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WITH A NOTE ON THE ORIGIN OF  
THE GENERIC NAME

BY

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THE TAXONOMY OF POISON IVY  
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THE GENERIC NAME

JAMES B. McNAIR

During a chemical investigation of *Rhus*,<sup>1</sup> the writer became interested in the geographical distribution of "poison ivy" (*Rhus Toxicodendron* L.). The common name applies to several species. On closer scrutiny it soon became evident that many of the new species which have been proposed during recent years were synonymous. Consequently an investigation of the taxonomy of the group seemed desirable.

For this study, material was borrowed from the United States National Herbarium, Washington, D.C. (U. S.); the Academy of Natural Sciences, Philadelphia, Pennsylvania (A.N.S.); and the Rocky Mountain Herbarium, Laramie, Wyoming (R.Mt.). Single specimens were borrowed from the Gray Herbarium, Cambridge, Massachusetts (G.H.) and the Herbarium of the Geological Survey of Canada, Ottawa, Canada (Can.). In the citation of specimens, the abbreviations indicated have been used. Specimens in the Herbarium of the Field Museum are noted by the letter F. The writer wishes to express his appreciation for these loans to W. R. Maxon, F. W. Pennell, Aven Nelson, B. L. Robinson, and M. O. Malte. For assistance with the taxonomy and form of the paper the writer is indebted to Mr. J. Francis Macbride, and to Dr. B. E. Dahlgren, of the Field Museum for criticism of the manuscript and suggestions.

ORIGIN OF THE GENERIC NAME

The common English name, "sumach," is similar to the ancient Arabian "sommaq" and the Byzantian σουμάκι,<sup>2</sup> from which it is probably derived. The botanical name for the genus *Rhus* has a more obscure origin. Miller<sup>3</sup> states that the genus name *Rhus*, as used by him, is

<sup>1</sup>McNair, James B. *Rhus Dermatitis, Its Pathology and Chemotherapy*. Chicago: University of Chicago Press, 1923.

<sup>2</sup>Hehn, V. *Kulturpflanzen u. Haustiere*, ed. 7. Berlin, 1902.

<sup>3</sup>Miller, Phillip. *The Gardener's and Botanist's Dictionary*. Ed. ix, Vol. 2, "Rhus," 1804.

that of Pliny. Pliny (A.D. 23-79)<sup>1</sup> says that *rhus* is from the Greek name for these trees, *ῥοῦς*, and that *ῥοῦς* has no Latin equivalent. The word *ῥοῦς* is also used by Dioscorides as a name for these plants and together with the ablative *rorē* or a corrupted form *roris* is employed by various other ancient writers on medicine and animal husbandry.<sup>2-6</sup>

Some 350 years before Pliny, Theophrastus<sup>7</sup> used the word *ῥοῦς* in describing sumachs, and in the sixth century B.C. the word is found to have been used similarly by Solon, the Athenian.<sup>8</sup>

When one investigates the etymology of the word *ῥοῦς*, a great difference of opinion is encountered as to its possible derivation and meaning. Miller<sup>9</sup> gives as a possible derivation its contraction from *ῥόος*, and that from the Greek verb *ῥέω* "to flow," because certain products of the plant were formerly used to check hemorrhages. Boehmer<sup>10</sup> suggests that the name is derived from the red color of the berries, from the word *ῥόος*, Latin *rufus* (red), or from *ἐρυθρόν*, Latin *rubrum* (red). Paxton<sup>11</sup> gives as a possible origin the Celtic word "rhudd," or red, from the prevailing color of the autumn foliage, but the Celtic tribes were probably too far north to have influenced the derivation of the word *rhus*, as the plants mentioned by Theophrastus and Pliny were native to Asia Minor. Since Pliny says the word *rhus* or *ros* has no Latin equivalent, it is thus likely that its origin is to be found in Greek or in some kindred language of Asia Minor.

#### ORIGIN OF THE GENERIC NAME AS APPLIED TO AMERICAN POISON IVY

The first specimen of the poison ivy group to be classified by botanists was that of Cornutus, which, in 1635,<sup>12</sup> he called *Edera trifolia canadensis*.

<sup>1</sup> Pliny, Caius Secundus. Natural History. English transl. by John Bostock and H. T. Riley. 3: 179. London, 1855.

<sup>2</sup> Dioscorides. Pedanos Anazarbeus Opera quae extant omnia, p. 21. Frankfurt, 1498.

<sup>3</sup> Taurus, Palladius Rutillius. Martius Mensis or Liber xi.15.1 A.D. 350.

<sup>4</sup> Columella, Junius Moderatus. A.D. 50.

<sup>5</sup> Largus, Scribonius. Compositiones Medicamentorum, p. 152. A.D. 50.

<sup>6</sup> Celsus, Aulus Cornelius. Medicinæ libri octo, 6.11. A.D. 50.

<sup>7</sup> Theophrastus. Enquiry into plants. English transl. by Sir Arthur Hort. 1: 269. New York, 1916.

<sup>8</sup> Photius, Patriarch of Constantinople. Φωτίου τοῦ πατριάρχου Λέξεων συναγωγὴ. Ed. by P. P. Dobree. 2: 491, l. 21. London, 1822.

<sup>9</sup> *Loc. cit.*

<sup>10</sup> Boehmer, Georg Rudolf. Lexicon rei herbariae tripartitum. Lipsiae, 1802.

<sup>11</sup> Paxton, J. Botanical Dictionary. Rev. ed., p. 482, 1868.

<sup>12</sup> Cornutus, Jacob. Plantarum Canadensis, etc., pp. 96-98. Paris, 1635.



In 1719<sup>1</sup> Tournefort renamed this plant *Toxicodendron triphyllon* and at the same time established two genera: *Rhus*, with unequally pinnate leaves and a villose fruit with a globular nucleus, and *Toxicodendron*, with ternate leaves, a striated fruit, and compressed nucleus.

Linnaeus, in 1753,<sup>2</sup> reduced *Toxicodendron* to *Rhus*.

Miller, in 1804,<sup>3</sup> again divided the genus into *Rhus* and *Toxicodendron*, describing the former genus as having only hermaphrodite flowers and the latter dioecious.

Several modern botanists, including Kuntze,<sup>4</sup> Greene,<sup>5</sup> and Britton and Brown,<sup>6</sup> have accepted Miller's segregation but not the characters upon which it was based. For their division Britton and Brown have the following key:

Fruit densely pubescent, its stems smooth.

Flowers in dense terminal panicles, appearing after the leaves

..... *Rhus*

Fruit glabrous, or sparingly pubescent, its stones striate

..... *Toxicodendron*

From facts pointed out later in this paper, it is evident that the division of the genus on any of the foregoing grounds of leaf, flower, fruit, and seed structure will no longer hold. The genus cannot be divided, giving to *Toxicodendron* the 3-foliolate *Rhus*, as *R. Vernix* L., a poisonous species, is 7-13 foliate; nor would *Toxicodendron* include all those with dioecious flowers; furthermore one of the *Toxicodendron* species, *R. quercifolia* (Michx.) Steud., has densely pubescent fruit and a smooth stone.

#### KEY TO SPECIES

Seeds smooth; fruit usually distinctly papillose or pubescent; ♂ petals 2-3 x 1; leaflets with 3-7 regular lobes. .... 1. *R. quercifolia*

Seeds roughened; fruit usually smooth; ♂ petals 3-4 x 1-2; leaflets various, if lobed, irregularly.

Leaflets obtuse or rounded at apex, entire, crenate or bluntly lobed; Pacific Coast species. .... 2. *R. diversiloba*

Leaflets acute, sometimes abruptly so, entire or serrate.

Seeds regular in outline, at least not definitely pinched in at the sides; distribution general, except California

..... 3. *R. Toxicodendron*

Seeds irregular in outline, rounded-cuneiform, definitely pinched in at the sides; Lower California

..... 4. *R. divaricata*

<sup>1</sup> Tournefort, Joseph Pitton. *Institutiones Rei Herbariae*. 1: 610-11. Paris, 1700.

<sup>2</sup> Linnaeus, Carolus. *Species Plantarum*. 1: 266. 1753.

<sup>3</sup> Miller, Phillip. *Loc. cit.*

<sup>4</sup> Kuntze, Otto. *Revisio Generum Plantarum*. Part 1, pp. 153-54. Leipzig, 1891.

<sup>5</sup> Greene, Edward Lee. *Leaflets of Botanical Observation and Criticism*. 1: 114-44. Washington, D.C., 1903-6.

<sup>6</sup> Britton, Nathaniel Lord, and Brown, Addison. *An Illustrated Flora of the Northern United States, etc.* 2: 484. New York, 1913.

1. *Rhus quercifolia* (Michx.) Steud., Nom. Bot. ed. 1: 690 (1821)

*R. Toxicodendron* L., var. *quercifolium* Michx., Fl. Bor.-Am. 1: 183 (1803).

*Toxicodendron compactum* Greene, Leaflets, 1: 126 (1905).

*T. monticola* Greene, loc. cit. 126.

*T. quercifolium* Greene, loc. cit. 127.

Erect, 3–5 dm. high; leaflets broadly rhombic-ovate, conspicuously 3–7 lobed, permanently somewhat pubescent beneath (or rarely glabrous at maturity), rather firm in texture and somewhat veiny, 4–10.5 cm. long and .06–.22 mm. thick<sup>1</sup> (between veins); petals on male flowers 2–3 mm. long and 1 mm. wide; fruit 4–5 mm. in diameter, at first pubescent, in maturity papillose or pubescent, or less frequently glabrous; seeds smooth, 3.5–4.7 mm. long and 1.91–2.57 mm. thick (caliper measurement). April–May.

DISTRIBUTION: Woods and barrens, New Jersey, southward and westward to Texas.

SPECIMENS EXAMINED: ALABAMA: Auburn, 1898, *F. S. Earle and C. F. Baker* (R.Mt. 16714; F. 170945). DELAWARE: Laurel, 1874, *A. Commons* (U.S. 394275); Laurel, 1908, *C. S. Williamson 1* (A.N.S.). FLORIDA: Levy Co., 1898, *A. S. Hitchcock* (F. 232712); Suwanee Co., 1898, *A. S. Hitchcock* (F. 232410). GEORGIA: Lookout Mt., 1898, *A. Ruth* (U.S. 345540); Taylor's Ridge, 1900, *P. Wilson* (U.S. 384663). LOUISIANA: Alexandria, *J. Hale* (A.N.S.). MARYLAND: Salisbury, 1878, *Chickering* (U.S. 43273). NEW JERSEY: Millville, 1909, *B. Long* (A.N.S.). NORTH CAROLINA: Wilmington, 1885, *G. McCarthy* (U.S. 19859). SOUTH CAROLINA: Columbia, 1912, *E. B. Bartram* (A.N.S. 551397); Manning, 1914, *W. Stone 353* (A.N.S. 554265). VIRGINIA: Woodlawn, 1899, *Wm. Hunter* (U.S. 364962).

In New Jersey,<sup>2</sup> it is found in sandy ground in the lower middle district and Cape May peninsula, spreading into the pine barrens as a rare straggler. In Alabama,<sup>3</sup> it occurs throughout the state in dry,

<sup>1</sup> The relative thickness of leaves having been employed as a character of specific importance in *Rhus*, measurements seemed necessary. Those given in this paper were made by a micrometer screw caliper (No. 2342 Catalogue "C," Central Scientific Co., Chicago, made by L. S. Starrett Co., Athol, Massachusetts). This caliper is graduated to read to 0.01 mm. It is provided with a friction head so that all measurements are made with the same pressure.

<sup>2</sup> Stone, Witmer. The Plants of Southern New Jersey with Special Reference to the Flora of the Pine Barrens. In Annual Report New Jersey State Museum, pp. 536–38. 1911.

<sup>3</sup> Mohr, Charles. Plant Life of Alabama. Contributions from the U. S. National Herbarium. 6: 601. 1901.

sterile soil, barren hillsides, and pine barrens. In Mississippi,<sup>1</sup> it has been reported from sandy upland soil in Tishomingo Co.; Oxford; Jackson; Hattiesburg; Montrose.

Linnaeus in 1753, in his summing up of the previous plants of the genus, does not mention any with oak like leaves. Apparently, it is not until 1762 that there is any reference to such a plant, when its existence was noted by Gronovius.<sup>2</sup> It remained for Michaux,<sup>3</sup> however, in 1803, to give the plant botanical recognition.

On the whole, the species exhibits its essential characteristics with remarkable uniformity. Three mature plants, however, from Georgia, North Carolina, and Texas have glabrous leaves. Also, in a very few instances, specimens were noted with seeds that showed a tendency toward the tubercled character of those of *R. Toxicodendron*. These may be hybrids.

2. *Rhus diversiloba* T. & G. Fl. N. Amer. 1: 218 (1838)

*Rhus lobata* Hooker, Fl. Bor.-Am. 1: 127 (1831).

*Toxicodendron diversilobum* Greene, Leaflets 1: 119 (1905).

*T. coriaceum* Greene, loc. cit. 120.

*T. comarophyllum* Greene, loc. cit. 120.

*T. isophyllum* Greene, loc. cit. 121.

