Newaygo Co. (B. A. Walpole, 1924); Montcalm Co. (B. Barlow, 1900); Van Buren Co. (H. S. Pepoon, 1905).

Reported from:- Bay Co. to Mackinac Co. ("sandy beaches of Lake Huron and sandy ridges of interior", C. K. Dodge); Tuscola Co., Chippewa Co. (Beal's Catalog); Allegan Co. (E. A. Bessey, 1922).

2. ARTEMISIA FORWOODII S. Wats.

Resembles A. caudata. According to Rydberg (Fl. N. Amer. 34:253.

1916), this species has 15-20 marginal flowers (ray-flowers) and is found in Michigan. No specimens have been seen.

3. ARTEMISIA CANADENSIS Michx.

In rocky soil.

Reported from:- Along the Great Lakes (Britton & Brown Ill. Fl., ed. 2); Isle Royale (W. S. Cooper); by various other collectors from counties bordering the Great Lakes. The only specimens seen that approached the description are those collected in Keweenaw Co. by O. A. Farwell and F. J. Hermann. Yet those fall short of the minimum requirements for size of heads and number of marginal flowers.

4. ARTEMISIA BOREALIS Pall. (northern)

Northern Wormwood.

Reported from:- Keweenaw Point, Mich. (Gray's Man., ed. 7). Fl. N. Amer. 34:256. 1916., gives the distribution as "Eastern Siberia and Alaska to Hudson Bay and Greenland". No specimens have been seen.

5. ARTEMISIA ABSINTHIUM L. (classical name for this plant.)

Common Wormwood.

A very common escape from gardens and cultivation.

Throughout. July-Oct. Naturalized from Europe.

Specimens examined:- Kent Co. (C. W. Fallass, 1884); St. Clair Co. (C. K. Dodge, 1893); Huron Co. (C. K. Dodge, 1910); Presque Isle Co. (C. K. Dodge, 1913); Cheboygan Co. (J. H. Ehlers, 1917); Oakland Co. (B. F. Chandler, 1915); Emmet Co. (C. W. Fallass, 1918); Roscommon Co. (H. T. Darlington, 1916); Ingham Co. Co. (B. A. Walpole, 1924); Houghton Co. (F. J. Hermann, 1926); Washtenaw Co. (F. J. Hermann, 1927).

Reported from:- Dickinson Co. (G. H. Coons, 1909); Tuscola Co., Chippewa Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Kent Co. (Emma J. Cole); Flint, Ionia Co., Gratiot Co. (Beal's Catalog); Keweenaw Co. (O. A. Farwell, 1890); Manistee Co. (F. P. Daniels); Midland Co. (M. S. C., 1923); Ontonagon Co. (M. S. C.).

6. *ARTEMISIA ABROTANUM* L. (classical name for this species)
Southernwood.

Rare as an escape from gardens. Adventive from Europe.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1895); Oscoda Co. (C. K. Dodge, 1913).

Reported from:- Wayne Co. (Farwell & Gladewitz, Oct. 26, 1917); Keweenaw Co. (O. A. Farwell, 1890); Alpena Co. (C. K. Dodge).

7. *ARTEMISIA ANNUA* L. (annual)
Annual Wormwood.

Rare. Yards and waste places. Summer. Adventive from Asia.

Specimens examined:- Wayne Co. (O. A. Farwell, 1893); Detroit (C. Billington); Jackson Co. (S. E. Wolff, 1924).

8. *ARTEMISIA BIENNIS* Willd. (biennial)
Wormwood.

Frequent. Waste places. Native to the central and western parts of the U. S. and to western Canada. Now distributed as a weed in southern Canada and northeastern U. S. Aug.-Oct.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1894); Ingham Co. (H. C. Skeels, 1894); Kent Co. (H. C. Skeels, 1895); Berrien Co. (A. E. Beebe, 1910); Arenac Co. (M. J. Reed, 1914); Oakland Co. (C. Billington, 1914); Wayne Co. (C. Billington); Manistee Co. (H. T. Darlington, 1918); Gogebic Co. (H. T. Darlington, 1919); Emmet Co. (J. H. Ehlers, 1921); Washtenaw Co. (S. E. Wolff, 1924).

Reported from:- Tuscola Co., Schoolcraft Co., Chippewa Co., Bay Co. to Mackinac Co. (C. K. Dodge); Magician Lake region (H. S. Pepoon); Montcalm Co. (M. S. C., 1918); Ottawa Co. (M. S. C., 1923).

9. *ARTEMISIA GNAPHALODES* Nutt. (like *Gnaphalium*, the Gudgeon)
Artemisia ludoviciana var. *gnaphalodes* T. & G.
Prairie Mugwort.

