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A STUDY OF RHUS GLABRA.

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INTRODUCTION.

THE genus *Rhus* as Tournefort restricted it two centuries ago, and as many another systematist since his day has held it, is clearly marked and easily defined. As to habit — that foremost indication of a good plant genus — this generic type stands well aloof from all its allies; even distinctly apart from each and every one of those kindred generic groups which, like *Cotinus*, *Toxicodendron*, *Metopium*, *Lobadium*, *Rhoetidium*, and *Styphonia*, in another than the Tournefortian school of taxonomy, have been thought of as preferably constituting mere subgenera of *Rhus*. But not a species in any of those other genera named makes the least approach to typical *Rhus* in habit. Every species and variety of this appears as a shrub or tree with few stout stag-horn-like branches, each clothed heavily near its summit with odd-pinnate leaves, these usually large and of many leaflets. In our silva the only tree which in aspect recalls the sumachs is that naturalized alien, the *Ailanthus*, a genus of no near affinity to *Rhus*. But between the last and its near relative *Schmaltzia* there is no habitual resemblance. In this regard they are quite as unlike as are currant bushes and elder trees; and, as for *Toxicodendron*, its habit is as remote from that of *Rhus* as the habit of a grape vine or English ivy is remote from that of walnut trees.

Over and above its marked habit, the characters by which this *Rhus* of Tournefort establishes itself as a model genus are, the

terminal origin of its inflorescence, the firmness and compactness of that inflorescence, concurring with small red velvety or plushy drupelets for fruits.

Of the genus, in this which seems to me the most reasonable and natural acceptance of it, there exist in North America, according to classic standards, four species, — *Rhus glabra*, *typhina*, *pumila* and *copallina*.<sup>1</sup>

To the last of these there is attributed a geographic range somewhat incredible for that of any one species of shrub of whatever genus; almost incredible, I say, to any experienced student of climatology as affecting plant life and the distribution of species. But according to the books *Rhus copallina* occurs as one and specifically the same in several widely sundered and very different floral regions. It is said to be common in the hard soil and severe climate of New England, and as much at home in the subtropic lowlands of Florida, twelve hundred miles southwestward; even running away to the arid cactiferous hills of further Texas that lie westward from Florida another thousand miles; and yet again, in a region so extremely different from either of these as that of the Great Lakes in Minnesota and Wisconsin, the same *Rhus copallina*, it is said, recurs.

An European celebrity more than twenty years ago, without field knowledge of the shrubs, and with no experience in problems of North American phytogeography, but using the imperfect light of European herbarium material only, made out and named a half dozen varieties and subvarieties of our *Rhus copallina*; <sup>2</sup> all which work is ignored or suppressed by later American compilers of books; to whom the following out of the vivid suggestions of Engler would entail the expenditure of much time and energy, whereas suppression is of all things the most easily done.

*Rhus copallina* is one of many hundreds of North American phytologic problems awaiting investigation and solution.

Another of our four species, namely *Rhus pumila*, stands in most marked contrast to the preceding in point of geographic

<sup>1</sup>Torrey & Gray, Flora of North America 1: 217. Gray, Synoptical Flora 1: 384.

<sup>2</sup>Engler, in DC. Monographiæ Phanerogamarum, 4: 383.

distribution. It is almost local, occurring nowhere but in lower and middle districts of the Carolinas and Georgia.

*Rhus typhina*, the largest and most tree-like of our species, ranges widely, at least when compared with *R. pumila*. It is catalogued for all the states from Maine to Georgia and Mississippi, thence northward to Minnesota and the Dakotas, but is everywhere less common than *R. glabra*, and more particular than either that or *R. copallina* as to its environment. Everywhere southward it is of the mountains or the hill country only, never coming down to the lowlands or to the seaboard. Neither at the northwest does it come out from its woodland habitat to adorn the copses bordering the prairies where a subspecific ally of *R. glabra* is so much in evidence. It seems to have little adaptability to varying conditions other than those of heat and cold; though in this regard its adaptability is very marked. The climate of Minnesota and the Dakotas, and that of Georgia and Mississippi are extremely unlike as to temperature. Yet between the *Rhus typhina* of the most northerly locality and that of the stations farthest southward, one does not discover notable differences other than those of the size of the shrub and the number of the leaflets. In other respects they seem to be much the same; so that the type is apparently one of a singular degree of stability under somewhat varying conditions.

Concerning *Rhus glabra*, the type species of the genus as to North America, one may note first of all its nearly universal distribution. In this regard it is most unlike any of its congeners here. From beyond the river St. Lawrence northward, down to the very shores of the Gulf of Mexico, its range is across the continent. Within these parallels, into every floral region between the oceans, however different — excepting only that of California — there enters that which, according to the books and lists of plants, is *Rhus glabra*.

There is no one species of tree or shrub of any continent that really holds the geographic range which the books and lists ascribe to *Rhus glabra*. By all the analogies of things there ought to be several marked species or subspecies of this type in the southern Appalachian region between Maryland and Tennessee and Georgia; another and an equally distinguishable set

between northern New England and the headwaters of the Mississippi beyond Lake Superior; another species or two peculiar to that vast empire of the Middle West, the prairie country; as many more in that different and equally extensive stretch of country lying between southern Missouri and the shores of the Gulf of Mexico. Then, since there is a *Rhus glabra* all up and down the two thousand miles' length of the Rocky Mountain region, this ought to be thoroughly distinct by plenty of characteristics, and to resolve itself naturally into a number of varieties or subspecies. Just the same should be looked for in the shrub accredited to another empire, that of the Pacific slope northward lying between the sources of the Columbia and Puget Sound; while the scores of isolated mountain ranges rising up out of the deserts of Nevada, Utah, Arizona and New Mexico — for the type in question is there also — should furnish another and presumably the most marked group of *Rhus glabra* segregates.

Our herbaria cannot to-day be supposed to be well supplied with specimens representing this type. No author has investigated it, and no special call has been made for the collecting of these shrubs from different regions. Nevertheless, the mass of material that has been before me during some months past is amply sufficient to enable the investigator to point out characters by which a number of species may be, and reasonably must be, given recognition; characters of foliage in abundance, and characters of the fruiting panicle and the fruit itself.

Perhaps more trying than the task of examining and comparing specimens to find out specific characters, is the great amount of bibliographic work that is necessary in order to determine which one of the several eastern species ought to bear the name *Rhus glabra*; for even this, as indicated — though never described — by Linnæus was an aggregate. In the botanic gardens of Europe several species had been long in cultivation, had been recognized as species and even described as such, when Linnæus in the middle of the eighteenth century came along, and, bundling all the glabrous kinds together, named not any one of them, but the whole bundle of species, *Rhus glabra*.