*T. oxycarpum* Greene, loc. cit. 121.

*T. vacicarum* Greene, loc. cit. 122.

Suberect and bushy, scrambling over fences, walls, etc., or in woods, climbing by rootlets to considerable heights, sparingly pubescent or glabrate, leaves pinnately 3—(rarely 5)—foliolate; leaflets very obtuse, entire, crenulate, or irregularly obtusely lobed, the incisions acute; paler and with some persistent or tardily deciduous pubescence beneath; panicles axillary, racemose; petals of female flowers 2–3 mm. long and 1–1.5 mm. wide, of male flowers 3–4 mm. long and 1–1.5 mm. wide; fruit whitish or cream-colored, subglobose, glabrous or nearly so, 4–7 mm. in diameter, sometimes sulcate in age; seeds 4–5.7 mm. long and 1.84–2.55 thick (caliper measurements); flattened and more or less irregularly roughened with knoblike protuberances. According to herbarium specimens, the plant flowers in Santa Catalina Island in February and March; in California, from April to June; and in Oregon and Washington, from April to August.

<sup>1</sup> Lowe, E. N. Plants of Mississippi. Mississippi State Geol. Survey Bulletin No. 17, p. 188. 1921.

<sup>2</sup> Gronovius, John Frederick. Flora Virginica, pp. 45–46. Lugduni Batavorum, 1762.

<sup>3</sup> Michaux, Andreas. Flora Boreali-Americana. 1: 183. Paris, 1803 (Anno xi).

DISTRIBUTION: Borders of woods, etc., Washington, Oregon, and California.

SPECIMENS EXAMINED: CALIFORNIA: Big Chico Creek, 1914, A. A. Heller 11211 (F. 426609); Calaveras Co. 1887, B. H. Smith (A.N.S.); Chico, 1916, A. A. Heller 12321 (F. 460347); Little Chico Creek, 1896, Mrs. R. M. Austin 780 (U.S. 285227; 286258); Los Buillos Hills, 1906, C. S. Williamson (A.N.S.); Los Gatos, 1904, A. A. Heller 7327 (A.N.S. 510379; F. 215988); Los Gatos, 1889, B. F. Leeds (F. 403353); Mendocino, 1898, H. E. Brown 750 (F. 412997); Mt. Lowe, 1901, C. S. Williamson (A.N.S.); Oroville, 1913, A. A. Heller 10787 (A.N.S. 558128; F. 411335); Salinas Valley, 1880, G. R. Vasey 86 (U.S. 19804); San Jacinto, 1898, J. B. Leiberger (U.S. 342019); Santa Barbara, 1902, A. D. E. Elmer 3940 (F. 235586); Santa Catalina Island, 1922, E. C. Knopf 485 (F. 516143); 1920, C. F. Millsbaugh 4716, 4734 (F. 496253; 496272); 1920, L. W. Nuttall 622 (F. 497126; 497127; 493350); 1912, H. H. Smith 5069 (F. 389415); Santa Cruz, 1884, J. Ball, (U. S. 292229); Saratoga Springs, 1888 (F. 403262); Sierra Valley, J. G. Lemmon 79 (F. 151861); Tighes, San Diego Co., 1875, E. Palmer 45 (F. 302931); 1878, E. Palmer (U.S. 19802). OREGON: Bridal Veil, Multnomah Co., 1910, H. H. Smith 3117 (F. 295650); The Dalles, 1906, J. Lunell (R.Mt. 56238); Hood River, 1898, T. E. Savage et al. (F. 92203); Multnomah Co., 1903, E. P. Sheldon S. 12087 (F. 217012); Portland, 1886, Drake and Dickson (F. 253592); 1890 (F. 253991); 1884, L. F. Henderson 176 (A.N.S. 549008); Salem, 1871, E. Hall (F. 455143); 1921, J. C. Nelson 3837 (A.N.S. 592684). WASHINGTON: Mercer Island, Seattle, 1895 (F. 366941); W. Klickitat Co., May 6–July, 1885, W. N. Suksdorf (F. 155984; 255875); 1885, W. N. Suksdorf (U.S. 19803).

Clavigero (1798) in his "Historia de la California" mentioned this plant under the name of "hiedra maligna" and among the Mexicans of today in California it is still known as "hiedra."

The plant was given botanical individuality when Hooker in 1831<sup>1</sup> called it *R. lobata* after examining a specimen obtained by Douglas at Fort Vancouver on the Columbia River.

Hooker and Arnott in 1832<sup>2</sup> considered the specimens obtained by Captain Beechey at San Francisco and Monterey, California, as similar to the more northern specimen. Perhaps the most marked character of this plant, compared with *R. Toxicodendron* L. as pointed out by Hooker, is its ovate and obtuse leaflets.

<sup>1</sup> Hooker, William Jackson. *Flora Boreali-Americana*. 1: 127. London, 1831.

<sup>2</sup> Hooker, W. J., and Arnott, G. A. W. *The Botany of Captain Beechey's Voyage*. Part III: 137. London, 1832.

In 1839, Torrey and Gray<sup>1</sup> noticed that the name *R. lobata* had been used by Poiret in 1817.<sup>2</sup> As Poiret used the name for a species of *Rhus* entirely different from the plant of Hooker, Torrey and Gray renamed the plant *R. diversiloba*.

After examining many plants in herbaria and in the field, I am unable to substantiate the observation of Nuttall<sup>3</sup> that the female plant has "almost entire or slightly lobed" leaflets, while the male "has rather deeply lobed leaflets." There seems to be no apparent difference between the sexes in this respect.

Like *R. Toxicodendron* L., it may have leaflets with an entire or crenate (or crenately lobed) margin. Entire leaflets and crenate leaflets may occur either on the same plant or on different plants. It also exhibits, when in good soil, the same tendency to climb trees, etc., by aerial rootlets, or it may grow as a shrub, and yet no one has made for it a variety "*radicans*," as was done for *R. Toxicodendron* L.

2a. *Rhus diversiloba* T. & G., forma *radicans*, f. nov.

*Toxicodendron dryophyllum* Greene, Leaflets, 1: 121 (1905).

SPECIMENS EXAMINED: CALIFORNIA: Little Chico Creek, Butte Co., 1896, Mrs. R. M. Austin 780 (U.S. 285287); Santa Catalina Island, "Extensively twining and rooting. Quite different habit from shrub," Millspaugh 4734 (F. 496272).

Few collections of this form have been made, but from personal observation it may be said that it is at least as common throughout the range of the shrub-form of *Rhus diversiloba* as the analogous forma *radicans* in the range of *Rhus Toxicodendron*. Although this climbing form of both species is probably an ecological or vegetative condition correlated with the vitality of the plant, taxonomic recognition as a form may be desirable.

3. *Rhus toxicodendron* L., Sp. Pl. 1: 266 (1753)

*R. Blodgettii* Kearney, Bull. Torr. Bot. Club 21: 486 (1894).

*R. littoralis* Mearns, Proc. Biol. Soc. Wash. 15: 148 (1902).

*R. Toxicodendron Rydbergii* Garrett, Spring Fl. Wasatch Reg. ed. 3: 69 (1917).

*R. Toxicodendron* var. *microcarpa* Michx., Fl. Bor.-Am. 1: 183 (1803).

*R. microcarpa* Steud., Nom. Bot. ed. 2: 452 (1840).

*Toxicodendron divaricatum* Greene, Leaflets 1: 122 (1905).

<sup>1</sup> Torrey, John, and Gray, Asa. A Flora of North America. 1: 218. New York, 1838.

<sup>2</sup> Poiret, J. L. M. Dictionnaire de Botanique. Supplement 5: 264. Paris, 1817.

<sup>3</sup> In Torrey and Gray. *Loc. cit.*

- T. arizonicum* Greene, *loc. cit.* 1: 123.  
*T. aboriginum* Greene, *loc. cit.* 1: 125.  
*T. rhomboideum* Greene, *loc. cit.* 1: 125.  
*T. rufescens* Greene, *loc. cit.* 2: 46 (1910).  
*T. Rydbergii* Greene, *loc. cit.* 1: 117 (1905).  
*T. Toxicodendron* Britton, Britton and Brown, Ill. Fl. ed. 2, 2: 484 (1913).  
*Rhus rhomboidea* Small, Fl. Southeastern U. S. 727, 1334 (1903).  
*R. Toxicodendron* Small, *loc. cit.*  
*R. Rydbergii* Small, Mem. N. Y. Bot. Gard. 1: 268 (1900).  
*Toxicodendron Negundo* Greene, *loc. cit.* 1: 117.  
*T. longipes* Greene, *loc. cit.* 1: 118.  
*T. hesperium* Greene, *loc. cit.* 1: 118.  
*T. lobadioides* Greene, *loc. cit.* 1: 119.  
*T. pumilum* Greene, *loc. cit.* 1: 124.  
*T. punctatum* Greene, *loc. cit.* 1: 125.  
*T. macrocarpum* Greene, *loc. cit.* 1: 117.  
*T. desertorum* Lunell, Am. Mid. Nat. 2: 185 (1912).  
*T. Fothergilloides* Lunell, *loc. cit.* 186.

Erect or suberect and bushy, or scrambling over fences, walls, etc., or in woods even climbing by rootlets to considerable heights, sparingly pubescent or glabrate; leaflets pinnately 3-foliolate, ovate to rhombic, mostly acute, entire, serrate or irregularly and coarsely few-toothed, paler and with some persistent or tardily deciduous pubescence beneath, especially along the veins; length of terminal leaflet 3.7–19 cm.; panicles axillary; petals of female flower 2 mm. long, 1 mm. wide; of male 3–4 mm. long, 1–2 mm. wide; fruit whitish or cream-colored, subglobose, normally glabrous or nearly so, sometimes pubescent when young (rarely persistent pubescence), 3–6 mm. in diameter, in age sometimes sulcate; seeds roughened similarly to those of *R. diversiloba*, 3–5 mm. long, 1.74–2.49 mm. thick (caliper measurements). According to herbarium specimens, it flowers in Mexico in February and March (in one locality June); in Florida and the Bahamas, February and March; in Texas, April; in Arizona, May to July; in Maine and Nova Scotia, July; in localities north and west of Virginia, May and June.

DISTRIBUTION: Abundant in hedgerows, thickets, and woods in Canada, United States, and Mexico between 15° and 50° north latitude except California.

*Rhus Toxicodendron* having leaves with serrate margins

SPECIMENS EXAMINED: BAHAMA ISLANDS: Andros, 1910, *J. K. Small* and *J. J. Carter 8850* (F. 283834).

CANADA: ALBERTA: Rosedale, 1915, *M. E. Moodie 1215* (F. 439452). NEW BRUNSWICK: Woodstock, 1916, *Fernald and Long 14016* (A.N.S. 576285). NOVA SCOTIA: Bridgewater, 1921, *Fernald and Long* (A.N.S. 587814). PORT BEVIS: 1920, *Fernald and Long 21792* (A.N.S. 588250). ONTARIO: Newburgh, 1896, *W. R. Baker* (F. 85618).

MEXICO: VICTORIA: 1907, *E. Palmer* 138165; 228 (F. 217477; 217506; 217578).