Along railroads and in waste places. Rare. Summer.

Specimens examined:- St. Clair Co. (C. K. Dodge, 1899); Oakland Co. (C. Billington); Keweenaw Co. (O. A. Farwell, Sep. 19, 1887);

Reported from:- Detroit (O. A. Farwell, July 21, 1917); Cheboygan Co. (F. C. Gates); Niles (Wheeler & Smith Catalog).

10. *ARTEMISIA STELLARIANA* Bess.
Beach Wormwood.

Rare. An escape. Common wormwood. July-Aug. Naturalized from Asia.

Specimens examined:- Huron Co. (C. A. Davis, 1896); St. Clair Co. (C. K. Dodge, 1904); Wayne Co. (C. Billington, 1917).

Reported from:- Cass Co. (H. S. Pepoon); Bay Co. to Mackinac Co. ("permanent escape", C. K. Dodge).

11. *ARTEMISIA PONTICA* L.
Roman Wormwood.

Rare. An escape from cultivation. Adventive from Europe.
Summer.

Specimens examined:- Mio, Oscoda Co. (C. K. Dodge, Oct. 1913); St. Clair Co. (C. Billington, 1915); Bay Co. (G. W. Bradford, Aug. 31, 1905).

Reported from:- Near Marl Lake ("an escape from cultivation", O. A. Farwell, Aug. 5, 1917).

12. ARTEMISIA VULGARIS L. (common)

Common Mugwort.

Infrequent as an escape from cultivation. Adventive from Europe. July-Sep.

Specimens examined:- Detroit (L. Holzer, 1866); St. Clair Co. (C. K. Dodge, 1892); North Island, Huron Co. (C. K. Dodge, 1908); Luce Co. (C. K. Dodge, 1915); Wayne Co. (C. Billington, 1918); Washtenaw Co. (B. A. Walpole, 1918); Ionia Co. (B. A. Walpole, 1922).

Reported from:- Schoolcraft Co. (C. K. Dodge).

41. TUSSILAGO L. Coltsfoot.

TUSSILAGO FARFARA L. (classical name for this species)
Coltsfoot.

Very rare. In wet soil. Naturalized from Europe. Apr.-June.

No specimens have been seen.

Reported from:- Sault St. Marie (Whitney's Catalog); Macomb Co. (Beal's Catalog); Manistee Co. (M. S. C., 1924).

42. PETASITES (Tourn.) Mill.

PETASITES PALMATUS (Ait.) A. Gray (palmate)
Sweet Coltsfoot.

Apparently confined to the eastern counties of the Lower Peninsula and to the Upper Peninsula. Frequent, often common. A composite flowering in the spring! Apr.-June.

Specimens examined:- Ontonagon Co. (A. E. Foote, 1868); Keweenaw Co. (O. A. Farwell, 1887); Oscoda Co. (1888); St. Clair Co. (C. K. Dodge, 1893); Marquette Co. (B. Barlow, 1901); Alcona Co. (H. T. Darlington, 1918); Schoolcraft Co. (C. K. Dodge, 1916); island near Drummond's Island (Lee A. White, 1918); Mackinac Co. (J. H. Ehlers, 1916); Gogebic Co. (H. T. Darlington, 1920); Cheboygan Co. (J. H. Ehlers, 1926); Emmet Co. (1926); Houghton Co. ("in alder swamp", F. J. Hermann, June 1926).

Reported from:- Chippewa Co., Mackinac Island (1912); Bay Co. to Mackinac Co. (C. K. Dodge); Schoolcraft Co. (W. T. S. Cornell); Isle Royale ("bog forest, common", W. S. Cooper).

43. ERECHTITES Raf.

ERECHTITES HIERACIFOLIA (L.) Raf. (having leaves like Hieracium, the Hawkweed)

Fire-weed.

Common. In thickets, woods and burned areas, usually in rich soil. Often abundant after fires, hence the common name. July-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Centreville, St. Joseph Co. (Mich. State Normal Herb., 1869); Oceana Co. (L. Foote, 1870); Ingham Co. (H. C. Skeels, 1894); Kent Co. (J. Shaddick & H. C. Skeels, 1896); St. Clair Co. (C. K. Dodge, 1896); Marquette Co. (B. Barlow, 1901); Van Buren Co. (H. S. Pepoon, 1905); Allegan Co. (C. H. Kauffman, 1910); Oakland Co. (C. Billington, 1914); Newaygo Co. (Bessey & Darlington, 1916); Washtenaw Co. (C. D. LaRue, 1916); Mackinac Co. (J. H. Ehlers, 1916); Gogebic Co. (H. T. Darlington, 1919); Berrien Co. (C. Billington, 1920); Kalamazoo Co. (S. E. Wolff, 1923).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Dickinson Co. (G. H. Coons, 1909); Muskegon Co. (C. D. McLouth); Charity Islands, Tuscola Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Huron Co. (C. A. Davis); Manistee Co., St. Joseph Co. (F. P. Daniels); Emmet Co. (Fallass & Swift).