If Linnæus is to be credited with some one particular *Rhus*

*glabra* that we must if possible segregate from the bundle of species which bundle he so named, our task is one demanding the very best skill of both the taxonomist and the historian.

#### EARLY HISTORY.

Prior to the discovery of America the *Rhus* of all botany was a monotypic genus. It began and ended with *Rhus coriaria*, also by some authors called *Rhus obsoniorum*, a shrub of the Mediterranean region, well known in the useful arts from immemorial ages.

No second species of *Rhus* was known until as late as the year 1620, when Caspar Bauhin, publishing an illustrated quarto containing names and descriptions of more than 600 new plants from various parts of the world, brought to the notice of botanists what he chose to name *Sumach angustifolium*.<sup>1</sup> This was known to have come from the New World, though in an herbarium specimen only. Historically this is the earliest and oldest element entering to the confused *R. glabra* Linn. Bauhin himself in the year 1620 showed a preference for the Arabic name *Sumach*, the exact equivalent of the Greek and Latin *Rhus*; but in his more comprehensive work of three years later, the *Pinax*, as if having decided to use the Greek and Latin rather than the Arabic name of the genus, he adopts *Rhus*, renaming his new American species, *Rhus angustifolia*.<sup>2</sup>

At the time of its publication in 1620, and long afterwards, the material on which it was founded was believed to have been derived from some island off the coast of Brazil; but a century later, no further specimens of it having been received from any part of South America, and because of its now having come to be known as certainly North American, the idea of its being indigenous to Brazil was abandoned.

In so far as I have been able to examine early records, the next mention of any American *Rhus* is in Banister's Catalogue of Virginian Plants, published in the year 1688. That this was some member of the group of *R. glabra* we are assured by his note that the branches are glabrous. The one with soft hairy

<sup>1</sup> *Prodromus Theatri Botanici*, p. 158.

<sup>2</sup> *Pinax Theatri Botanici*, p. 414.

branches, *R. typhina*, was by this time well known by Bauhin's description of it, and had perhaps already appeared in some gardens in Europe. In 1726 both the hairy and the smooth sumachs were to be found in some London gardens and parks, and in 1732 Dillenius published a folio plate and a full description of what must apparently stand for the *R. glabra* Linn. of 1753.

CHARACTERS FOR SEGREGATE SPECIES.

Linnæus' statement of the characters of *Rhus glabra* reads thus: "Leaflets pinnately arranged, lanceolate, serrate, glabrous on both faces." This is the same as no description at all. If one assume said compound leaf to be odd-pinnate rather than equally pinnate, one does so without any warrant in any word that author said about either the species or the genus. Equally without warrant will be any assumption that the leaf is of 7 leaflets, or that it is of 17, or of 27. Linnæus gives no hint of its character in these most significant particulars. One will also reasonably infer that the leaflets are not notably pointed at the upper end; and whether at base they be stalked or sessile you have no means of judging. It must also be assumed that there is no distinction of coloring noticeable respecting the two faces of the leaf; also whether of a dark-green, or of a bright-green, or of a glaucous or blue-green, one is not informed. Such a description as Linnæus gives of *Rhus glabra* might easily apply to each one of five species, or of fifty, or of five hundred species in a genus. It is therefore worthless for diagnostic purposes.

Coming down from the middle of the eighteenth century to near the close of the nineteenth, we shall find that in American books of American botany the Linnæan diagnosis of *R. glabra* has met with a little amendment. That in Gray's Manual in 1890 reads thus: "Smooth, somewhat glaucous; leaflets 11-31, whitened beneath, lanceolate-oblong, pointed, serrate." The expression, "whitened beneath," is one that helps us to fix on certain shrubs, mostly southern, as representing this author's *R. glabra*; but in New England there are at least two different sumacs which this phrase completely excludes; one of them, inhabiting Massachusetts, shows not even a trace of bloom on the lower face. Both of these, and with them several more

species of the east and south, are excluded as having hardly half of the "11-31" leaflets.

In Britton's Manual of 1901 is that of Gray somewhat amplified and therefore less safe. Here Gray's evasive term, "pointed," gives place to the more definitive word "acuminate," but this excludes yet another set of forms in which no leaves are acuminate. Moreover, leaves and leaflets have different ways of being acuminate, in so much that, in order to be able to really describe the apex of the leaflet in each segregate of *R. glabra*, I find it necessary to use such truly definitive terms as subulate-acuminate, cuspidate-acuminate, and such phrases as slenderly acuminate and caudately acuminate. But more unfortunate still is the Britton's Manual description of the leaves as being dark-green above. That indeed applies to what I take for real *R. glabra*, and to several of its Atlantic slope allies; but it holds good in not one of those far-southwestern species of New Mexico, Arizona and Utah, which said Manual goes far out of its way to speak of as forming a part of *R. glabra*. Even in the middle west and far-northwestern districts not a tittle of the definable species can be said to have leaves of other than a dull lightish green.

Finally, the authors of none of the books knew anything of the differences of fertile inflorescences in this aggregate. That these in the fruiting and mature state are narrowly oblong in a few, oblong-fusiform in many, and almost or quite exactly pyramidal in many more, a discovery the importance of which will not be disputed, is a fact which is herein first brought to notice.

It is my belief that even the flowers in some species will be found to present characters available for the further establishment of species here. Both calyx and corolla are far from being the same in all; but I have declined to make any use of these for the reason that in the herbaria exist such multitudes of specimens that are in flower only, and of which the fruiting panicles are yet unknown.

In true *Rhus glabra*, and also in by far the greater proportion of the segregates herein proposed, both branches and foliage are wholly glabrous. In the diagnoses I permit this to be taken

for granted, never mentioning such a matter except in the cases of those two or three of the new species in which there occurs a trace of pubescence.

KEY TO THE SPECIES.

\* Leaves deep or dark green above (except in No. 9), usually white with bloom beneath.

† Panicles of fruit oblong, or oblong-fusiform.

Leaflets very many, 17-21 or more, and large.

Leaflets oblong-lanceolate, obtuse at base and sessile, at apex abruptly pointed..... 1. *R. glabra*.

Leaflets oblong-lanceolate, sessile, slenderly long-pointed.

2. *R. oreophila*.

Leaflets linear-lanceolate, sessile and auricled at base, at apex caudate-acuminate..... 3. *R. auriculata*.