UNITED STATES: ARIZONA: Flagstaff, 1898, *D. T. Macdougall* 28 (F. 697784); Flagstaff, 1898, *D. T. Macdougall* (U.S. 334125); Fort Apache, 1901, *P. S. Mayerhoff* 47 (F. 113386); Grand Canyon, *C. F. Millspaugh* 122 (F. 69772); Willow Spring, 1874, *J. T. Rothrock* 254 (F. 303933). COLORADO: Boulder, 1906, *W. W. Robbins* (R.Mt. 56840); Boulder, 1902, *F. Tweedy* 4946 (R.Mt. 42996); Denver, 1891, *A. Eastwood* (F. 82260). FLORIDA: Marco, 1898, *A. S. Hitchcock* (F. 232095). GEORGIA: Bainbridge, 1895, *J. K. Small* (F. 180475). ILLINOIS: Edgebrook, 1906, *F. C. Gates* 1517 (F. 458944; 159487); Lake Bluff, 1881, *M. E. Hutchinson* (F. 101002); Leyden, 1905, *F. C. Gates* 745 (F. 458666); Liana, 1916, *F. C. Gates* 10016 (F. 472756); Romeo, 1898, *L. M. Umbush* (F. 94764); Springfield, 1861 (F. 13974); Starved Rock, 1909, *J. M. Greenman et al.* 66 (F. 248726); Waukegan, 1908, *F. C. Gates* 2506; 2805 (F. 344721; 344780); Winnebago Co., 1859 (F. 13975; 13976). INDIANA: Hanover, 1876, *J. M. Coulter* (F. 363331); Whiting, 1899, *O. E. Lansing, Jr.* (F. 68011). IOWA: Johnson Co., 1895, *T. J. Fitzpatrick* (F. 123607). KANSAS: Riley Co., 1895, *J. B. Norton* (U.S. 352742); 1896 (U.S. 352743); Riley Co., 1896, *J. B. Norton* 73a (R.Mt. 18888); Syracuse, 1893, *C. H. Thompson* (U.S. 265734). LOUISIANA: Alexandria, 1899, *C. R. Ball* 429 (F. 93465). MAINE: Fairfield, 1916, *Fernald and Long* 14017; 14018 (A.N.S. 576286; 578022). MARYLAND: Savage Sta., 1905, *C. S. Williamson* (A.N.S. 524661). MICHIGAN: Hamlin Lake, 1910, *R. W. Chaney* 210 (F. 296953). MONTANA: Ravalli, 1908, *Mrs. J. Clemens* (F. 345138). NEBRASKA: Gage Co., *W. C. Knight* (R.Mt. 172). NEW JERSEY: Bennett, 1910, *B. Long* 5170 (A.N.S.); Folsom, 1910, *B. Long* 4299 (A.N.S.). NEW MEXICO: Black Range, *O. B. Metcalfe* 1088 (U.S. 498281); Kingston, 1904, *O. B. Metcalfe* 1088 (F. 187484); Magdalena Mts., 1910, *J. Herrick and R. Herrick* 70 (F. 292657). NEW YORK: Chemung Co., 1896, *T. F. Lucy* 7793 (F. 3551); Chemung Co., 1896, *T. F. Lucy* (F. 140325; R.Mt. 21947); Glenwood Ravine, 1888, *C. F. Millspaugh* (F. 18506); Troy, 1834 (F. 476882). NORTH CAROLINA: Tryon, 1918, *C. F. Millspaugh* 4060 (F. 479441). NORTH DAKOTA: Grand Forks, 1894, *C. A. Egebreton* 148 (F. 352080). OKLAHOMA: Woods Co., 1900, *P. J. White* (R.Mt. 26792). OREGON: Deshutes River, 1885, *T. Howell* (F. 150943). PENNSYLVANIA: Mercersburg, 1845 (A.N.S.); Nottingham Barrens, 1914, *F. W. Pennell* 1558 (A.N.S.); Perkiomen, 1892, *J. B. Brinton* (A.N.S.); Philadelphia, 1921, *R. R. Dreisbach* (F. 531925); Westmoreland, 1877, *P. E. Pierron* (F. 154294). SOUTH DAKOTA: S. A. Skinner (R.Mt. 61824); Ashcroft, 1910, *S. S. Visher* (R.Mt. 69869); Bald Hills, 1910, *J. Murdoch, Jr.*

4092 (F. 471322); Deadwood, 1913, *W. P. Carr* 83 (F. 468198); Edgemont, 1911, *S. S. Visher* 2569 (F. 386301); Fall River Co., 1911, *S. S. Visher* 2569 (R.Mt. 76332); Harding Co., 1910, *S. S. Visher* 244 (F. 385898); Piedmont, 1895, *A. D. Pratt* (F. 140405; R.Mt. 9235). TEXAS: Hempstead, 1872, *E. Hall* 78 (F. 453952); Kerrville, 1894, *A. A. Heller* 1670 (F. 17075); Tannart Co., 1920, *A. Ruth* 941 (F. 507859). UTAH: 1875, *L. F. Ward* 212 (F. 106360); City Creek Canyon, 1880' *M. E. Jones* 1932 (F. 252602; 475769); Glenwood, 1875, *L. F. Ward* 212 (U.S. 153641). VERMONT: Charlotte, 1879, *F. H. Hosford* (F. 354-348). VIRGINIA: (opposite Georgetown, D.C.), *A. Schott* (F. 44175); Great Falls, 1909, *C. S. Williamson* (A.N.S.). WISCONSIN: Elkhart Lake, 1884, *J. H. Schuette* (F. 351000); Green Bay, 1906, *J. H. Schuette* (F. 378276); Milwaukee, *I. A. Lapham* (A.N.S.); Richland Center, 1912, *O. E. Lansing, Jr.* 3408 (F. 323983). WYOMING: Freezeout Hills, 1898, *E. Nelson* (R.Mt. 12331); Hartville, 1894, *A. Nelson* (R.Mt. 3733); Norwood Hill, 1912, *E. P. Walker* 498 (R.Mt. 75747); Pole Creek, 1894, *A. Nelson* (R.Mt. 3958); Upper Goose Creek Ditch, 1909, *V. Willets* 188 (R.Mt. 68884).

*Rhus Toxicodendron* having leaves with entire margins

SPECIMENS EXAMINED: BERMUDA: Boaz Island, 1912, *S. Brown* 1005 (A.N.S. 556483); Paget Marsh, 1905, *S. Brown* (A.N.S. 511291); Tuckers Town, 1908, *S. Brown* 499 (A.N.S. 534730).

GREAT BAHAMA: 1905, *L. J. K. Brace* 3570 (F. 184239); 1905, *Britton* 2446 (F. 173562).

CANADA: NOVA SCOTIA: East Bridgewater, 1910, *J. Macoun* 81289 (F. 295036); East Jordan, 1921, *Fernald and Long* 24095 (A.N.S. 589438); Yarmouth, 1920, *Pease and Long* 21785 (A.N.S. 588259).

MEXICO: Cuyameralis de Cuicatlan, 1909, *Conzatti* 2409 (F. 246942); Morelia, 1909, *T. Maria* 10 (F. 387369); San Luis Potosi, 1878, *Parry and Palmer* 124 (A.N.S.); Sierra del Pajarito, 1855, *A. Schott* (F. 42195).

JAPAN: Island of Jesso, 1861, *Albrecht* (F. 53316).

UNITED STATES: ARIZONA: Fort Huachuca, 1890, *Palmer* 453a (U.S. 19847); Lowell, 1884, *W. F. Parish* 217 (F. 152917); Santa Catalina Mts., 1894, *J. W. Toumey* (U.S. 441725; 619140; 664167). DELAWARE: Ruthby, 1897, *A. Commons* (A.N.S. 541741). DISTRICT OF COLUMBIA: Washington, 1893, *L. L. J. Boettcher* 250 (F. 286579; R.Mt. 68107). FLORIDA: Alva, 1900, *Hitchcock* 39 (F. 101118); Palm Beach, 1908, *W. Garvens* (F. 224033); Palm Beach, 1895, *Hitchcock* (F. 232708). GEORGIA: Milledgeville, *S. Boykin* (A.N.S.). ILLINOIS: Joliet, 1904, *H. C. Skeels* (F. 177229). MAINE: Mt. Desert Island, 1890, *J. H. Redfield* (A.N.S.); Winn, 1916, *Fernald and Long* 14014



(A.N.S. 576283). MASSACHUSETTS: Bolton, 1910, *C. H. Knowlton* (A.N.S. 562021); Falmouth, 1904, *A. H. Moore 1775* (F. 468774); Falmouth, 1911, *Pennell 3176* (A.N.S. 546542); Middleboro, 1900, *J. Murdock, Jr. 527* (F. 469864). MISSOURI: Vulcan, 1908, *H. H. Smith 441* (F. 240812). MONTANA: Bozeman, 1905, *J. W. Blankinship 106* (F. 190151). NEW JERSEY: Cape May Court House, 1911, *B. Long 6671* (A.N.S.); Folsom, 1911, *B. Long 5936* (A.N.S.); Tomlin, 1911, *B. Long 6822* (A.N.S.). NEW MEXICO: Kingston, 1904, *O. B. Metcalfe* (U.S. 890258). OREGON: Deshutes River, 1885, *Howell* (F. 366-339). PENNSYLVANIA: Philadelphia, 1908, *S. S. Van Pelt* (A.N.S.). SOUTH CAROLINA: Manning, 1914, *W. Stone 505* (A.N.S. 554417). TEXAS: Willis, 1908, *R. A. Dixon 292* (F. 238230). VIRGINIA: Hacker Valley, 1908, *H. H. Smith 1532* (F. 241984); Little Falls, *C. F. Mills-paugh* (F. 24465); Ocean View, 1898, *T. H. Kearney, Jr. 1759* (U.S. 346424); Virginia Beach, 1893, *N. L. Britton et al.* (F. 394587). WASHINGTON: Spokane, 1898, *T. E. Savage et al.* (F. 93077); Spokane, 1912, *G. W. Turesson* (R.Mt. 76339); Wenatchee, 1893, *K. Whited 241* (U.S. 268197).

*Rhus Toxicodendron* having leaves with entire and serrate margins on the same plant

SPECIMENS EXAMINED: BAHAMA ISLANDS: New Providence, 1905, *E. G. Britton 3416* (F. 184117); North Cat Cay, 1904, *C. F. Mills-paugh 2336* (F. 156302).

CANADA: Five Mile River, N. S., 1920, *A. S. Pease and B. Long 21788* (A.N.S. 588113).

MEXICO: St. Diego, 1891, *C. V. Hartman 589* (U.S. 306052; F. 49-631); Tunicachi, 1890, *C. V. Hartman 102* (U.S. 306157).

UNITED STATES: ARIZONA: Chiricahua Mts., 1907, *J. C. Blumer 1325* (F. 242184). FLORIDA: Lake City, 1898, *A. S. Hitchcock* (F. 232-709); Lake City, 1901, *L. McCulloch 45* (U.S. 440443); Tampa Bay, 1893, *P. H. Rolfs 247* (F. 228840). ILLINOIS: Glencoe, 1877, *M. Bross* (F. 103924); Peoria, *J. T. Stewart* (F. 114587); Stony Island, 1914, *H. H. Smith 6033* (F. 417145). KANSAS: Riley Co., 1895, *J. B. Norton 73* (R.Mt. 19505). LOUISIANA: Alexandria, *J. Hale* (A.N.S.). MAINE: Monticello, 1916, *Fernald and Long 14015* (A.N.S. 576284). MISSOURI: Independence, 1921, *B. F. Bush 9365* (F. 504307). NEW JERSEY: 1911, *B. Long 6306* (A.N.S.); Farmingdale, 1910, *B. Long and S. Brown 96* (A.N.S.); Locust Grove, 1911, *B. Long 6492* (A.N.S.). NORTH DAKOTA: Devil's Lake, 1902, *J. Lunell* (R.Mt. 39163). PENNSYLVANIA: Allentown, 1922, *H. W. Pretz 11394* (A.N.S.); Conewago, 1889, *J. K. Small* (F. 117542); Grenoble, 1910, *B. Long* (A.N.S.); Harrisburg, 1888, *J. K. Small* (F. 177717; 177718); Mifflin Co., *J. T. Rothrock*

(F. 321404); Pittsburgh, 1884, *J. A. Shafer* 544 (F. 18508); Westmoreland Co., 1876, *P. E. Pierron* (F. 154296). VIRGINIA: Marion, 1892, *N. L. Britton et al.* (F. 394767). VERMONT: Johnson, 1894, *A. J. Groul* (F. 428782).

*Rhus Toxicodendron* L. was probably the first poisonous species of *Rhus* discovered in North America. It was perhaps first noticed by Captain John Smith in 1609, and in 1635 Cornutus gave it botanical status as *Edera trifolia canadensis*. Since that time it has been divided into many species and varieties by many botanists.

It may readily be distinguished from *R. diversiloba* and *R. quercifolia* by its acute leaflets, as those of both the other species are obtuse. The leaf-margins and seed shapes are also different, as shown in the key.

Tracings of the outlines of leaves may be found on Plates XVIII–XXIII. These have been taken from all parts of North America between lower Canada and lower Mexico, with the exception of California (where, apparently, it does not grow). Its terminal leaflets in the north are generally ovate and in some cases nearly circular, while toward the south, especially in Lower California, Arizona, Florida, Mexico, and the Bahamas, they seem more likely to assume a lanceolate shape.

The plant may climb trees, etc., by means of aerial rootlets, but frequently remains suberect and bushy. Soil conditions may have a great deal to do with its habit, for in barren sandy soils the climbing form is not known to occur, while in fertile soils the radican is frequently met with. For instance, the sand dunes of Indiana have only the low form, but in the neighborhood of Laporte, Indiana, on more fertile soil, the climbing form is found. "This species of so wide a range shows many variations, some of which have been described as species. This fact led the writer, who is immune to ivy poisoning, to make an intensive study of the form in this State (Indiana). Especial attention was given to the study of the erect forms; those with thick and nearly smooth leaves; and those with hairy fruit. Hundreds of plants have been examined and from these, 78 sheets from 58 counties have been collected. The study suggests that the low erect forms are branches of underground stems; that the thick-leaved forms are always found in places exposed to heavy winds and direct sunlight; and that the hairy-fruited forms are rare and are distributed throughout our area, and have no other character to distinguish them."<sup>1</sup>

<sup>1</sup> Deam, Charles C. Shrubs of Indiana, p. 176. Publications of the Department of Conservation, State of Indiana, No. 4. Indianapolis, December, 1924.

In the Sandy River Valley in Maine, Knowlton<sup>1</sup> found only the prostrate vine. In New Jersey, Stone<sup>2</sup> found the shrubby form in sandy ground in the lower part of the middle district and Cape May peninsula spreading into the Pine Barrens as a rare straggler, while the vine-like form was found in low woods and along fence rows in the northern, middle, and coast districts and was absent from the Pine Barrens "except as an incursion." In Mississippi, Lowe<sup>3</sup> found the vinelike form throughout the state climbing over trees, while the shrub was found only on sandy upland soil. In Alabama, Mohr<sup>4</sup> found the vine-like form in rich, damp woods and bottom lands, while the shrub was found in dry, sterile soil, barren hillsides, and pine barrens. Peterson in his *Flora of Nebraska*<sup>5</sup> found the vinelike form commonly in woods and along fences in Lincoln; while the shrub was an inhabitant of open woods and prairies, as found in Kearney, Long Pine, Minden, Newcastle, and Valentine.