44. MESADENIA Raf.

Stem terete, glaucous; lower leaves triangular-kidney-form, palmately veined and angulate-lobed, glaucous beneath.....1. *M. atriplicifolia*.
Stem angled, grooved, not glaucous; lower leaves lance-ovate or oval, 5-7-nerved, entire or repand, not glaucous.....2. *M. tuberosa*.

1. MESADENIA ATRIPLICIFOLIA (L.) Raf. (having leaves like *Atriplex*)

Cacalia atriplicifolia L.

Pale Indian Plantain.

In thickets and woods. Frequent in the southern half of the Lower Peninsula only. Jul.-Sep.

Specimens examined:- Kent Co. (H. C. Skeels, 1895); Jackson Co. (S. H. & D. R. Camp, 1896); Van Buren Co. (H. S. Pepoon, 1905); Allegan Co. (C. H. Kauffman, 1910); Berrien Co. (Dodge & Darlington, 1917); Washtenaw Co. (B. A. Walpole, 1919); Ionia Co. (B. A. Walpole, 1923); Kalamazoo Co. (S. E. Wolff, 1923); St. Joseph Co. (Mich. State Normal Herb.).

Reported from:- Magician Lake region (H. S. Pepoon); Eaton Co. (H. L. Clark); Southern Mich. (Wright's Catalog); Manistee Co. (F. P. Daniels); Battle Creek (W. S. Cooper).

2. MESADENIA TUBEROSA (Nutt.) Britton (bearing tubers)

Cacalia tuberosa Nutt.

Tuberous Indian Plantain.

Rare or local. In wet marshes or low prairies. Southern counties and the "Thumb". June-Aug.

Specimens examined:- Cass Co. (H. S. Pepoon, 1905); Huron Co. (C. K. Dodge, 1909); Cass Co. (C. Billington, 1917).

Reported from:- Magician Lake region ("marshes, common", H. S. Pepoon); Tuscola Co. (C. K. Dodge); Tuscola Co. (C. A. Davis); Bay Co., (Kalamazoo Co., 1828 (Beal's Catalog); Southern Mich. (Wright's Catalog).

45. SYNOSMA Raf.

SYNOSMA SUAVEOLENS (L.) Raf. (sweet-smelling)

Cacalia suaveolens L.

Sweet-scented Indian Plantain.

Very rare. Southern part of the Lower Peninsula. In woods.

Aug.-Oct.

Specimens examined:- Ionia Co. (B. A. Walpole).

Reported from:- Lodi, Washtenaw Co. (Miss Clark, in Winchell's Catalog).

46. SENECIO (Tourn.) L.

Heads discoid.

Short outer tegules black-tipped; lower leaves
oblanceolate, pinnatifid; annual.....1. *S. vulgaris*.

None of the tegules black-tipped; lower leaves
oval to ovate, crenate to sharply dentate;
perennial.....2. *S. pauciflorus*.

Heads radiate.

Lower leaves obovate, occasionally subrotund or
oblong, or, broadly ovate and cordate.

Lower leaves obovate, occasionally subrotund
or oblong, never cordate; stolons when
well developed slender and creeping.....3. *S. obovatus*.

Lower leaves broadly ovate, deeply cordate;
stolons, when present, stout, assurgent.....4. *S. aureus*.

Lower leaves subrotund-ovate to oblong-
oblanceolate, gradually narrowed to the base
and 0.5-2 cm. broad.

Lower leaves subrotund-ovate to oblong-
lanceolate, mostly rounded at the base,
1-2.5 cm. broad; heads 8-12 mm. high.

Stem white-tomentose, rarely glabrate; lower
leaves ovate-oblong to lanceolate, or
somewhat oblanceolate, tomentose, at
least beneath; heads 8-10 mm. high; plants
of dry soil.....5. *S. plattensis*.

Stem glabrous; lower leaves broadly ovate,
glabrous; heads 10-12 mm. high; plants
of moist places.....6. *S. pauciflorus*,

Lower leaves oblong-oblanceolate, gradually
narrowed to the base, 0.5-2 cm. broad;
heads 5-10 mm. high.....7. *S. pauperculus*.