Leaflets less numerous, commonly 13-17.

Leaflets lance-oblong, tapering abruptly at base and less abruptly at apex..... 4. *R. ithacensis*.

Leaflets oval to oblong-lanceolate, merely acute at apex.

5. *R. ashei*.

†† Fruiting panicles broadest near the base and pyramidal.

Leaflets rather few (except in Nos. 6 and 8).

Leaflets 17-21, sessile, oblong-lanceolate, acuminate.

6. *R. pyramidata*.

Leaflets very large, but only 13-17, sessile, acute rather than acuminate..... 7. *R. caroliniana*.

Leaflets 19-23, narrowly oblong-lanceolate, obtuse at base, the apex subulate-linear..... 8. *R. atrovirens*.

Leaflets 13-17 and small, oblong-lanceolate, coarsely serrate, slenderly acuminate..... 9. *R. pulchella*.

Leaflets only 11-15, notably thin, attenuate-acute.

10. *R. ludoviciana*.

Leaflets 11-13, small but firm, subpetiolulate, abruptly but sharply acuminate..... 11. *R. arbuscula*.

Leaflets 13-15, large, petiolulate, subfalcate, sharply acuminate.

12. *R. petiolata*.

Leaflets 13-17, oblong-lanceolate, subpetiolulate, triangular-subulate at apex..... 13. *R. valida*.

Leaflets 13-15, sessile by a rounded base, the apex short, slenderly attenuate..... 14. *R. longula*.

Leaflets only 11-13 and small, sessile, subulate-acuminate, their rachis pubescent..... 15. *R. sandbergii*.



\* \* Leaves ample (except in No. 25), of a lighter green above, less glaucous beneath. Panicles in almost all pyramidal.

All the species far western and northwestern.

Leaflets 13-17, subsessile, sparsely pilose, subulate-acuminate.

16. *R. borealis*.

Leaflets 11-13.

Large, sessile, subfalcate-oblong, abruptly broad-pointed.

17. *R. media*.

Oblong, subsessile, abruptly acuminate .....18. *R. cismontana*.

Large, acutish at base and subpetiolulate, abruptly short-pointed.

19. *R. sambucina*.

Leaflets 13-17.

Shining above, sessile by an obtuse base, cuspidately acute.

20. *R. nitens*.

Checked light and dark green above, subsessile, cuspidately acuminate .....21. *R. tessellata*.

Leaflets 9-15, oblong-lanceolate, sessile, acuminate.

22. *R. macrothyrsa*.

Leaflets 17-19, oblong-linear, sessile, acutish at base, long-acuminate.

23. *R. arguta*.

Leaflets 13-17, oblong, sessile, obtuse at base, the apex merely acute.

24. *R. aprica*.

Leaflets 11-13, narrowly lanceolate, sessile, acuminate.

25. *R. occidentalis*.

\* \* \* Leaves smaller, of fewer leaflets, altogether pale, very glaucous beneath. Panicles small, less definitely pyramidal.

All of arid southwestern regions (But No. 9. *R. pulchella*, of the southern Appalachian mountains is naturally of this group).

Leaflets 11-15.

Sessile, oblong-lanceolate, short-acuminate.....26. *R. albida*.

Petiolate, subfalcate-lanceolate, slenderly acuminate.

27. *R. elegantula*.

Leaflets 9-11, sessile, oval to oblong-lanceolate.....28. *R. sorbifolia*.

Leaflets 7-9, subsessile, lanceolate, slenderly acuminate deeply incise-serrate .....29. *R. asplenifolia*.

### 1. RHUS GLABRA Linnæus.

*Rhus ramis ex stipite pullulantibus glabris*, Banist. Catal. in Ray, Hist. 2: p. 1928. 1688.

*Rhus Virginicum panicula sparsa, ramis patulis glabris*, Dillen., Hort. Elth. p. 323, t. 314. 1732.

*Rhus glabra* Linn. Sp. Pl., p. 265. 1753, in part, excluding both the shrub of C. Bauhin and that of Catesby.

*Rhus glabrum*, Mill. Dict. 1768?

Shrub commonly 2-3 m. high, with very few and stout divergent branches: leaves mostly 5-7 dm. long, the rachis and petiole very stout, the latter 1-1.5 dm. long; leaflets about 17-21, not crowded, very large, 8-13 cm. long, 3-3.5 cm. wide, oblong-lanceolate, subsessile, abruptly and not slenderly acuminate, evenly serrate, the serratures 12 or 13 on a side, texture in maturity rather firm but not subcoriaceous, upper face deep green and smooth, lower face glaucous but not excessively so: staminate panicle very large, often 3 dm. high, pyramidal, almost 2 dm. wide at base in the largest, the pistillate, when in flower nearly as long but fusiform, less than 1 dm. wide up and down the middle part, in fruit oblong-fusiform, 6-10 cm. wide below the middle; drupelets very many, round-ovate.

This is the common and apparently the only glabrous *Rhus* of the Potomac Valley in southern Maryland and eastern Virginia, ranging eastward and northward through southern Pennsylvania, to Delaware, New Jersey, and to Connecticut, if I refer here a flowering specimen in the National Herbarium from Green's Farms, 1894, by C. L. Pollard. The type from which the above description is drawn is the shrub as it grows in the District of Columbia, and up and down the Potomac above Georgetown.

The choice between this and the next for something to bear the name *R. glabra* Linn. is made rather arbitrarily, perhaps; for either one may have been that grown in the Eltham garden and figured by Dillenius. The two are distinct by their fruiting panicles, and the fruit of the Dillenian type was unknown, because only the staminate shrub was raised from the seed by which it was introduced into Europe. As to the size of the leaves and leaflets, however, the present species alone answers to the account given by Dillenius; hence the probability in favor of this as identical with his.

Since Linnæus himself did not describe the species; and since the one only synonym, quoted by him which carries with it a description is that of Dillenius, the name *R. glabra* must be

applied here unless it be left to fall into synonymy altogether.

Philip Miller, as a contemporary of Dillenius and Linnæus, and as a cultivator of these shrubs, might have been expected to identify correctly the *R. glabra* of Linnæus when he adopted the name; yet to what he so named in his Dictionary, the name *glabra* does not really apply, for he describes its branches as downy, thus awakening a doubt as to whether his *R. glabra* was not some possible segregate of *Rhus typhina*.