The plant has female flowers with petals 2 mm. long and 1 mm. wide; male flowers with petals 3-4 mm. long and 1.5 mm. wide; fruit 3-5 mm. long with seeds 3-4.5 mm. long and 1.74-2.29 mm. thick. The seeds have knoblike protuberances which make them readily distinguishable from those of *R. diversiloba* and *R. quercifolia*.

The terminal leaflets vary from 3.7-12 cm. in length and are larger in the shade than in sunny locations. Dried herbarium leaves show a difference in thickness between .06 and .18 mm. Dried specimens of leaves grown in the sun are thicker than those grown in the shade. Miss Turner<sup>6</sup> states that in fresh material no appreciable difference in thickness occurs between leaves grown in the shade and leaves grown in the sun. However, she says that sunny leaves have more compact tissue, consequently, in dried material sunny leaves would be thicker.

In making measurements on material from many parts of North America (see Tables III, IV) no difference in thickness could be noticed between leaves from western and eastern grown plants. But, in general, lanceolate leaves from the South were thicker than other shapes.

Panicles may be large or small, dense or open, upright or pendulous.

<sup>1</sup> Knowlton, Clarence H. *Flora of the Sandy River Valley in Maine*. In *Rhoda*, 16: 14 (1914).

<sup>2</sup> *Loc. cit.*

<sup>3</sup> *Loc. cit.*

<sup>4</sup> *Loc. cit.*

<sup>5</sup> P. 161. Plainview, Nebraska, 1923.

<sup>6</sup> Turner, Helen. *The Ecology of Rhus Toxicodendron*. *Transactions of the Illinois State Academy of Science*. 15: 208-11 (1922).

Leaflets and growing parts of the plant are covered with short, deciduous hairs mostly disappearing at maturity, but, in general, leaflets of equal maturity have approximately the same amount of pubescence whether from eastern or western America. However, some specimens from the District of Columbia, New Jersey, and Texas have leaflets densely pubescent beneath even at maturity.

As appears from the list of specimens examined, there are many plants of *R. Toxicodendron* which possess both leaves with serrate and entire leaf-margins. These may be hybrids, but this point cannot be decided without breeding experiments. The habit of growth of *R. Toxicodendron* has no relation to size of petals or character of leaf-margin, size and shapes of seed (see Tables III, IV). In this connection, it should be remembered that *R. diversiloba* exhibits similar leaf variations, showing no concomitant differences in flower, seed, or habit.

The subdivision of the species must be made on characters other than leaf-margins. Of the hundreds of specimens examined, only a few exhibit variations that appear sufficiently important or constant to be worthy of recognition. These may be defined as follows:

- Plants erect, not developing aerial rootlets; leaflets acute or acutish, entire or very coarsely few-toothed; mature fruit glabrous; seeds somewhat kidney-shaped, roughened. . . . . var. *typica*  
 Plants developing aerial rootlets, often climbing. . . . . 3a. f. *radicans*  
 Plants erect or suberect, without aerial rootlets  
 Fruit pubescent; leaflets not deeply lobed. . . . . 3b. f. *malacotrichocarpum*  
 Fruit glabrous; leaflets deeply lobed, the lobes very acute  
 . . . . . 3c. var. *eximia*

3a. ***Rhus Toxicodendron* L., forma *radicans* (L.) comb. nov.**

- Rhus radicans* L., Sp. Pl. 266 (1753).  
*R. Toxicodendron*, var. *radicans* Torr., Fl. N. and Mid. States, 1: 323 (1824).  
*R. Toxicodendron*, a. *radicans* Dippel, Handb. Laubholzk. 2: 376 (1892).  
*R. Toxicodendron radicans* Schelle, Beissner, Schelle and Zabel, Handb. Laub. Benen. 286 (1903).  
*R. floridana* Mearns, Proc. Biol. Soc. Wash. 15: 149 (1902).  
*Toxicodendron vulgare* (Mill.) Greene, Leaflets, 1: 115 (1905).  
*T. glabrum* (Mill.) Greene, loc. cit. 1: 116.  
*T. pubescens* (Mill.) Greene, loc. cit. 1: 116.  
*T. phaseoloides* Greene, loc. cit. 1: 123.  
*T. laetevirens* Greene, loc. cit. 1: 123.  
*T. gonicarpum* Greene, loc. cit. 1: 125.  
*T. radicans*, a. *normale* O. Ktze; Rev. Gen. 1: 154 (1891).

This is designated as a form only because it has occupied so prominent a place in literature, although its characteristic—a more or less climbing habit—scarcely entitles it to special taxonomic recognition.

3b. **Rhus Toxicodendron, f. malacotrichocarpum**

A. H. Moore, *Rhodora*, 11: 163 (1909).

DISTRIBUTION: Occasional throughout the eastern range of the species.

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4. **Rhus divaricata** (Greene) comb. nov.

*Toxicodendron divaricatum* Greene, Leaflets, 1: 122 (1905).

This species has entire leaves, but with a seed quite different in shape from typical *R. Toxicodendron* (see Plate XXIV). When further collections of this plant are made, it may prove to be only a variety of *R. Toxicodendron*. At present, however, in view of the rather marked difference in seed characters, as exhibited in the single specimen known, it seems best to retain the plant as a separate species.

Leaflets and growing parts of the plant are covered with short, deciduous hairs mostly disappearing at maturity, but, in general, leaflets of equal maturity have approximately the same amount of pubescence whether from eastern or western America. However, some specimens from the District of Columbia, New Jersey, and Texas have leaflets densely pubescent beneath even at maturity.

As appears from the list of specimens examined, there are many plants of *R. Toxicodendron* which possess both leaves with serrate and

### A CORRECTION

*Rhus Greenei*, nom. nov.

*Toxicodendron divaricatum* Greene, Leaflets, I: 122 (1905).

*Rhus divaricata* (Greene) McNair, Field Mus. Pub. Bot. IV: 69 (1925), not *R. divaricata* Eckl. & Zeyh. Enum. Pl. Afr. 146 (1834-37).

In my paper on the taxonomy of poison ivy, *Toxicodendron divaricatum* Greene was transferred to *Rhus* as *Rhus divaricata*. I was unaware at the time that the name had already been used for an entirely different and presumably valid African species. *Toxicodendron divaricatum* Greene must, therefore, be renamed.

April 6, 1925.

(1892).

*R. Toxicodendron radicans* Schelle, Beissner, Schelle and Zabel, Handb. Laub. Benen. 286 (1903).

*R. floridana* Mearns, Proc. Biol. Soc. Wash. 15: 149 (1902).

*Toxicodendron vulgare* (Mill.) Greene, Leaflets, I: 115 (1905).

*T. glabrum* (Mill.) Greene, loc. cit. I: 116.

*T. pubescens* (Mill.) Greene, loc. cit. I: 116.

*T. phaseoloides* Greene, loc. cit. I: 123.

*T. laetevirens* Greene, loc. cit. I: 123.

*T. goniocarpum* Greene, loc. cit. I: 125.

*T. radicans*, a. normale O. Ktze; Rev. Gen. I: 154 (1891).

This is designated as a form only because it has occupied so prominent a place in literature, although its characteristic—a more or less climbing habit—scarcely entitles it to special taxonomic recognition.

3b. **Rhus Toxicodendron, f. malacotrichocarpum**

A. H. Moore, *Rhodora*, 11: 163 (1909).

DISTRIBUTION: Occasional throughout the eastern range of the species.

SPECIMENS EXAMINED: MAINE: Bristol, *Chamberlain and Dinsmore 832* (G.H.); Wells, York Co., *Fernald and Long 14018* (A.N.S.). NEW JERSEY: Cape May Court House, Cape May Co., *B. Long 6671* (A.N.S.); Delair, Camden Co., *B. Long 6306* (A.N.S.); Tomlin, Gloucester Co., *B. Long 6822* (A.N.S.). PENNSYLVANIA: Grenoble, Bucks Co., *B. Long 4581* (A.N.S.). BERMUDA: Boaz Island, *S. Brown and N. L. Britton 1005* (A.N.S.).

3c. **Rhus Toxicodendron, var. eximia** (Greene) comb. nov.

*Toxicodendron eximium* Greene, Leaflets, 1: 123 (1905).

*T. biternatum* Greene, *loc. cit.* 1: 124.

*Rhus eximia* Standl., *Contrib. U.S. Nat. Herb.* 23: 668 (1923).

This variety apparently varies greatly from *R. Toxicodendron* only in its leaf-shape. It has a leaf shaped somewhat like the leaf of a Norway maple (see Plate XXIV), although some plants have unlobed serrate leaves in addition. The petals, fruits, and seeds are similar in shape and size to those of *R. Toxicodendron*.

It is found in Mexico in Durango, Morelia, Nuevo Leon, and Tamulipas, and in the United States in Texas.

SPECIMENS EXAMINED: TEXAS: Eagle Nest, *V. Havard* (U.S. 156164). MEXICO: Durango, 1896, *E. Palmer 106* (U.S. 305009; F. 51217); San Augustin, Morelia, 1910, *Arsene* (F. 417262).

4. **Rhus divaricata** (Greene) comb. nov.

*Toxicodendron divaricatum* Greene, Leaflets, 1: 122 (1905).

This species has entire leaves, but with a seed quite different in shape from typical *R. Toxicodendron* (see Plate XXIV). When further collections of this plant are made, it may prove to be only a variety of *R. Toxicodendron*. At present, however, in view of the rather marked difference in seed characters, as exhibited in the single specimen known, it seems best to retain the plant as a separate species.

SPECIMEN EXAMINED: LOWER CALIFORNIA: Calmali, 1898, C. A. Purpus (U.S. 383431, type).

#### THE QUESTION OF HYBRIDS

Without positive data based on breeding experiments, it may be idle to discuss the question of hybrids. However, it may be noted that the ranges of *R. quercifolia* and *R. Toxicodendron* overlap and, as these plants are closely related and insect-pollinated, hybrids possibly occur. Mohr<sup>1</sup> states that in Alabama the two plants have different flowering periods, *quercifolia* blooming in April and *Toxicodendron* in May, and that he has never met with forms intergrading between them. In North Carolina there also appears to be a difference in the flowering period according to herbarium specimens.

The ranges of *R. diversiloba* and *R. Toxicodendron* overlap in Oregon and Washington, as was observed by Howell. According to herbarium specimens examined by the author, their flowering periods also overlap and they are insect-pollinated. No forms suggestive of this cross have been observed.

<sup>1</sup> *Loc. cit.*



TABLE I  
RHUS QUERCIFOLIA (MICHX.) STEUD.

| Location       | Fruit Size<br>(mm.) | Seed Size<br>(mm.) | ♂ Petal Size<br>(mm.) | ♀ Petal Size<br>(mm.) | Terminal Leaflet |                  |
|----------------|---------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
|                |                     |                    |                       |                       | Length (cm.)     | Thickness (mm.)† |
| Alabama        | .                   | .                  | 3 x 1                 | .                     | 4-4.5            | .06-.07          |
| Florida        | .                   | 4.0 x 1.92*        | .                     | .                     | 5.5              | .16-.18          |
| Florida        | 5                   | .                  | .                     | .                     | 7.5-8.5          | .20-.22          |
| Mexico         | .                   | .                  | .                     | .                     | 10               | .12              |
| Alabama        | .                   | .                  | 3 x 1                 | .                     | 5.3              | .08              |
| North Carolina | 5-6                 | 4.7 x 2.57         | .                     | .                     | 7-7.5            | .18              |
| Maryland       | 5-6                 | 4.2 x 2.19         | .                     | .                     | 6.5-8.5          | .16-.18          |
| Texas          | 4                   | 3.7 x 1.93         | .                     | .                     | 6-7              | .11-.14          |
| Georgia        | .                   | 4.0 x 2.08         | .                     | .                     | 7-8              | .17-.18          |
| Virginia       | .                   | 4.0 x 1.91         | .                     | .                     | 6.5-9.0          | .13-.20          |
| Georgia        | 5                   | 3.5 x 2.12         | .                     | .                     | 7-8              | .12-.14          |
| Delaware       | 5-6                 | 4.5 x 2.20         | .                     | .                     | 7-7.5            | .14-.19          |
| North Carolina | 5                   | 4.0 x 2.01         | .                     | .                     | 6.5-8.5          | .12-.15          |
| South Carolina | .                   | .                  | 2 x 1                 | .                     | 7-8.5            | .16              |
| Louisiana      | 4-5                 | .                  | .                     | .                     | 7.5-8.5          | .20-.22          |
| Louisiana      | 5-6                 | 4.0 x 2.49         | .                     | .                     | 5.5              | .17-.19          |
| New Jersey     | 5-6                 | 4.0 x 2.30         | .                     | .                     | 6-7              | .13              |
| New Jersey     | 5-6                 | 4.0 x 2.10         | .                     | .                     | 9-10.5           | .11-.13          |

\*Figures in this column to right of multiplication signs are caliper measurements.