1. SENECIO VULGARIS L. (common)

Common Groundsel.

In waste places. More frequent in the Upper Peninsula. Naturaliz-
ed from Europe. Apr.-Oct.

Specimens examined:- Houghton Co. (O. A. Farwell, 1887); Marquette Co.
(B. Barlow, 1901); Mackinac City (C. K. Dodge, 1914); Gogebic Co. (E. A.
Bessey, 1919).

Reported from:- Wayne Co. (O. A. Farwell); Keweenaw Co., Flint, Macomb Co. (Beal's Catalog).

(*Senecio sylvaticus* L. (growing among trees) has been found by C. A. Davis at Bessemer, Gogebic Co., Aug. 1905. It resembles *S. vulgaris* but lacks the black-tipped tegules of that species. Adventive from Europe.

2. *SENECIO PAUCIFLORUS* Pursh. (few-flowered)

Senecio discoideus (Hook.) Britton

Northern Squaw-weed.

Recorded from the northwestern part of the Upper Peninsula and Isle Royale. In moist soil. June-Aug.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1890).

Reported from:- Keweenaw Peninsula (Robbins, 1863); Marquette Co. (E. J. Hill, July, 1889); Isle Royale (Wheeler).

3. *SENECIO OBOVATUS* Muhl. (inversely egg-shaped; the broad end up)

Round-leaf Squaw-weed.

Rare. In moist soil. Apr.-June. Only a few specimens of this seen were typical and possessed the slender stolons.

Specimens examined:- Washtenaw Co. (B. A. Walpole, 1918); Clinton Co. (S. E. Wolff, 1927); Edison (B. A. Walpole, May 18, 1921).

Reported from:- St. Joseph Co. (F. P. Daniels).

4. *SENECIO AUREUS* L. (golden)

Golden Ragwort.

Common. Throughout the state. In wet meadows and swamps. May-June.

Specimens examined:- Macomb Co. (D. Cooley, 1840); Keweenaw Co. (O. A. Farwell, 1886); Gratiot Co. (C. A. Davis, 1889); Livingston Co. (C. F. Wheeler, 1890); Ingham Co. (H. C. Skeels, 1894); Kent Co. (G. Fyfe & J. Shaddick, 1896); Cass Co. (H. S. Pepoon, 1906); Tuscola Co. (W. J. Musselman, 1814); Alpena Co. (E. A. Bessey, 1918); Oakland Co. (C. Billington, 1914); Washtenaw Co. (B. A. Walpole, 1918); Baraga Co., Gogebic Co. (H. T. Darlington, 1920); Emmet Co. (C. W. Fallass, 1919); Kalamazoo Co. (S. E. Wolff, 1923); Montcalm Co. (Ida^E Fallass & C. W. Fallass, 1926); Houghton Co. (F. J. Hermann, 1926); Chippewa Co. (E. A. Bessey, 1927).

Reported from:- Mackinac Island (C. K. Dodge, 1912); Muskegon Co. (C. D. McLouth); Magician Lake region (H. S. Pepoon); Schoolcraft Co., Bay Co. (C. D. Dodge, 1896); Shiawassee Co. (G. H. Hicks, 1889); Calhoun Co. (C. C. McDermid); Lenawee Co. (F. L. Stearns).

5. *SENECIO PLATTENSIS* Nutt.

Prairie Ragwort.

Frequent. Sandy dry soil in oak openings, dry woods or fields. May-June.

Specimens examined:- Hillsdale Co. (ex. Herb. D. A. Pelton, 1885); Mecosta Co. (C. W. Fallass, 1881); Kalamazoo Co. (R. M. Gibbs, 1877); Clinton Co. (C. F. Wheeler, 1899); Jackson Co. (Wheeler & Longyear, 1898); Kent Co. (G. Fyfe & J. Shaddick, 1895); Macomb Co. (B. F. Chandler, 1917); Washtenaw Co. (B. A. Walpole, 1920); Ionia Co. (B. A. Walpole, 1924); Iosco Co. (W. R. Heim, 1924); Roscommon Co. (Ida E. Fallass & C. W. Fallass, 1926); Crawford Co. (C. F. Wheeler, 1899); Oscoda Co. (M. S. C.

Herb., 1888); Barron Lake, Cass Co. (C. F. Wheeler, 1890); Oceana Co. (D. Cooley, 1840).

Reported from:- Oakland Co. (O. A. Farwell, 1912); Van Buren Co. (H. S. Pepoon, 1906).