## 2. RHUS OREOPHILA, sp. nov.

Shrub 2-3 m. high: leaves 3-4 dm. long, the petiole 6-8 cm. long; leaflets 19-27, closely approximate, not of the largest, 7-9 cm. long, 2.5 cm. wide, narrowly oblong-lanceolate, sessile, rather slenderly acuminate, lightly and almost obsolete serrate, the serratures 10-12 on each side, texture firm, almost subcoriaceous, lower face whitish with a dense bloom, upper face by no means deep or dark green, of a rugulose-roughened rather than smooth surface: fruiting panicle large and much elongated, oblong-fusiform, 18-28 cm. long, only about 5 cm. wide, very compact, the drupelets subglobose, nearly 5 mm. in diameter.

Mountain districts of Maryland, Virginia, the Carolinas and eastern Tennessee; not in the lower hill country of the Potomac Valley outside the mountains, nor at all northward. The type specimen in the National Herbarium is on sheet No. 327800, from Chapel Hill, North Carolina, by W. W. Ashe, no date of collecting given, nor any specific locality. Two sheets from the Biltmore Herbarium, the material gathered at different dates in 1896 and 1897, without indication of either the collector or special station, except the name Biltmore, represent the species beautifully. So does another, from the mountains of Coker County, Tenn., by Mr. Thos. H. Kearney, September 14, 1897. Yet another U. S. Herbarium specimen, in good foliage but young fruit, is from near Luray, Va., by Mr. and Mrs. Steele, August 30, 1901.

The species is in contrast with *R. glabra* by smaller leaflets, with denser bloom beneath, and a longer, narrower thyrsum of larger and more closely compacted drupelets.

It may not perhaps be determinable to a certainty that the preceding rather than this, was grown in London, and formed the type of Dillenius' figure of leaves and staminate panicle. But Banister's field, and probably that of Catesby also, by both of whom seeds were sent to England, was the lower country, where only what I have here called *Rhus glabra* is found.

### 3. RHUS AURICULATA, sp. nov.

More slender than *R. glabra*, all the parts somewhat smaller, the fruiting panicles especially only about one-third as large: leaves 2.5–3.5 dm. long; leaflets about 19, approximate, often alternate, 7–10 cm. long, never more than 2 cm. in width, often less, of linear-lanceolate outline, the apex caudately long-attenuate, the sessile base showing definite though small auricles, the serratures light but rather close, 14–18 on a side, texture subcoriaceous, the upper face light green, transversely rugose, the somewhat sunken veins correspondingly prominent on the very glaucous lower face; fruiting panicles oblong or slightly verging toward the pyramidal, 10–13 cm. high; drupelets comparatively few, large.

A remote southwestern ally of *R. glabra*, with very definite specific marks. It is known to me only as collected by Mr. C. L. Pollard, August 11 to 12, 1896, the special locality, Agricultural College, Oktibbeha County, Mississippi. The type specimen occupies sheet 271931 of the National Herbarium. There is a duplicate in Herbarium Field Museum which I have seen. Mr. Pollard's distribution number 1261 is on these two of his labels that I have seen.

The species must quite surpass *R. glabra* in beauty. Its narrow slender-pointed leaflets seem to droop from the rachis rather than to spread away from it horizontally. This, however, is characteristic of several other allies of *R. glabra* belonging to regions lying westward.

### 4. RHUS ITHACENSIS, sp. nov.

All the parts smaller and more slender than in *R. glabra*, the branches not glaucous, seldom glaucescent: leaflets 13–17,

sessile by an abruptly acutish base, 6–7 cm. long, saliently serrate, the serratures 13–15 on a side, upper face dull deep green, lower glaucous but less so than in *R. glabra*, the texture thinner: fruiting panicle small comparatively, long-peduncled, 12–18 cm. long, oblong fusiform, not very compact, its branches thinly tomentellous; drupelets below medium size, notably smaller than in *R. glabra*.

Seems to take the place of *R. glabra* everywhere to the westward of the Alleghenies in western Pennsylvania and New York, and in northern Ohio. The station for the type is near Ithaca, New York, as the name might indicate; the type specimen is on sheet No. 225037 U. S. National Herbarium; was collected at Fall Creek, September, 1893, by K. M. Wiegand. Sheet 292227 is the same from Westmoreland County, Pennsylvania, 1878, by P. E. Pierron, consisting of uppermost leaves and a panicle each of staminate and pistillate flowers. It is also in U. S. Herbarium in flower only, from Elyria, Lorain County, northern Ohio, as collected in flower only by A. E. Ricksecker, August 1, 1894.

Excellent specimens, true to the type, are in the Herbarium of the Geological Survey of Canada as follows: sheet 34165 from Sandwich, Ontario, by John Macoun, July, 1901; also another from Bellville, Ontario, by the same as early as 1867, this in male flower only.

All the so-called *Rhus glabra* from the geographic region so indicated, differs from the southern *R. glabra* and the New England *R. pyramidata* in points quite sufficient to establish it in the rank of at least a strong subspecies.

##### 5. RHUS ASHEI (Small).

*Rhus Caroliniana* Ashe, Bot. Gaz. 20: 548, 1895, not of Miller, Dict. 1768.

*Schmaltzia Ashei* Small, Fl. 729.

Shrub erect but low, only 3–5 dm. high; leaflets 13–17, oval to oblong lanceolate, 5–7 cm. long, acute, not acuminate, sessile, rather coarsely subserrate-dentate, the teeth about 10 on each side, pale beneath but not glaucous: panicle of ovoid outline, large for the plant, 10–15 cm. long.

In old fields and low woods of middle North Carolina, collected by Ashe, who correctly indicated it as a good new species but under a name long preoccupied.

6. RHUS PYRAMIDATA, sp. nov.

Both the shrub and its foliage smaller than in *R. glabra*, the mature leaves firmer, almost subcoriaceous, equally white with bloom beneath, the whole leaf 3 dm. long or less; leaflets 17-21, sessile, oblong-lanceolate, acuminate, lightly serrate, the serratures 12-16 on each side: fruiting panicle large, notably compound, the primary branches being again widely branched, the whole subpyramidal, 8-12 cm. wide toward the base and only 12-18 cm. high; drupelets very numerous, smaller than in southern allies, 3 mm. wide, suborbicular inclining to ovate.

This definition I trust may prove to include a large part of what has been called *Rhus glabra* in northern New York, New England and adjacent Canada. That which I wish to cite as the type specimen is on sheet 312308 of the National Herbarium, and was collected near Lake Waccabuc, Westchester County, New York, by Mr. C. L. Pollard, August 12, 1894. The locality lies easily within the range of Colden's field studies made in the middle of the eighteenth century or earlier. It might therefore be guessed that *R. pyramidata* also entered into, and formed a part, bibliographically speaking, of Linnæus' aggregate *R. glabra*. But this cannot be established as a fact; nor would it alter the situation in the least if it could be; for Colden did not describe the shrub, and his work is of later date than that of Dillenius, to which we are obliged to resort for any described and definable thing that may bear the appellation *Rhus glabra* Linn.