†Caliper measurements.

TABLE II  
RHUS DIVERSILOBA T. & G.

| Location                                    | Fruit Size<br>(mm.) | Seed Size<br>(mm.) | ♂ Petal Size<br>(mm.) | ♀ Petal Size<br>(mm.) | Terminal Leaflet |                 |
|---|---------------------|--------------------|-----------------------|-----------------------|------------------|-----------------|
|   |                     |                    |                       |                       | Length (cm.)     | Thickness(mm.)† |
| Oregon . . . . .                            | . . . . .           | . . . . .          | 3 x 1                 | . . . . .             | 3                | .12-.14         |
| Hood River, Oregon . . . . .                | . . . . .           | . . . . .          | 3.5 x 1.5             | . . . . .             | 6-7              | .13             |
| Sierra Valley, California . . . . .         | 6                   | . . . . .          | . . . . .             | . . . . .             | 5.5-6.0          | .08-.13         |
| Columbia River, Washington . . . . .        | 6-7                 | 5.5 x 2.13*        | . . . . .             | 2 x 1                 | 5.2-6.2          | .14             |
| Los Gatos, California . . . . .             | . . . . .           | . . . . .          | . . . . .             | 2.5 x 1               | 6                | .09             |
| Rocky Butte, Oregon . . . . .               | . . . . .           | . . . . .          | . . . . .             | 2 x 1                 | . . . . .        | . . . . .       |
| Santa Barbara, California . . . . .         | . . . . .           | . . . . .          | . . . . .             | 2.5 x 1.5             | . . . . .        | . . . . .       |
| Portland, Oregon . . . . .                  | . . . . .           | . . . . .          | 3 x 1.5               | . . . . .             | 6-6.5            | .11             |
| Columbia River, Washington . . . . .        | 4-6                 | 5.0 x 2.02         | . . . . .             | 2 x 1                 | 4-3              | .08             |
| Bridal Veil, Oregon . . . . .               | 6                   | 5.0 x 1.99         | . . . . .             | . . . . .             | 4.5-5.0          | .16-.17         |
| San Diego Co., California . . . . .         | 5                   | 4.5 x 1.84         | . . . . .             | . . . . .             | 4.5              | .13-.14         |
| Saratoga, California . . . . .              | . . . . .           | . . . . .          | 4 x 1                 | . . . . .             | 4.5-5.0          | .13             |
| Oroville, California . . . . .              | 5-7                 | 5.7 x 2.53         | . . . . .             | . . . . .             | 6-6.5            | .08-.11         |
| Big Chico Creek, California . . . . .       | . . . . .           | . . . . .          | 3 x 1                 | . . . . .             | 3.5-4.0          | .12             |
| Salem, Oregon . . . . .                     | 6                   | . . . . .          | . . . . .             | . . . . .             | . . . . .        | .09             |
| Santa Catalina Island, California . . . . . | . . . . .           | . . . . .          | 3 x 1.5               | 3 x 1                 | 6                | .06-.11         |
| Santa Catalina Island, California . . . . . | 6                   | 5.0 x 2.54         | . . . . .             | 2.5 x 1               | 7.5              | .12             |
| Santa Catalina Island, California . . . . . | 5-6                 | 5.0 x 2.55         | . . . . .             | . . . . .             | 5-7.5            | .14             |
| Santa Catalina Island, California . . . . . | 4-5                 | 4.0 x 1.87         | . . . . .             | . . . . .             | 5.5-6.0          | .17             |

\*Figures in this column to right of multiplication signs are caliper measurements.

†Caliper measurements.

TABLE III  
R. TOXICODENDRON HAVING LEAVES WITH ENTIRE MARGINS

| Location             | Fruit Size<br>(mm.) | Seed Size<br>(mm.) | ♂ Petal Size<br>(mm.) | ♀ Petal Size<br>(mm.) | Terminal Leaflet |                  |
|----------------------|---------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
|                      |                     |                    |                       |                       | Length (cm.)     | Thickness(mm.) † |
| West Virginia        | .                   | .                  | 3.5 x 1.5             | .                     | 8                | .10-.12          |
| Washington           | 4                   | .                  | .                     | .                     | 9.5-11.0         | .06-.08          |
| Florida              | 4                   | 3.0 x 1.90*        | .                     | .                     | 11-12            | .07-.09          |
| Arizona              | .                   | .                  | 4 x 1.5               | .                     | 8.5              | .08-10           |
| Florida              | 4-5                 | 3.5 x 1.74         | .                     | .                     | 3-7              | .15-18           |
| Bahamas              | .                   | .                  | .                     | 2 x 1                 | 7                | .13-15           |
| Illinois             | .                   | 4.0 x 2.24         | .                     | .                     | 10.5             | .07-.08          |
| Bahamas              | .                   | 3.5 x 1.91         | .                     | .                     | 5.5              | .18              |
| Montana              | .                   | .                  | .                     | .                     | 7-7.5            | .09-.11          |
| Florida              | .                   | .                  | 3 x 1.5               | .                     | 7.5-8.0          | .06-.09          |
| Florida              | 4                   | .                  | .                     | .                     | 7                | .11              |
| Texas                | .                   | .                  | .                     | .                     | 5.5-5.8          | .09              |
| Missouri             | 3-4                 | .                  | .                     | .                     | 9-10.5           | .09-11           |
| West Virginia        | .                   | .                  | 3 x 1.5               | .                     | 10.5-11.0        | .06-11           |
| District of Columbia | .                   | 4.5 x 1.96         | .                     | .                     | 10.5             | .08-13           |
| Nova Scotia          | .                   | .                  | .                     | .                     | 11               | .08              |
| Oregon               | 4-5                 | .                  | .                     | .                     | 7.5-10.5         | .07              |
| Minnesota            | .                   | 4.0 x 1.99         | .                     | .                     | 6                | .09-.11          |
| Virginia             | .                   | 4.0 x 2.29         | .                     | .                     | 8.5              | .08              |
| Massachusetts        | .                   | .                  | .                     | .                     | 7                | .07-.08          |
| Massachusetts        | .                   | .                  | .                     | .                     | 4.5-5.0          | .12              |
| Washington           | .                   | .                  | 4 x 1.5               | .                     | 10.5-12.0        | .06-.07          |
| District of Columbia | .                   | 4.0 x 1.90         | .                     | .                     | 13               | .11-13           |
|                      | .                   | .                  | .                     | .                     | 10               | .09-.10          |

\*Figures in this column to right of multiplications sign are caliper measurements.

†Caliper measurements.

TABLE IV  
R. TOXICODENDRON HAVING LEAVES WITH SERRATE MARGINS

| Location             | Fruit Size<br>(mm.) | Seed Size<br>(mm.) | ♂ Petal Size<br>(mm.) | ♀ Petal Size<br>(mm.) | Terminal Leaflet |                 |
|----------------------|---------------------|--------------------|-----------------------|-----------------------|------------------|-----------------|
|                      |                     |                    |                       |                       | Length (cm.)     | Thickness(mm.)† |
| New York             | .                   | .                  | 4 x 1*                | .                     | 6.5-8.5          | .06-.07         |
| Illinois             | .                   | .                  | 3 x 1.5               | .                     | 10-12.5          | .07-.09         |
| Illinois             | .                   | 4.2-2.2            | .                     | .                     | 7-9              | .08-.11         |
| Illinois             | 4-5                 | 4.5-2.46           | .                     | .                     | 10.5             | .09-.11         |
| District of Columbia | .                   | .                  | 3.5 x 1.5             | .                     | 8                | .07-.08         |
| Arizona              | .                   | .                  | .                     | .                     | 4.7-8.0          | .07-.11         |
| Arizona              | 5                   | 4.0-2.1            | .                     | .                     | .                | .               |
| Colorado             | .                   | .                  | .                     | .                     | 5-5.2            | .09-.10         |
| Ontario              | .                   | .                  | .                     | 2 x 1                 | 6-6.5            | .07             |
| Louisiana            | .                   | .                  | .                     | .                     | 10-12            | .10             |
| Illinois             | .                   | .                  | .                     | .                     | 11-13.5          | .08-.10         |
| Illinois             | .                   | .                  | .                     | .                     | 10-11.5          | .06             |
| Utah                 | 5                   | 4.0 x 2.11         | .                     | .                     | 6.5-7.5          | .09-.11         |
| Arizona              | .                   | .                  | .                     | .                     | 6.5              | .15-.19         |
| Iowa                 | .                   | .                  | .                     | 2 x 1                 | .                | .               |
| New York             | .                   | .                  | .                     | .                     | 7.5-9.5          | .06             |
| South Dakota         | 5                   | 4.5 x 2.07         | 4 x 1.5               | .                     | 8-9.5            | .08-.10         |
| Oregon               | 5                   | .                  | .                     | .                     | 5                | .09             |
| Pennsylvania         | .                   | .                  | .                     | .                     | 9-9.5            | .               |
| Texas                | .                   | .                  | .                     | .                     | 4.5-5.5          | .08             |
| Georgia              | .                   | .                  | .                     | .                     | 8-9              | .09-.10         |
| New Mexico           | .                   | .                  | .                     | .                     | 9.5              | .09-.10         |

\*Figures in this column to right of multiplication signs are caliper measurements.

†Caliper measurements.

TABLE IV—Continued  
R. TOXICODENDRON HAVING LEAVES WITH SERRATE MARGINS

| Location     | Fruit Size<br>(mm.) | Seed Size<br>(mm.) | ♂ Petal Size<br>(mm.) | ♀ Petal Size<br>(mm.) | Terminal Leaflet |                  |
|--------------|---------------------|--------------------|-----------------------|-----------------------|------------------|------------------|
|              |                     |                    |                       |                       | Length (cm.)     | Thickness (mm.)† |
| Illinois     | .                   | .                  | .                     | .                     | 17               | .08              |
| Illinois     | .                   | .                  | .                     | .                     | 8-10             | .08              |
| Utah         | .                   | .                  | 3.5 x 1.5             | .                     | 7.5              | .06-.07          |
| Bahamas      | .                   | .                  | .                     | .                     | 6.5              | .07-.08          |
| New Mexico   | .                   | 4.5 x 2.09*        | .                     | .                     | 7-9              | .08-10           |
| Michigan     | 5<br>6              | 4.5 x 2.22         | .                     | .                     | 9-11             | .10-11           |
| Wisconsin    | .                   | .                  | 3.5 x 1               | .                     | 6.5              | .08-.09          |
| Illinois     | 5-6                 | 4.5 x 2.14         | .                     | .                     | 7.2              | .06              |
| Illinois     | .                   | 4.5 x 1.96         | .                     | .                     | 5-6              | .15              |
| Montana      | 5                   | .                  | .                     | .                     | 6-10.5           | .08-.11          |
| Wisconsin    | 4-6                 | 4.5 x 2.49         | .                     | .                     | 9.5              | .09              |
| North Dakota | 5-6                 | 5.0 x 2.29         | .                     | .                     | 6.5              | .18              |
| Vermont      | 5-6                 | 4.5 x 2.22         | .                     | .                     | 8                | .08-.09          |
| Indiana      | .                   | 4.0 x 2.07         | .                     | .                     | 8-13             | .12-14           |
| Wisconsin    | .                   | .                  | .                     | .                     | 12.5             | .11              |
| South Dakota | .                   | .                  | .                     | .                     | 5.7              | .11              |
| Alberta      | .                   | .                  | .                     | .                     | 5.5-6.0          | .08-.15          |
| South Dakota | 6                   | 5.0 x 2.34         | .                     | .                     | 6                | .....            |
| Texas        | .                   | .                  | 3.5 x 1               | .                     | 7                | .12              |
| Illinois     | 5-6                 | 4.0 x 2.01         | .                     | .                     | 10.5-14.0        | .06-.09          |
| Illinois     | .                   | .                  | 3 x 1                 | .                     | 13-19            | .06-.08          |
| South Dakota | 5                   | .                  | .                     | .                     | 7-7.5            | .06-.10          |