6. *SENECIO PAUCIFLORUS* Pursh, var. *FALLAX* Greenman (deceitful)

With the species in the northwestern counties of the Upper Peninsula and Isle Royale.

Specimens examined:- Keweenaw Co. (F. J. Hermann, 1926); Houghton Co. (F. J. Hermann, 1926).

7. *SENECIO PAUPERCULUS* Michx. (poor little)

Senecio balsamitae Muhl.

Frequent. Absent or rare in the southern counties. In dry, mostly sandy soil. May-Jul.

Specimens examined:- Alpena Co., Montmorency Co. (C. F. Wheeler, 1895); Grand Traverse Bay (C. F. Wheeler, 1898); Muskegon Co. (C. F. Wheeler, 1900); Roscommon Co. (E. A. Bessey, 1919); Gogebic Co. (E. A. Bessey, 1920); Baraga Co. (H. T. Darlington, 1920); Mackinac Co. (C. K. Dodge, 1912); Schoolcraft Co. (C. K. Dodge, 1915); Cheboygan Co. (J. H. Ehlers, 1923); Ontonagon Co. (H. T. Darlington, 1922).

Reported from:- Mackinac Island, Bay Co. to Mackinac Co., Tuscola Co., Chippewa Co. (C. K. Dodge); Isle Royale (W. S. Cooper); Manistee Co. (F. P. Daniels); Wayne Co. (O. A. Farwell); Lapeer Co. (M. S. C., 1917); Van Buren Co. (H. S. Pepoon).

47. *ARCTIUM* L. Burdock.

Involucre 2.5 cm. broad or more; inner tegules equaling or exceeding the flowers; petioles solid, deeply furrowed.....1. *A. lappa*.

Involucre 1.2-1.8 cm. broad; inner tegules not exceeding the flowers; petioles hollow, not deeply furrowed.....2. *A. minus*.

1. *ARCTIUM LAPPA* L. (a bur)

Great Burdock.

Occasional. In waste places. Naturalized from Europe. Jul.-Aug.

Recorded in many cases for the Common Burdock.

Specimens examined:- Van Buren Co. (F. C. Gates, Aug. 24, 1906).

2. *ARCTIUM MINUS* Schk. (smaller)

Common Burdock.

Common. Roadsides and waste places everywhere. Jul.-Oct. Naturalized from Europe.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1890); St. Clair Co. (C. K. Dodge, 1892); Kent Co. (Emma J. Cole, 1899); Washtenaw Co. (B. A. Walpole, 1918); Mackinac Co. (C. K. Dodge, 1912); Wayne Co. (C. Billington, 1914); Oakland Co. (C. Billington, 1919); Kalamazoo Co. (S. E. Wolff, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- the various counties of the state.

48. CIRSIUM (Tourn.) Hill

- Leaves strongly decurrent, forming prickly-lobed wings on the stem; ^{tegules}all tipped with spreading prickles.....1. *C. lanceolatum*.
 Leaves not decurrent or scarcely so; inner or all the tegules without prickles.
 Heads numerous, small, 2.5 cm. broad or less; flowers partly dioecious; perennial, with horizontal rootstocks and forming patches.....2. *C. arvense*.
 Heads few, large, 2.5-8 cm. broad; flowers perfect, fertile; perennial or biennial, without horizontal rootstocks, not forming patches.
 Leaves white-woolly on both sides.
 Leaves pinnately-parted, the segments linear, mostly entire; flowers cream-color; plants of the sand dunes.....3. *C. pitcheri*.
 Leaves pinnatifid, the segments triangular or lanceolate; flowers reddish-purple.....4. *C. undulatum*.
 Leaves green above, pubescent or white-woolly beneath.
 Outer tegules prickly-pointed.
 Leaves white-woolly beneath; stems 1-3.8 m. high.
 Leaves spinose-toothed or shallowly lobed..5. *C. altissimum*.
 Leaves obviously pinnatifid, the lobes spinose-toothed.....6. *C. discolor*.
 Leaves hirsute, not white-woolly, beneath; stems 0.3-1 m. high.....7. *C. hillii*.
 Outer tegules acute or mucronate, not prickly-pointed; leaves with loose webby hairs beneath.....8. *C. muticum*.

1. CIRSIUM LANCEOLATUM (L.) Hill (lance-shaped)

Carduus lanceolatus L.

Cnicus lanceolatus Willd.

Common or Bull Thistle.

Common. Throughout the state. In waste places and fields.

Naturalized from Europe. Native also of Asia. Jul.-Nov.