The *Rhus glabrum* of Philip Miller, which he said was from New England, and which he reported as cultivated in his time under the name of New England Sumach, cannot have been the present species; for he attributes to that "downy" branches, as I have already remarked under *R. glabra*.

There is presumptive evidence in the herbaria of the existence in southern New England of at least two more species, the diagnoses of which cannot be safely made for want of fruiting pani-

cles. One of these I have seen only in the herbarium of the Field Museum, sheets 13682 and 18510. Both specimens were collected and distributed by the late D. C. Eaton, somewhere near New Haven; no date. Another is from South Hadley, Mass., 1887; the collector's name illegible. This is on sheet 275445 of U. S. National Herbarium. By evident marks of foliage and detached flowering panicle this is certainly distinct from all others known, and nearest *R. ithacensis*, unless the panicle be pyramidal.

#### 7. RHUS CAROLINIANA Miller.

*Rhus glabra*, *panicula sparsa coccinea*, Catesby, Carol. App. 4, t. 4.

*Rhus glabra* Linn. Sp. Pl. 2 ed. 380 (1762) in part only, and as to the shrub of Catesby.

*Rhus Caroliniana* Mill. Dict. ed. 1768.

*Rhus elegans* Ait. Hort. Kew. 1: 365. 1789.

Shrub 2-3 m. high: leaves large, but of only 13-17 leaflets, these not closely approximate but large, commonly 8-11 cm. long, 2-3 cm. wide, subsessile, acute rather than acuminate, strongly serrate, the serratures about 9 on a side, upper face deep green, lower glaucous: fruiting panicle large and not compact, exactly pyramidal, 2 dm. long or more, 1.5 dm. wide at base; drupelets uncommonly small, bright scarlet rather than dark-red in maturity.

A South Carolinian species, collected, described and illustrated by a large folio plate, in the middle of the eighteenth century, by Catesby, who also was the medium of its introduction into English parks and gardens at the same time; from which, also, it is probably long since lost. That it is thoroughly distinct from *R. glabra* Catesby's description and figure demonstrate, to all who know *Rhus glabra*. Philip Miller also knew it to be distinct, and in the year 1768 gave it the trivial name of *R. caroliniana*. Again, as still grown in Kew Gardens twenty years later than the date of Miller's work, Aiton, as if ignorant of Miller's name *R. caroliniana*, published it again as distinct from *R. glabra* under a new name, *R. elegans*.

From a highly instructive paper on some small trees observed

in Georgia, published by Mr. Roland M. Harper last year,<sup>1</sup> it appears to me probable that this zealous explorer of southern fields and woods has, without knowing it, rediscovered this large scarlet-fruited *Rhus* of Catesby. Mr. Harper says that he found what he took for *Rhus glabra* "in a cane-brake on the bank of the Coosa River, in Floyd County, about twelve miles below Rome, Georgia, a veritable little grove of this species, in which many of the specimens were as much as seven inches in diameter and thirty feet tall, with the lowest branches higher up than I could reach." Mr. Harper describes the drupelets of this tree as "bright scarlet," just the color mentioned by Catesby more than a century ago, as being one among several marks by which *R. caroliniana* was to be distinguished readily from the then well known *R. glabra*, the fruits of which are unvaryingly of a dark crimson when mature.

#### 8. RHUS ATROVIRENS, sp. nov.

Stout upright shrub, the young branches and lower face of foliage not very glaucous: leaves about 3 dm. long, with unusually stout petiole and rachis, the whole more firm and ascending than in allied species: leaflets about 23 and closely approximate, subcoriaceous, of a dark green above, pale but not white beneath, of only middle size, 5-7.5 cm. long, narrowly oblong-lanceolate, subsessile by an obtuse base, the apex subulate-linear, entire, the serratures of the margin, though obscure very numerous, 16-22 on each side: panicle of fruit narrowly pyramidal, 1.5 dm. long, compact; drupelets larger, than in the last, quite rotund, 4 mm. wide, deep crimson as in most species.

Mountain region of northern Alabama; type in the National Museum No. 19814, from near Gadsden, 1888, by Gerald McCarthy. Distinguished from one and all the foregoing by its narrow and crowded dark green and rather rigid leaflets.

#### 9. RHUS PULCHELLA, sp. nov.

Branches not stout, angular, glaucous, minutely lenticellate: leaves not large, about 2 dm. long, rather long-petioled, of a

<sup>1</sup>Torrey, 5: 163.



somewhat glaucescent green above, very glaucous beneath; leaflets 13-17, small, sessile, drooping on the rachis rather than spreading away from it on the same plane, oblong-lanceolate, 5-6 cm. long, slenderly acuminate and somewhat irregularly and coarsely serrate-toothed below the acumination, as well as more lightly and evenly serrate in the middle: panicle pyramidal, small, about 8 cm. long, slender-peduncled, somewhat recurved or drooping.

Known only from Yellow River, near McGuire's Mill, Guinnett County, Georgia, July 11, 1893, John K. Small; type in National Museum, sheet No. 19816. A small and very graceful species, recalling some of the far-southwestern forms found in Arizona.

#### 10. RHUS LUDOVICIANA, sp. nov.

Shrub with quite slender branches, the foliage not large ascending, glabrous except as to the hairy line of the rachis, about 2.5 dm. long; leaflets 11-15, opposite, of thin texture even in full maturity, dull green above, moderately glaucous beneath, 5-8 cm. long, attenuate, acute rather than acuminate, evenly serrate, the serratures 12-16 on each margin: panicle small, pyramidal, 8 cm. long, 4 cm. broad toward the base; drupelets obliquely orbicular, of a dark red-purple and not strongly pubescent.

The type specimen is in my own herbarium, from along the seaboard in southwestern Louisiana, at Cotes Blanches, October 10, 1884, by A. B. Langlois. A strongly-marked, probably small species, said to form low thickets in a peculiar maritime region that is still almost unknown botanically.