TABLE IV—Continued  
R. TOXICODENDRON HAVING LEAVES WITH SERRATE MARGINS

| Location       | Fruit Size<br>(mm.) | Seed Size<br>(mm.) | ♂ Petal Size<br>(mm.) | ♀ Petal Size<br>(mm.) | Terminal Leaflet |                   |
|----------------|---------------------|--------------------|-----------------------|-----------------------|------------------|-------------------|
|                |                     |                    |                       |                       | Length (cm.)     | Thickness (mm.) † |
| South Dakota   |                     |                    | 3.5 x 1               |                       | 6.5              | .13-.15           |
| Illinois       |                     |                    |                       |                       | 9.5-11.0         |                   |
| New Mexico     |                     |                    | 3.5 x 1               | 2 x 1                 | 7.5              | .07-.12           |
| Utah           |                     |                    | 3 x 1.5               |                       |                  |                   |
| New York       |                     |                    | 3.5 x 1.5             |                       | 6-7.5            | .10               |
| North Carolina |                     |                    |                       |                       | 8-10             | .06               |
| Texas          | 4                   |                    |                       |                       | 8                |                   |
| Pennsylvania   |                     |                    |                       |                       | 11-14.5          | .08               |
| Wyoming        | 5-6                 | 5.0 x 2.34*        |                       |                       | 5.5              | .08-.11           |
| South Dakota   |                     |                    |                       |                       |                  | .10-.11           |
| South Dakota   |                     |                    |                       |                       |                  |                   |
| Wyoming        |                     | 4.0 x 1.9          |                       |                       | 7.5              | .05-.07           |
| South Dakota   | 6                   | 4.5 x 1.8          |                       |                       | 5                | .09-.10           |
| Colorado       | 6                   | 5.0 x 2.49         |                       |                       | 7                | .08-.10           |
| Oklahoma       |                     |                    |                       |                       | 10.5             |                   |
| Nebraska       |                     |                    |                       |                       | 5                | .11               |
| Wyoming        |                     |                    | 3.5 x 1.5             |                       | 7                | .07-.09           |
| Wyoming        | 5                   | 4.0 x 1.90         |                       |                       | 6.5              | .10               |
| South Dakota   | 5-5.5               | 4.0 x 2.1          |                       |                       | 7-7              | .10-.11           |
| New York       |                     |                    | 4 x 1.5               |                       | 9.5-10           | .07               |
| Kansas         |                     |                    | 3.5 x 1.5             | 2 x 1                 | 14               | .06               |
| Colorado       |                     |                    |                       | 2 x 1                 | 11               | .05-.07           |



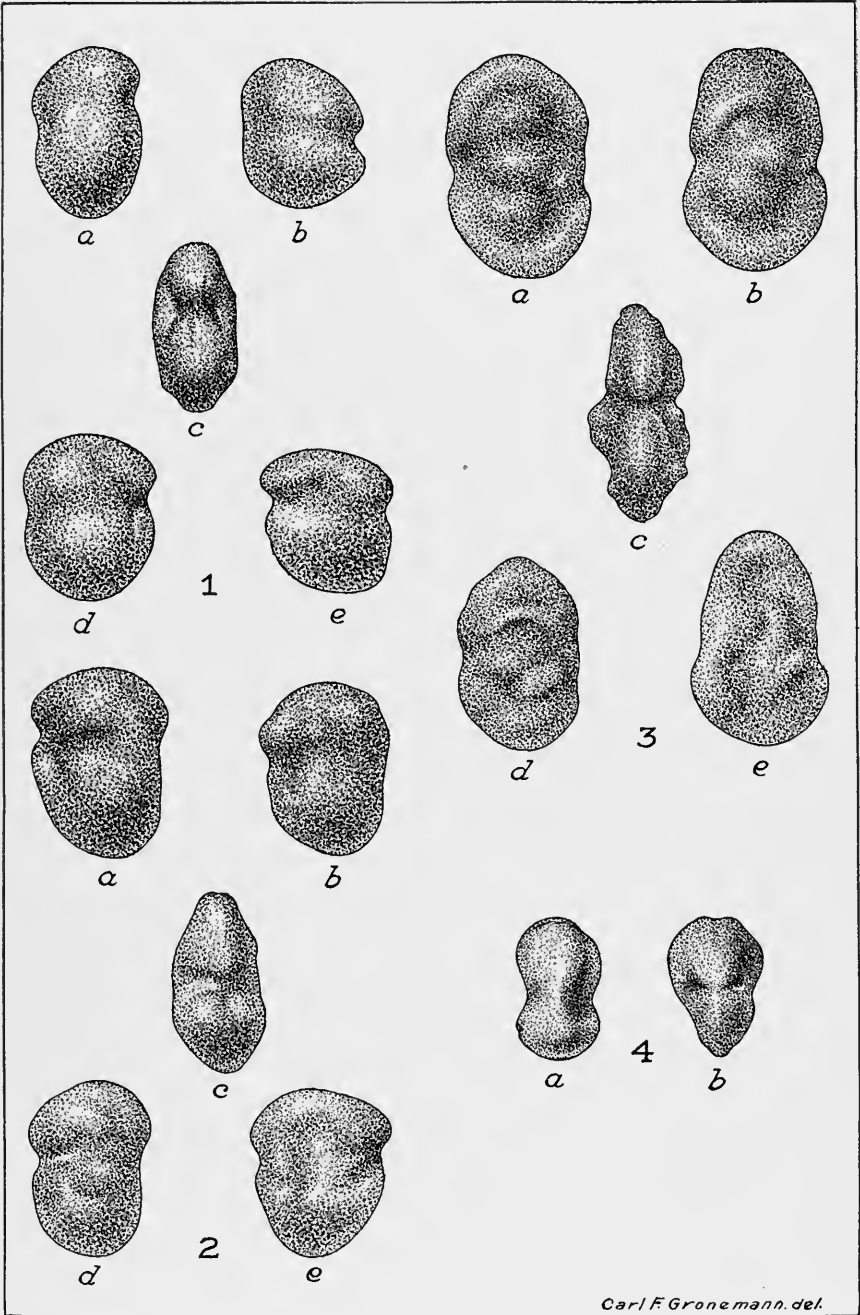
PLATE XIV.

- Fig. 1. Seeds of *Rhus quercifolia*: *a, b, d, e* views from side, *c* view from below.  
Fig. 2. Seeds of *Rhus Toxicodendron*: *a, b, d, e* views from side, *c* view from below.  
Fig. 3. Seeds of *Rhus diversiloba*: *a, b, d, e* views from side, *c* view from below.  
Fig. 4. Seeds of *Rhus divaricata*: *a* view from side, *b* view from below.

PLATES XV - XXIV.

The originals of the tracings reproduced, made from specimens cited in this paper, are deposited in the herbarium of the Field Museum, and bear the author's notations indicating the source of each.



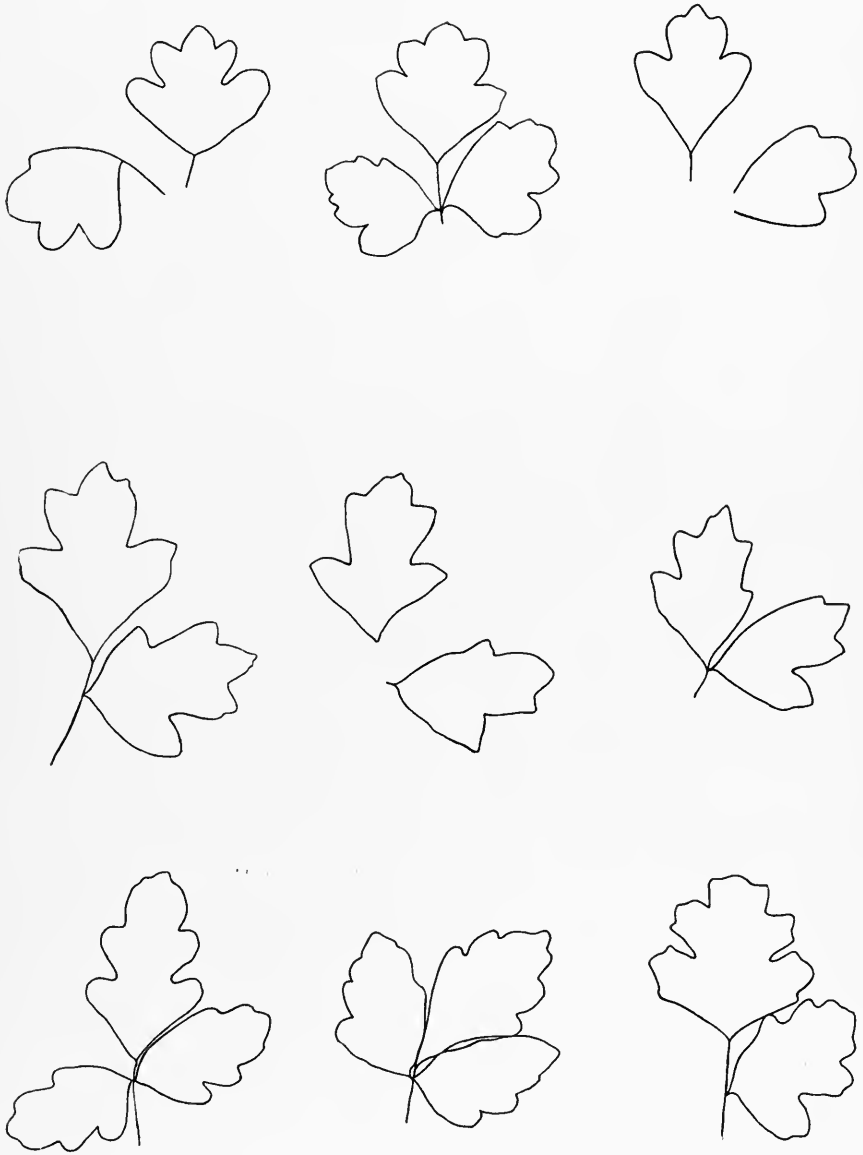


RHUS SEEDS (x 4½x).

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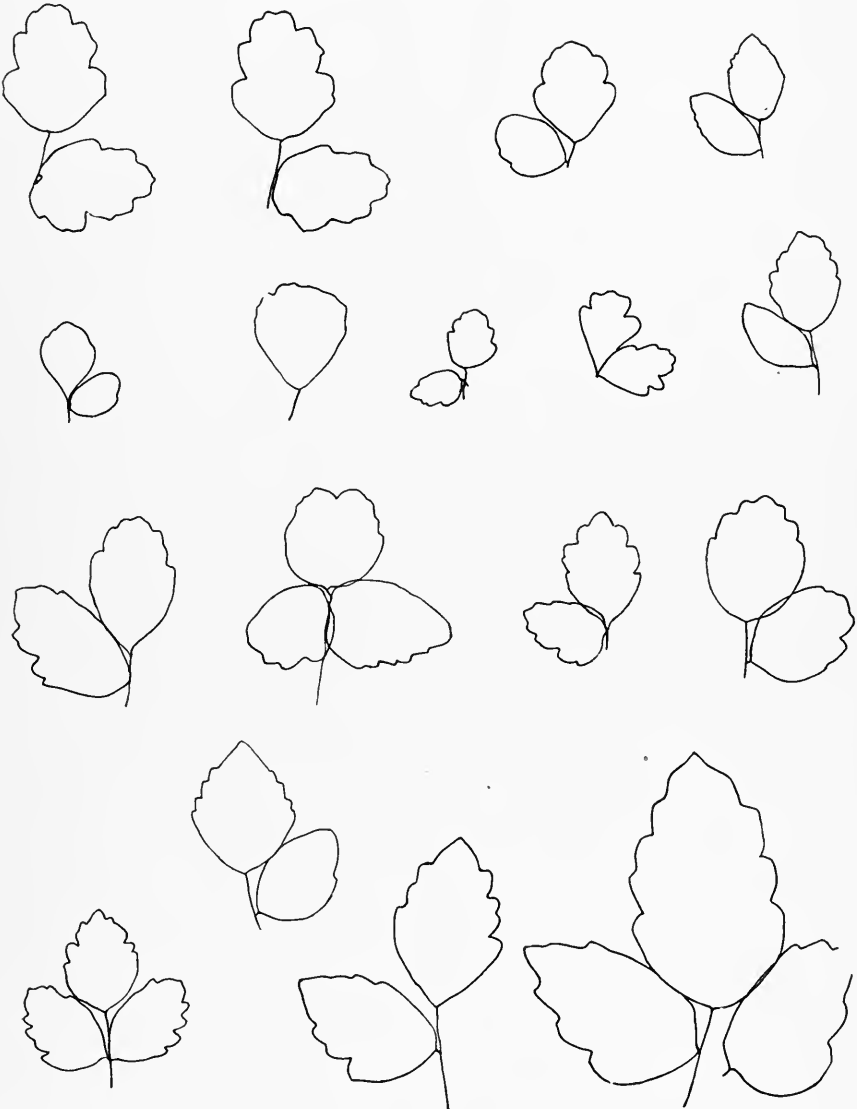


RHUS QUERCIFOLIA LEAF TRACINGS (x 1/4).