Specimens examined:- Macomb Co. (D. Cooley, 1853); Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1896); Emmet Co. (C. W. Fallass, 1894); Marquette Co. (B. Barlow, 1901); Kent Co. (Emma J. Cole, 1901); Van Buren Co. (H. S. Pepoon, 1905); Washtenaw Co. (C. D. LaRue, 1915); Oakland Co. (C. Billington, 1918); Berrien Co. (C. Billington, 1919); Ontonagon Co. (E. A. Bessey, 1923); Kalamazoo Co. (S. E. Wolff, 1923); Houghton Co. (F. J. Hermann, 1926); Jackson Co. (S. E. Wolff, 1927).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Dickinson Co. (G. H. Coons, 1909); Crawford Co. (W. L. McAtee); Tuscola Co., Chippewa Co., Schoolcraft Co., Bay Co. to Mackinac Co. (C. K. Dodge); Manistee Co., St. Joseph Co. (F. P. Daniels); Huron Co. (C. A. Davis); Gogebic Co., Baraga Co. (H. T. Darlington); Wayne Co. (O. A. Farwell).

2. *CIRSIIUM ARVENSE* (L.) Scop. (of cultivated ground)

Carduus arvensis Robs.

Cnicus arvensis Hoffm.

Canada Thistle.

Common. In fields and waste places, usually most common in the richer and moister parts of any given locality. Persistent because of its long rootstocks. Naturalized from Europe. The common name, therefore, is unfortunate and misleading. June-Sep.

Specimens examined:- Ingham Co. (H. C. Skeels, 1894); St. Clair Co. (C. K. Dodge, 1895); Kent Co. (J. Shaddick & H. C. Skeels, 1896); Cheboygan Co. (F. C. Gates, 1911); Van Buren Co. (H. S. Pepoon, 1905); Wayne Co. (C. Billington, 1914); Washtenaw Co. (B. A. Walpole, 1918); Oakland Co. (C. Billington, 1919); Emmet Co. (J. H. Ehlers, 1920); Kalamazoo Co. (S. A. Wolff, 1923); Houghton Co. (F. J. Hermann, 1926).

Reported from:- Grand Traverse Co. (H. T. Darlington, 1919); Charity Islands, Sanilac Co., Chippewa Co., Schoolcraft Co., Tuscola Co., Bay Co. to Mackinac Co. (C. K. Dodge); Huron Co. (C. A. Davis); Manistee Co., St. Joseph Co. (F. P. Daniels); Gogebic Co., Baraga Co. (H. T. Darlington); Isle Royale (W. S. Cooper); Ionia Co. (M. S. C., 1916).

3. *CIRSIIUM PITCHERI* (Torr.) T. & G.

Carduus pitcheri Porter

Cnicus pitcheri Torr.

Pitcher's Thistle.

Endemic. Confined to the shores of Lake Michigan, Lake Huron and Lake Superior. An interesting thistle because of its aspect and place of growth. June-Aug.

Specimens examined:- Emmet Co. (C. W. Wheeler, 1879); Iosco Co., Oscoda Co. (Beal & Wheeler, 1888); Huron Co. (C. A. Davis, 1896); Ottawa Co. (Mrs. H. B. Fallass, 1895); Leelenaw Co. (C. F. Wheeler, 1898); Muskegon Co. (W. J. Beal, 1898); Antrim Co. (W. S. Cooper, 1902); Benzie Co. (C. A. Davis, 1905); Arenac Co. (C. K. Dodge, 1912); Cheboygan Co. (C. K. Dodge, 1914); Berrien Co. (H. T. Darlington, 1917); Alger Co. (R. Ford, 1921).

Reported from:- Charity Islands, Mackinac Island, Arenac Co. to Mackinac Co., Schoolcraft Co., Chippewa Co. (C. K. Dodge); Manistee Co. (F. P. Daniels).

4. *CIRSIIUM UNDULATUM* (Nutt.) Spreng. (wavy)

Carduus undulatus Nutt.

Cnicus undulatus A. Gray

On plains and along railroads, in dry soil. Rare. Perhaps only native to the upper part of the Lower Peninsula. June-Sep.

Specimens examined:- Mackinac Co. (H. C. Voight, 1896); Washtenaw Co. (B. A. Walpole, 1919).

Reported from:- Drummond's Island (Winchell's Catalog).

5. *CIRSIIUM ALTISSIMUM* (L.) Spreng. (very tall)

Carduus altissimus L.

Cnicus altissimus Willd.

Tall Thistle.

In fields and thickets. Frequent. Apparently confined to the southern half of the Lower Peninsula. Aug.-Sep.