If the *Rhus angustifolia* Bauhin, believed to have come from the coast of Brazil, was derived from some North American coast by that voyager of nearly or quite three centuries ago, it would be easy to fancy that the specimen in Burser's herbarium, which became Bauhin's type, was from some shore of the Gulf of Mexico, and even may have been identical with what is here described as *R. ludoviciana*, and which is the only known maritime ally of *R. glabra*. And that which may elevate this

fancy almost or quite to the rank of a probability is the at least highly interesting coincidence that my type specimens of *R. ludoviciana* bear the only leaves and leaflets known to me that answer to Bauhin's description of those of Burser's specimen. He gave the number of the leaflets, their form and dimensions, the serrated character of their margin, and the narrowly attenuate apex, not omitting mention of the darker green upper and paler lower faces of the leaflets.

This, as I have said before under *R. glabra*, is the earliest element, historically speaking, that enters into Linnæus' aggregate; and had the latter described his *Rhus* species as carefully as Bauhin had described his a hundred and thirty years before him, the task of the twentieth century botanist at this juncture would have been much less difficult.

#### 11. RHUS ARBUSCULA, sp. nov.

Shrub low, tree-like in form though commonly less than 1 m. high: branches of the season glabrous, glaucous, obscurely angled, not very stout, but foliage large and ample; largest leaves 3 dm. long, of 11 to 13 rather remote leaflets, these lance-oblong, 7 to 9 cm. long, often subfalcate, notably inequilateral at base, never quite sessile, the petiolule definite though very short, upper face of leaflets light or deep-green, the lower very glaucous; serratures moderately salient, 10 to 15 on each margin, the apex abruptly and sharply acuminate: panicle pyramidal, very small for the foliage, usually but 7 to 9 cm. long; drupelets of the smallest.

Near Culver, Marshall County, Indiana; collected August 18, 1906, by Mr. H. Walton Clark, of the United States Bureau of Fisheries.

The type locality, and thus far the only known station, is a barren hill above the eastern shore of Lost Lake, near Culver, Indiana. The specimens at hand are two, both of them excellent, but evidently not from the same bush, and, as I suspect, from somewhat different exposures. One of them has a maturer foliage beginning to redden for the autumn; and the branch, as well as the rachis of the leaves in this all show much bloom.

This I designate as the type specimen. The other differs only in having foliage of a clear and vivid green, and the stem shows but little bloom. Both specimens have been presented to, and will be preserved in, the U. S. National Herbarium.

12. RHUS PETIOLATA, sp. nov.

Branches not stout, glabrous, glaucous, striate, roughened also by small and very protuberant lenticels: leaves ample, not long, though long-petioled: leaflets about 13, large, 8-10 cm. long, oblong-lanceolate and often subfalcate, distinctly petiolulate, the base obviously inequilateral, apex sharply acuminate, the sides sharply but unevenly serrate, the serratures 13 to 15, upper face of leaflets of a rich deep green, the lower very glaucous: panicle small for the foliage, pyramidal, 10 cm. high, compact, the branches thinly and rather stiffly hirtellous; drupelets rather large.

Prairie region of the interior of Minnesota, the type from near Spicer, Minn., August, 1892, W. D. Frost, Herb. Field Mus. sheet No. 140259. Well marked by the large definitely petiolulate leaflets.

13. RHUS VALIDA, sp. nov.

Branches very stout and robust, upright, at the end of the first season no longer glaucous but light brown, between cinnamon and chestnut-color, striate, copiously lenticellate: leaves not large in proportion, less than 3 dm. long; leaflets about 15, approximate, short-petiolulate, oblong-lanceolate, 6-10 cm. long, with about 11 serratures on each margin and a short triangular-subulate point, texture subcoriaceous, upper face dull deep green and transverse-rugose, lower fairly glaucous but not white: panicle rather oblong-pyramidal, large, 12-14 cm. high, its branches thinly tomentulose-pubescent: drupelets many, large, little compressed, rather thinly plushy.

Even in the herbarium specimens this impresses one as something wholly apart from any and all eastern and southern shrubs that have been called *R. glabra*. The very stout striated, lenticellate and upright branches, with smallish foliage

evidently more ascending than is usual in the genus, and the large rather narrow panicle—all these marks indicate a species, and one possibly somewhat local about Lake Michigan. The type specimens, all in Herbarium Field Museum, are from Hinsdale, a suburb of Chicago, and were collected October 12, 1902, by Ernest C. Smith, his distribution No. 577. I also refer here without hesitation Mr. O. E. Lansing's No. 1111, as in Herbarium Field Museum, from West Pullman, Ill., September 8, 1900.

Later than all these are specimens sent me late in August, 1906, from near Nashotah, Wisconsin, by Dr. H. V. Ogden of Milwaukee. These came to hand after the above diagnosis of *R. valida* had been finished, and the type specimens returned to the Field Museum. But they answer perfectly to my description of the species in every particular, and therefore only further confirm it while extending its range.

#### 14. RHUS LONGULA, sp. nov.

Stem and branches not known: leaves about 3 dm. long, with long stout ascending petiole, and 13 or 15 approximate leaflets, these 7–9 cm. long, sessile by a rounded base, the apical acumination short though slenderly attenuate, the margins lightly and almost subcrenately serrate with about 11 or 12 serratures, texture firm, hardly subcoriaceous, color dark dull-green above, whitish-glaucous beneath: fruiting panicle narrowly oblong and greatly elongated, 18 cm. long, hardly 5 cm. wide at the widest part, the short branches hirtellous-tomentulose; drupelets of middle size and numerous.

Bluffs of the Mississippi River far northward; the special station for the type somewhere near Stockton, Minnesota; the type specimen in U. S. Herbarium, No. 19813, collected by Mr. John M. Holzinger, August 23, 1888. Also on sheet 19811 is a flowering specimen by the same collector, of "May, 1889," which appears to be the same specifically. The station for this is not named.

That *R. longula*, away at the western North should flower in May is noteworthy; for its ally, *R. glabra*, so far southward as the valley of the Potomac does not begin to flower until July.

The eastern analogue, *R. ithacensis*, in Pennsylvania, does not come into flower before the end of July or early August. These segregates of *R. glabra* from the northwest, by their almost vernal flowering, reassert for themselves a more distant relationship to the eastern types than that which we should infer from their visible characters alone.

15. RHUS SANDBERGII, sp. nov.

*Rhus glabra* var. *sandbergii*, Vasey & Holzinger in Herbarium Field Museum.

Very dwarf, flowering and fruiting freely at 1.5–2 dm. high; branches of the season 4–5 cm. long, angular, rusty-tomentulose and with also a few hirsute hairs, older branches glabrate: leaves small, barely 1.5 dm. long, the slender rachis pubescent on all sides; leaflets 11–13, sessile, oblong-lanceolate, 4–6 cm. long, appressed-serrate, the serratures 15–17 on each margin, apex subulate-acuminate, both faces nearly or quite glabrous, the upper deep green, the lower glaucous: panicle very small, seldom exceeding 5 cm. long, subpyramidal, its branches densely and subtomentosely hirsute: drupelets of the ordinary size and color.