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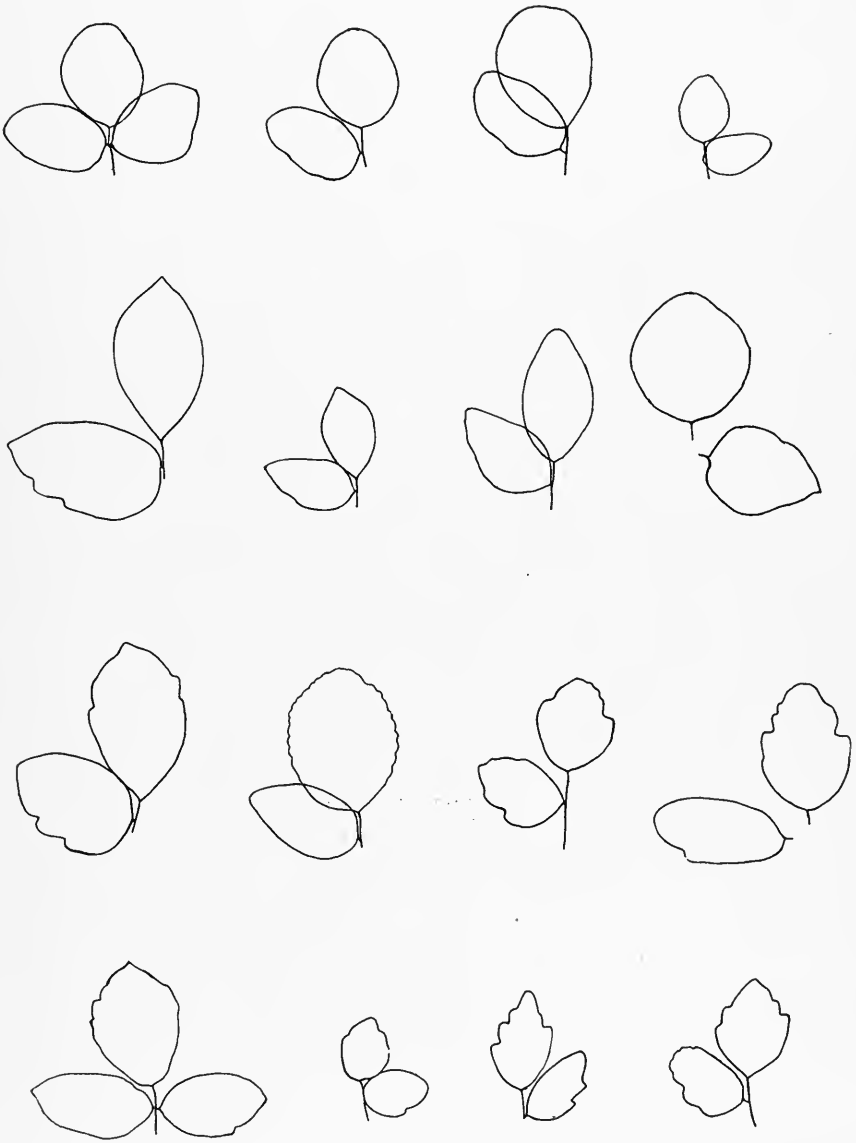


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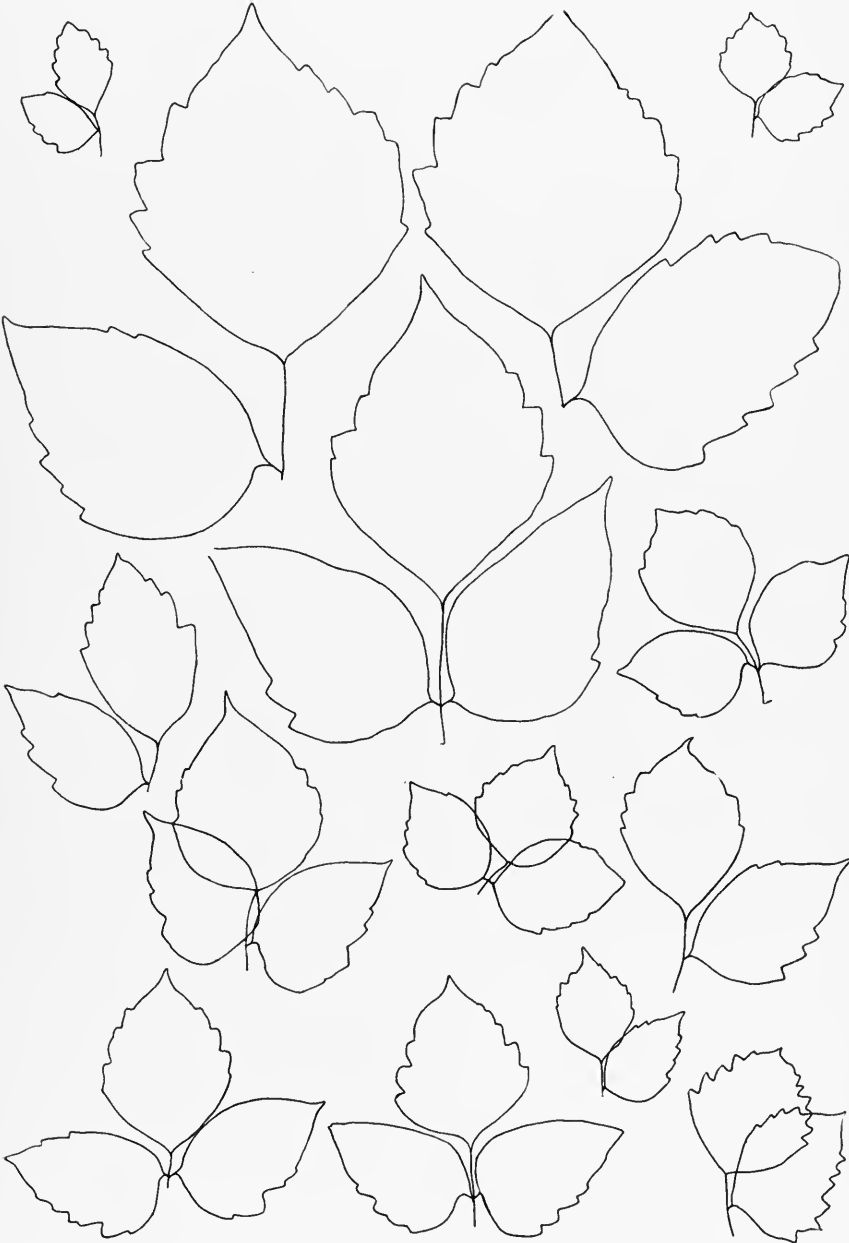
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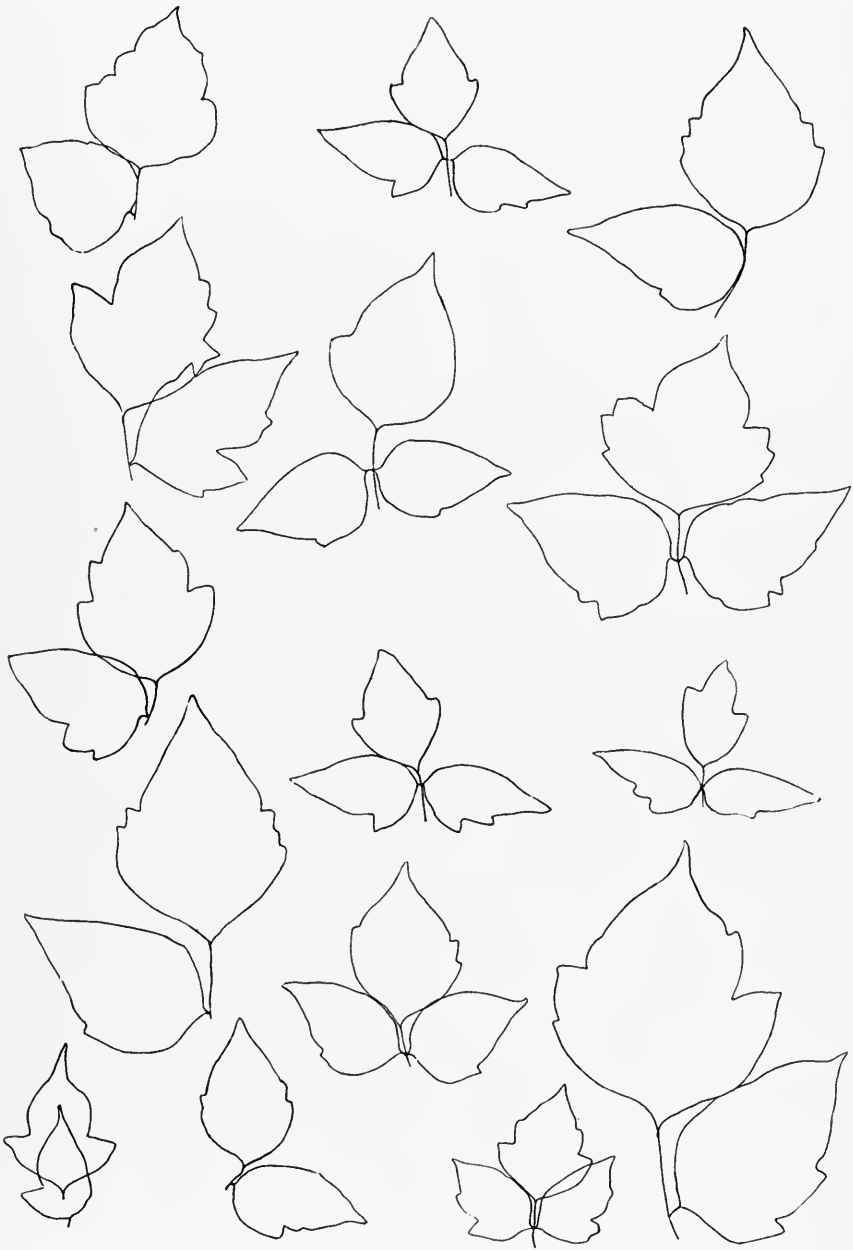


RHUS TOXICODENDRON LEAF TRACINGS (x 3/8).

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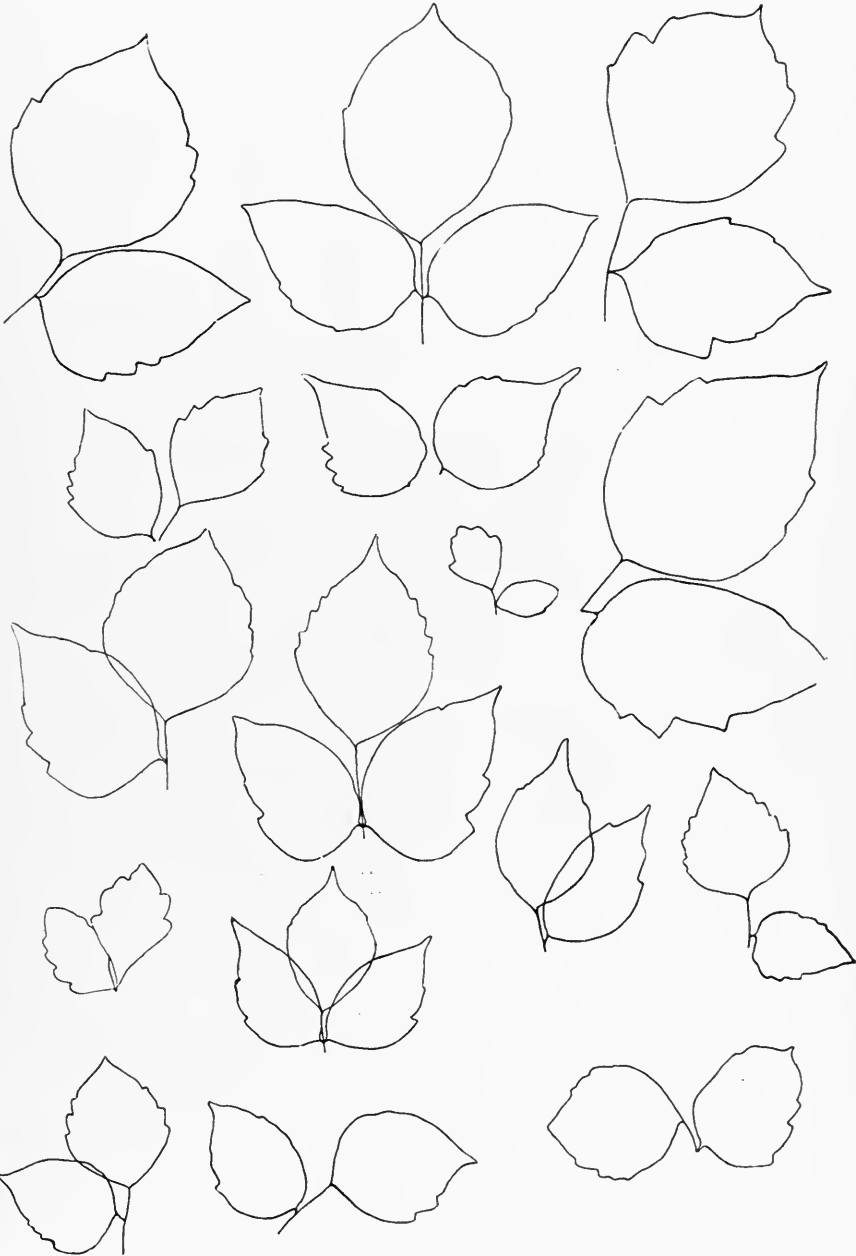