Specimens examined:- Macomb Co. (D. Cooley, 1843); Oceana Co. (D. Cooley, 1844); Ingham Co. (H. C. Skeels, 1894); Berrien Co. (H. T. Darlington, 1917); Washtenaw Co. (B. A. Walpole, 1922).

Reported from:- Magician Lake region (H. S. Pepoon); Ionia Co., Flint, Bay Co. (Beal's Catalog); St. Joseph Co. (F. P. Daniels); Gratiot Co. (M. S. C., 1916); Oakland Co. ("scarce", Farwell & Gladewitz, #8144).

6. *CIRSIIUM DISCOLOR* (Muhl.) Spreng. (of different colors)

Cnicus discolor Muhl.

Carduus discolor Nutt.

In fields and along roadsides. Frequent. Perhaps throughout the state. More common than the preceding. Jul.-Oct.

Specimens examined:- Lenawee Co. (W. J. Beal, 186-); Kent Co. (L. J. Cole, 1895); St. Clair Co. (C. K. Dodge, 1896); Calhoun Co. (Ned Mayo, 1897); Berrien Co. (H. T. Darlington, 1917); Oakland Co. (C. Billington, 1920); Kalamazoo Co. (S. E. Wolff, 1922); Jackson Co. (S. E. Wolff, 1927); Washtenaw Co. (B. A. Walpole, 1922).

Reported from:- Magician Lake region (H. S. Pepoon); Chippewa Co., Schoolcraft Co., Mackinac Island, Bay Co. to Mackinac Co. (C. K. Dodge); Tuscola Co. (C. A. Davis); Wayne Co. (O. A. Farwell); Montcalm Co., Ionia, Flint (Beal's Catalog); St. Joseph Co. (F. P. Daniels); Hillsdale Co. (M. S. C., 1921).

7. *CIRSIIUM HILLII* (Canby) Fernald

Hill's Thistle.

Infrequent. In fields and pastures. June-Jul. Most of the material in the herbaria is inadequate. It all seems to fall under this rather than *C. odoratum* with which it has been confused.

Specimens examined:- Cheboygan Co. (J. H. Ehlers, Aug. 8, 1920, #1175); Muskegon Co. (C. F. Wheeler, 1900); Oscoda Co. (M. S. C. Herb., July 28, 1888); Oakland Co. (D. Cooley, 184-); Jackson Co. (ex. Herb. S. H. & D. R. Camp, 1896); Cass Co. (H. S. Pepoon, 1906).

8. *CIRSIIUM MUTICUM* Michx. (pointless)

Carduus muticus Pers.

Cnicus muticus Pursh

Swamp Thistle.

Common. Throughout. In moist soil and swamps. Jul.-Oct.

Specimens examined:- Oceana Co. (D. Cooley, 1844); Ingham Co. (H. C. Skeels, 1894); Kent Co. (J. Shaddick & H. C. Skeels, 1896); St. Clair Co. (C. K. Dodge, 1896); Keweenaw Co. (O. A. Farwell, 1888); Calhoun Co. (W. J. Beal, 1898); Montcalm Co. (B. Barlow, 1900); Marquette Co. (B. Barlow, 1901); Cass Co. (H. S. Pepoon, 1904); Cheboygan Co. (F. C. Gates, 1911); Ottawa Co. (L. H. Pennington, 1910); Wayne Co. (C. Billington, 1914); Missaukee Co. (E. A. Bessey, 1916); Berrien Co. (H. T. Darlington, 1917); Alpena Co., Oscoda Co., Gogebic Co. (H. T. Darlington, 1918); Oakland Co. (B. A. Walpole, 1920); Kalamazoo Co. (S. E. Wolff, 1923); Emmet Co. (C. W. Fallass, 1923); Houghton Co. (F. J. Hermann, 1926); Chippewa Co. (E. A. Bessey, 1927); Muskegon Co. (C. D. McLouth).

Reported from:- Tuscola Co., Schoolcraft Co., Bay Co. to Mackinac Co.,

Charity Islands (C. K. Dodge); St. Joseph Co. (F. P. Daniels); Sanilac Co. (M. S. C., 1913); Baraga Co. (H. T. Darlington, 1920); Dickinson Co. (G. H. Coons, 1909).

(*Cirsium horridulum* Michx. (somewhat prickly)

Carduus spinosissimus Walt.

Cnicus horridulus Pursh

Yellow Thistle.

Reported in Beal's Catalog from the Upper Peninsula. This is mostly a Coastal Plain species.

49. *CARDUUS* (Vaill.) L.

Heads solitary and nodding at the ends of woolly-

pubescent stems or branches.....1. *C. nutans*.

Heads usually several, crowded at the ends of

spiny-winged branches.....2. *C. crispus*.