Said to grow in crevices of rocks, near the head of Lake Superior at Thompson, Minnesota, where it was collected in flower in July, and in fruit in August, 1891, by J. H. Sandberg, who afterwards distributed it under numbers 401 and 921. His locality for it is the only one known. I would indicate as the type specimen the fruiting one on sheet 19898 of the National Herbarium. Happily Mr. Sandberg, unlike most collectors of *Rhus* specimens, gathered this in both flower and fruit.

Prof. John M. Holzinger of the Normal School at Winona, Minnesota, would have proposed this species as new, in his paper published in the Minnesota Botanical Studies, part 8, in 1896, but was deterred by the opinion of some authority who would have reduced *R. typhina* and *R. glabra* to one species, with this as a connecting link between them.

## 16. RHUS BOREALIS, sp. nov.

Shrub evidently large but not stout, at least as to the branches, these smooth, glabrous, glaucous: leaves ample as to breadth, but not greatly elongated, 3 dm. long, the usual hairy line of the rachis quite hirsute, but other parts of the rachis, and also the midvein of the leaflets on both faces showing a few pilose hairs; leaflets 13-17, subsessile, broad and approximate, oblong-lanceolate, 8-11 cm. long, subulate-acuminate, coarsely and closely subcrenate-serrate, the serratures about 14 on a side, texture of leaflet uncommonly thin, upper face of a light but rather lurid green, the lower glaucous almost to whiteness: panicle not large, 11 cm. long in fruit, narrow-pyramidal, distinctly pedunculate, the peduncle and branches of panicle hirsute, the hairiness more or less distinctly retrorse: drupelets larger than the average and of a lighter color, being bright crimson.

Central Michigan near Alma, on dry ridges, collected August 12, 1895, by Charles A. Davis, the type specimen in the Herbarium of the Field Museum, Chicago. A fine species, perhaps common enough in central Michigan, and probably beyond the boundaries of the State southward, a region in which little or no effective collecting has been done in late years. But there is a poor flowering specimen, or fragment, in the National Herbarium which, by the one leaf it bears, I can refer here. This appears to have been sent by Mr. Beale, in 1899; but there is nothing to indicate who collectèd it, or where. Although pubescent, this bears no relation to *R. hirta*.

## 17. RHUS MEDIA, sp. nov.

Branches rather sharply angular in maturity and sparsely dotted with small lenticels: leaves large but not elongated, only 2 dm. long, rachis not stout, whitish with bloom, glabrous except as to a tomentulose line; leaflets about 13, large, sessile, oblong or subfalcate-oblong, broadly and abruptly pointed rather than acuminate, appressed-serrate, the serratures 13-15 on a side, the whole leaflet of firm texture and about 8 cm. long, 2-2.5 cm. wide, of a dull lightish green above, quite glaucous beneath:

fruiting panicle rather lax, slender-peduncled and as if somewhat drooping but of pyramidal outline, its branches rather finely pubescent; drupelets of middle size, notably oblique, acutish.

Inhabits the region of scattered woodlands and small prairies in southern Michigan and northern Indiana and Illinois, if I rightly refer to it rather numerous specimens, collected in various places, all in young leaf and flower only. Such are in the herbaria from Warrenville, Ill., by L. M. Umbach, July 2, 1895, and by Charles C. Deam at Bluffton, Indiana, 1897; but the type sheet, No. 124146 of the Field Museum, a perfect fruiting specimen, is from Jackson County, Michigan, by S. H. and D. R. Camp, September 19, 1898. Sheet 6072 of the same herbarium, from Stark County, Illinois, may or may not be the same. Its detached fruiting panicle may well belong here, but the one leaf shown is attached to a flowering branch, and therefore immature.

#### 18. RHUS CISMONTANA, sp. nov.

Shrub doubtless low, all its parts reduced in size and rather slender as to branches and leaf-rachis, all these pale and glaucous: leaves 1.5–2 dm. long, ascending; leaflets 11–13, not crowded, of a pallid green above but only glaucescent beneath, mostly oblong and abruptly acuminate, 4–6 cm. long, only sessile, or some of the more basal leaflets definitely petiolulate, sharply and rather closely serrate, the serratures 10–12 on each side, even the most mature state of foliage not subcoriaceous, though firm: fruiting panicle about 9 cm. high, pyramidal but narrowly so and compact; outline of drupelets slightly inclining to ovate, being a trifle longer than broad, not depressed but rather acutish at summit.

Open hills of the more westerly parts of Nebraska and Kansas, as well as probably in adjacent Colorado, if not Wyoming. The type specimens are in U. S. Herbarium No. 210241, collected by Mr. Rydberg in Thomas County, Nebraska, 1883; and Mr. J. B. Norton's so-called *R. glabra* from Riley County, Kansas, collected in 1895, appears to be quite the same; probably even Mr. Clements' specimens from northeastern Nebraska, 1893,

belong here, for, while in these the foliage is larger, the leaflets seem to have all the marks of *R. cismontana*, even to the petiolules, these being very evident.

19. RHUS SAMBUCINA, sp. nov.

Stem and branches unknown: leaves of few leaflets, the whole leaf, including the rather long petiole, little more than 2 dm. long, the leaflets 11 or 13, approximate, large, 7-10 cm. long, oblong-lanceolate, acutish at base and subpetiolulate, the apical acumination rather abrupt and short, the sides with 11 or 12 quite large and sharp serratures, the texture of mature foliage not known, color of upper face a pale glaucescent green, of the lower only paler, with nothing of the white bloom of real *R. glabra*: panicle not pyramidal even in flower, but rather oval, or at most oval-subpyramidal, in fruit oval, decidedly lax, the branches villous-pubescent; drupelets of middle size.

Singular species, with broad short leaves made up of few and much serrated leaflets, all pale green on both faces. The locality of this is remote and but little known. The type specimens are in Herbarium Field Museum, sheet 140404, and are from near Piedmont, South Dakota, by Alice Pratt, June and August, 1895. Unfortunately only the young foliage is present; the one fruiting panicle was preserved only as detached from the branch; yet this matches perfectly, in its peculiar branching and laxity, the flowering panicles.

In the same herbarium, sheet 123606, are flowering specimens of what seems to be the same, from southern Iowa, Decatur County, T. J. Fitzpatrick, June 13, 1896.