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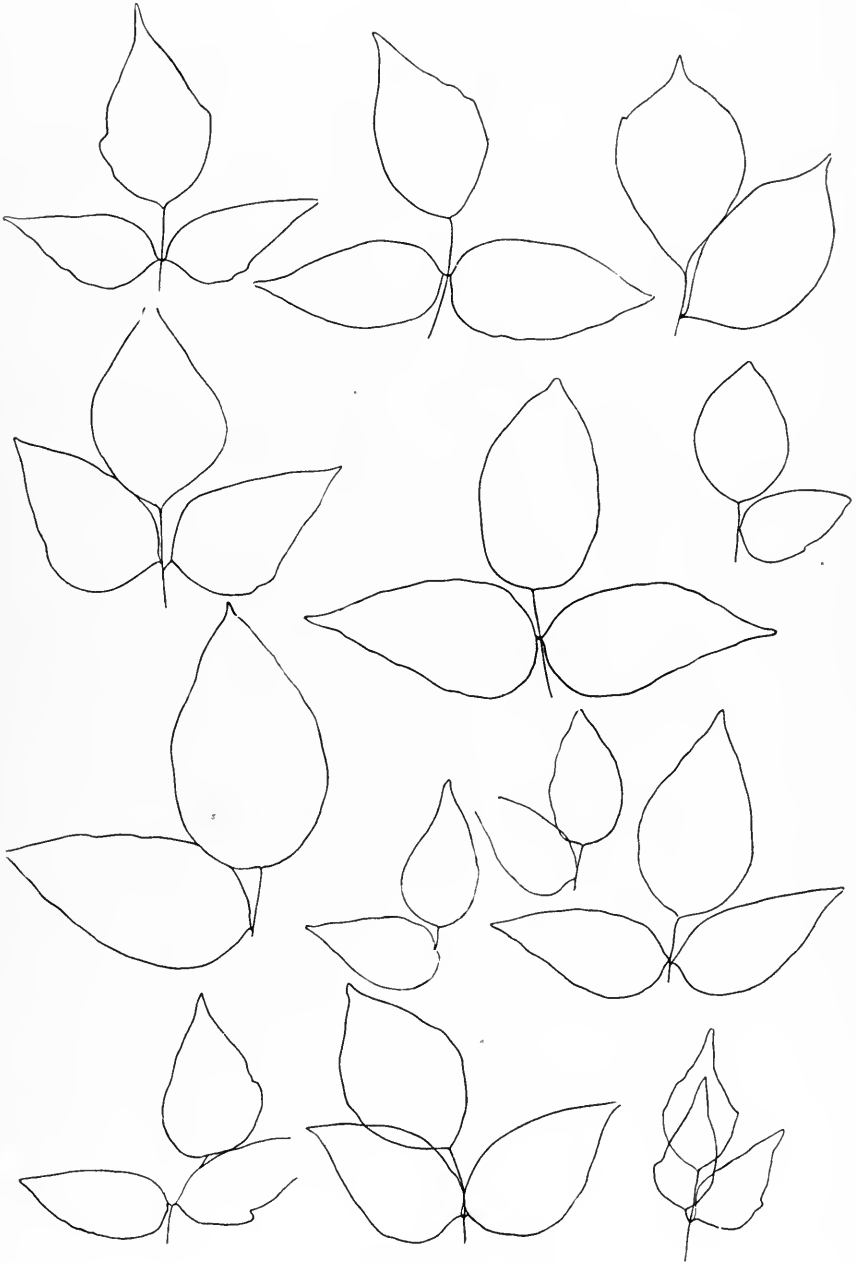


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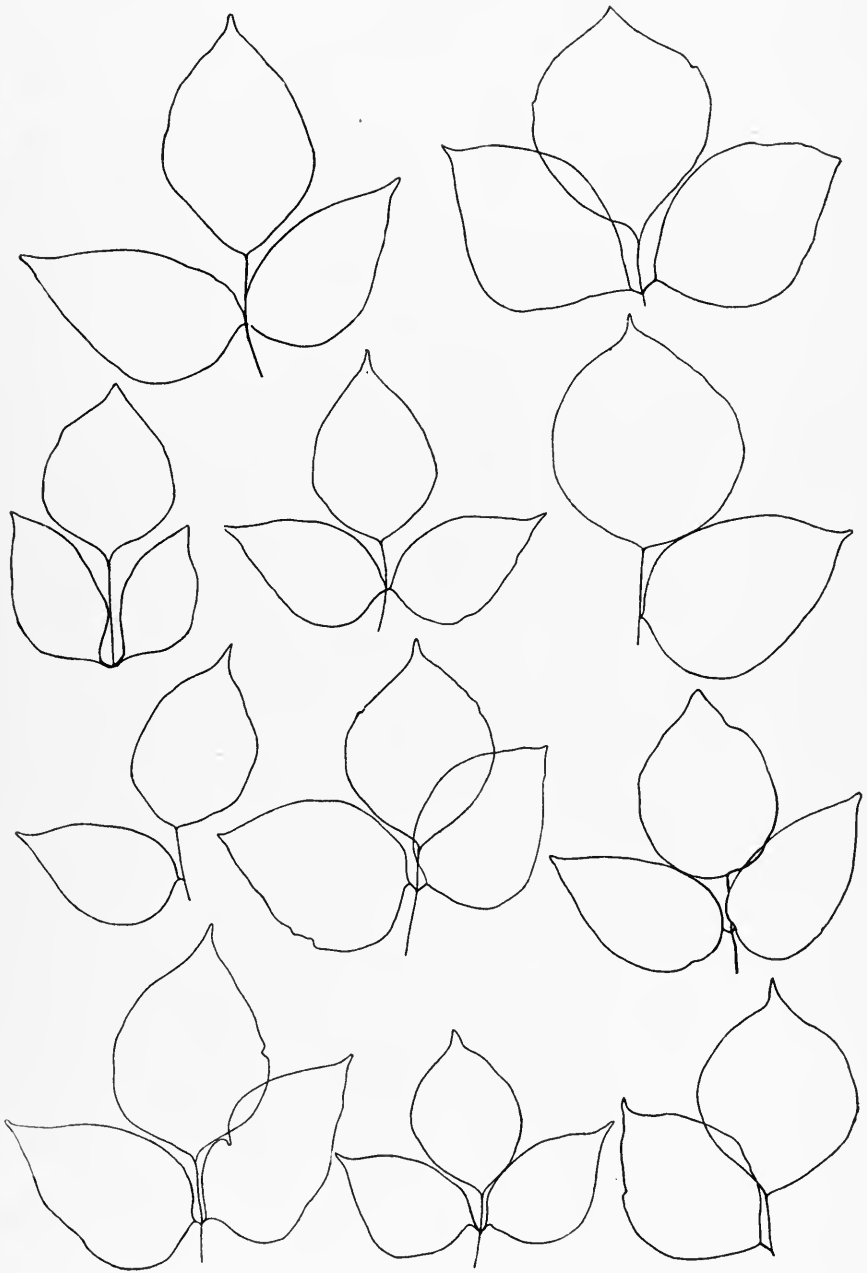
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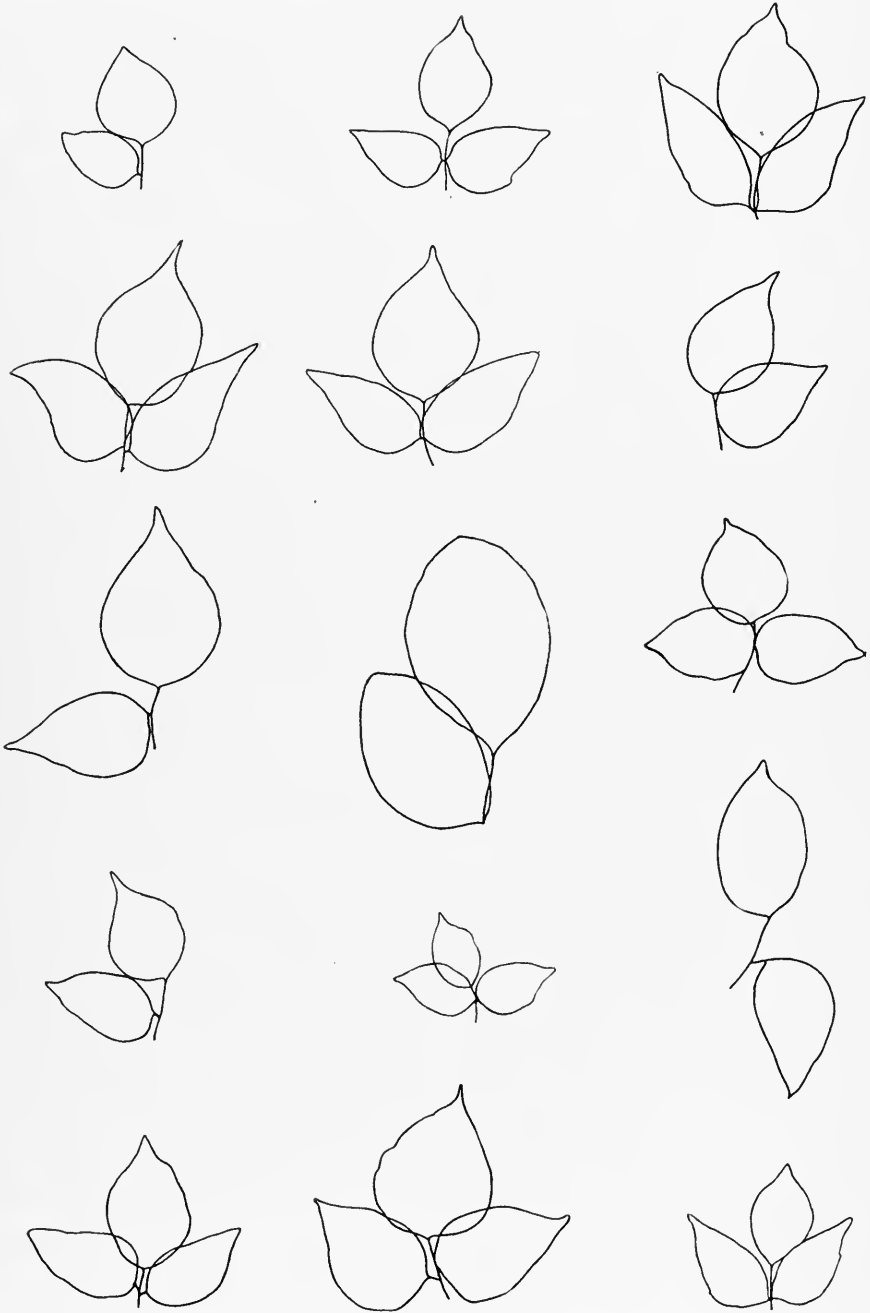
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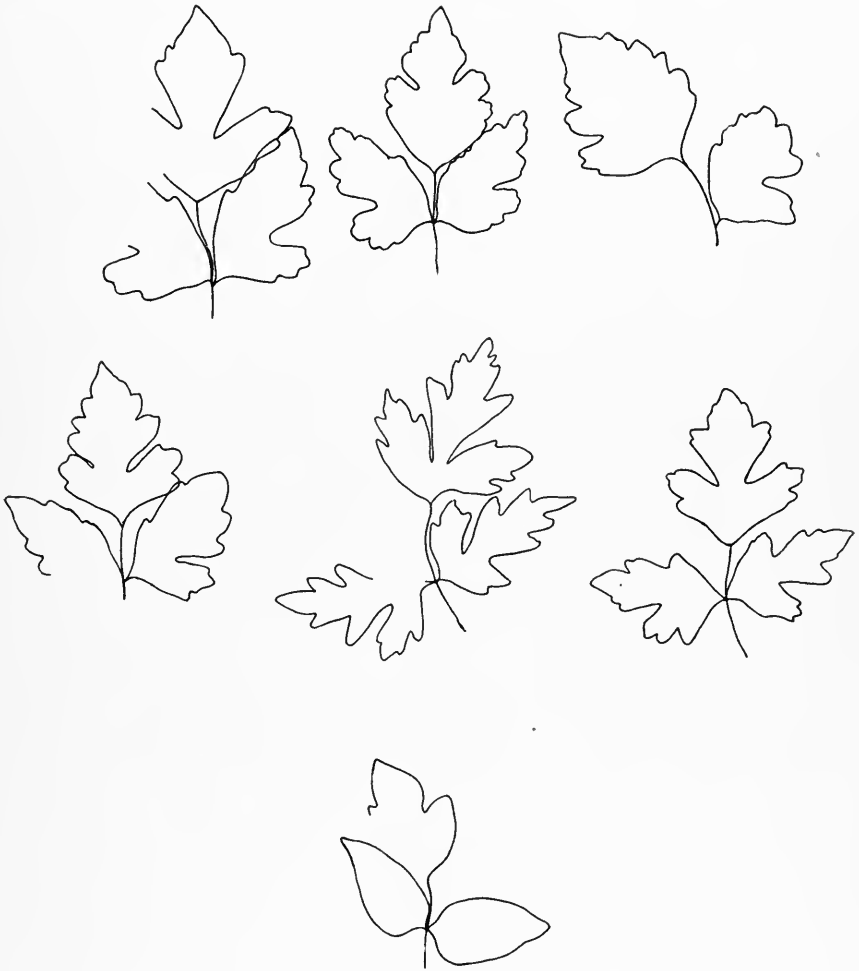


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RHUS TOXICODENDRON VAR. EXIMIA (UPPER SIX) LEAF TRACINGS

RHUS DIVARICATA (LOWEST) LEAF TRACING (x 1/3).

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