1. *CARDUUS NUTANS* L. (nodding)

Plumeless Thistle.

Rare. In waste places. Adventive from Europe. Biennial. Jul.-Oct.

Specimens examined:- Lapeer Co. (C. S. Farrar); Washtenaw Co. (B. A. Walpole, Aug. 1920); Shiawassee Co. (Homer Dennison, 1919); Eaton Co. (P. Fendler, 1924).

Reported from:- Isabella Co., Clinton Co., Clare Co. (M. S. C., 1924).

2. *CARDUUS CRISPUS* L. (curled)

Curled Thistle.

In waste places. Rare. Adventive from Europe. Biennial.

Specimens examined:- Kent Co. (G. Wieland, Aug. 1914); Oakland Co. ("barnyard of J. C. Townsend", C. Billington, 1922).

50. *MARIANA* Hill

MARIANA MARIANA (L.) Hill, the Milk Thistle is sometimes cultivated.

In Beal's Catalog reported "occasional", presumably as an escape. No specimens have been seen. Annual or biennial.

51. *ONOPORDON* (Vaill.) L.

ONOPORDON ACANTHIUM L.

Cotton Thistle.

Rare. In waste places, as an escape. Adventive from Europe.

Biennial. June-Sep.

Specimens examined:- St. Clair Co. (C. K. Dodge, Sep. 1905); Kent Co. (Emma J. Cole, June 1896); Mecosta Co. (W. J. Beal);

Reported from:- Wayne Co. ("escape, infrequent", O. A. Farwell).

52. CENTAUREA L.

Tegules tipped with stout yellow spines.....1. *C. solstitialis*.
Tegules lacerate or pectinate, not spiny.

Leaves simple, linear or lanceolate, entire.....2. *C. cyanus*.

Leaves, all but the upper, pinnatifid into linear
segments.....3. *C. maculosa*.

1. CENTAUREA SOLSTITIALIS L. (mid-summer)

Barnaby's Thistle.

Frequent. Annual. Introduced from Europe with various legumes.

Perhaps not persisting. Jul.-Nov.

Specimens examined:- Eaton Co. (G. E. Field, Oct. 1903); Kent Co. (J. B. Field, Oct. 1908); Mason Co. (F. Morell, July 1908); Alcona Co. (J. VanBuskirk, Sep. 1909); Ionia Co. (V. W. Clark, July 1909); Wayne Co. (S. E. Campbell, Nov. 1910); Wexford Co. (R. Nichols).

Reported from:- Newaygo Co. (M. S. C., 1913); Hillsdale Co. (M. S. C., 1921); Cass Co., Van Buren Co., Oakland Co. (M. S. C., 1922); Genesee Co. (M. S. C., 1927);

2. CENTAUREA CYANUS L. (classical name for the species)

Blue-bottle. Bachelor's-button.

Annual. Escaped from gardens. Rare. Seldom persisting. Jul.-Sep.

Specimens examined:- Keweenaw Co. (O. A. Farwell, 1890); Ingham Co. (M. S. C. Herb., 1905); Washtenaw Co. (B. A. Walpole, 1919); Kalamazoo Co. (S. E. Wolff, 1922).

Reported from:- Van Buren Co. (M. S. C., 1913); Wayne Co. (Farwell & Gladewitz, 1925).

3. CENTAUREA MACULOSA Lam. (spotted)

Spotted Knapweed.

Infrequent. Annual or Biennial. In waste places. Adventive from Europe. Jul.-Oct.

Specimens examined:- Washtenaw Co. (C. Billington, 1918); Washtenaw Co. (B. A. Walpole, July 1918); Clare Co. (B. A. Walpole, Oct. 1924).

Reported from:- Newaygo Co. (M. S. C., 1911); Montcalm Co. (M. S. C., 1913); Menominee Co., Osceola Co. (M. S. C., 1917); Oakland Co. (Farwell & Gladewitz, Sep. 12, 1917); Mecosta Co. (M. S. C., 1922).

53. CNICUS (Tourn.) L.

CNICUS BENEDICTUS L., Blessed Thistle, is reported from Michigan in Britton & Brown Ill. Fl., ed. 2. Annual. Adventive from Southern Europe.

54. ECHINOPS L.

ECHINOPS SPHAEROCEPHALUS L. (round-headed)

Globe Thistle.

An occasional escape. Perennial. Adventive from Europe. Aug.-Oct.

Specimens examined:- Kent Co. (J. Shaddick & H. C. Skeels, Aug. 1896).

Reported from:- Cass Co. (O. A. Farwell).