20. RHUS NITENS, sp. nov.

Shrub stoutish, perhaps low, young branches and also petioles and lower face of foliage merely glaucescent: leaves short and short-petioled, the whole leaf barely 2 dm. long, the petiole and rachis stout, ascending; leaflets 13-17, closely approximate, seldom opposite, lance-oblong, 4.5-6.5 cm. long, subcoriaceous, sessile by an obtuse base, the apex cuspidately acute rather than acuminate, evenly but not deeply serrate, the serratures 10-12



on a side, upper face of a lightish green but somewhat polished, the lower only pale, not whitened: fruiting panicle small, only about 8 cm. high, definitely pyramidal, its branches short, sparsely hirtellous: drupelets immature but perhaps full grown, orbicular, or a little broader than high.

At 6000 feet in the mountains near Provo, Utah, July 10, 1894, as collected by Mr. Marcus E. Jones, his No. 5612 as in the National Herbarium. This differs from all other far-western species in that its foliage is almost as highly polished as that of *R. copallina*.

#### 21. RHUS TESSELLATA, sp. nov.

Shrub low, copiously and densely leafy, the leaves rigidly ascending, about 2.5 dm. long, the pinnæ approximate; leaflets about 15, lance-oblong, 5-7 cm. long, not quite sessile, cuspidately acuminate, evenly and quite sharply serrate, the serratures 13-17 on a side, the texture subcoriaceous even at flowering time, upper face very smooth and somewhat shining, in general dark green, showing very prominently the fine whitish midvein and veinlets, but some intervals between veinlets wholly of a light green, exhibiting the whole surface as notably checkered, lower face merely pale and glaucescent, not glaucous: panicle small for the foliage; fruit not seen.

Foothills of the Rocky Mountains in northern Colorado, at altitudes of 6000 to 7000 feet; type specimen in U. S. Herbarium No. 257466, collected by J. H. Cowen, July 20, 1895; no special locality mentioned. The species by leaf characters alone is a very good one, even if the checkering of dark and light green be but accidental or occasional. The species here defined may or may not include all the so-called *R. glabra* of eastern Colorado mountains.

#### 22. RHUS MACROTHYRSA Goodding.

*Rhus macrothyrsa* Good. Bot. Gaz. 37: 56. 1904.

Shrub 1.5-2.5 m. high, glabrous except as to vigorous young growing shoots, these at base ferruginous-tomentose: leaves 2-2.5 dm. long; leaflets 9-15, green above, not glaucous beneath, oblong-lanceolate, sessile, acuminate, sharply serrate:

fruiting panicle open, large, oblong-fusiform, 15–25 cm. long, recurved, its branches coarsely pubescent: drupelets little compressed, 3 mm. wide.

Calientes, Nevada, 1902, L. N. Goodding. No specimens seen by the writer, but by the description the species must be distinct enough, and probably local in southern Nevada.

23. RHUS ARGUTA, sp. nov.

Shrub said to be 1–3 m. high, the branches stoutish, smooth, glabrous, glaucous even in full maturity; leaves notably ascending rather than spreading, 3 dm. long, the petiole uncommonly elongated and, like the rachis, very glaucous; leaflets 17 or 19, narrowly oblong-linear or subfalcate, 6–8 cm. long, sessile by an acutish base, closely, sharply and saliently serrate, the serratures 15 or 16 on a side, the acumination long and narrow, upper face deep green but dull, the transverse veins conspicuously paler, lower face very glaucous: panicle not large, 10–12 cm. high, pyramidal, its branches hirsutulous; drupelets of the largest.

Species of the Pacific slope, apparently common in the Columbia River region, at least eastward; very possibly an aggregate, resolvable into several; but the type of the above diagnosis is from Rhea Creek, Morrow County, Oregon, and was collected by J. B. Leiberger, September 11, 1894, his No. 893 as in U. S. Herbarium. The following, all from western Washington, are more or less true to this type: sheet 93075 in Herbarium Field Museum, from near Spokane, in flower only; sheet 93076 of the same, from the same region with lax pyramidal panicle very much larger, leaflets larger, greener on both faces and by no means sharply serrate; A. D. E. Elmer, Wawawai, 1897; Frank Kreager, Spokane County, 1902; Sandberg & Leiberger, Rock Island, 1893, and Robert Horner, Waitsburg, 1897, these last all as in U. S. Herbarium, likewise from Idaho, A. A. Heller, Nez Perces County, 1896, his No. 3421. This is quite true to the type as to foliage, but in flower only; a fruiting specimen, from Salmon River, Vernon Bailey, 1895, with leaflets not so typical.

Among all these there is nothing of Torrey's *Rhus glabra*, var. *occidentalis*. Nearly all that I have seen of Pacific coast material which matches that of the Wilkes Expedition, comes not from Oregon or Washington, but from British Columbia.

24. RHUS APRICA, sp. nov.

Dimensions of shrub, and characters of branches unknown: leaves as a whole remarkably broad and short, the leaflets being few and approximate but large, subcoriaceous, deep green above, light green beneath, but without bloom; leaflets about 15, oblong, 6–8 cm. long, obtuse at base and sessile, at apex only cuspidately acute, not acuminate, very evenly and quite distinctly though not sharply serrate, the serratures 10 or 11 on each margin: panicle pyramidal, small, about 8 cm. high, its branches only sparingly and obscurely villous-pubescent; drupelets rather large.

Very well marked by its few and large leaflets green on both faces; but known only as collected by M. W. Gorman, on Camas Creek in the Washington State Forest Reserve, August 20, 1897. It is said to occupy dry open grassy slopes. The type specimen is in U. S. Herbarium. Its label bears Mr. Gorman's collection number 632.

25. RHUS OCCIDENTALIS (Torrey).

*Rhus glabra occidentalis* Torr. in Bot. Wilkes' Exp. 257. 1874.

Only flowers and young foliage known: leaflets (in what should be the type specimen, U. S. Herbarium sheet No. 19819) 11–13, oblong-lanceolate, sessile, notably acuminate, beneath only glaucescent; the panicle small and very slender peduncled; even the branch slender, but quite glaucous.

The label bears, in the handwriting of Asa Gray, the legend, "Okanogan, Wash. Territory."

The Okanogan region lies partly in Washington and partly in British Columbia, and all the more recent specimens seen by the writer which match the type are from the Canadian part of the region. Sheet 4471 of the Canadian Survey Herbarium, Arrow

Head Lake, near Lake Okanogan, is every way true to the type, except that the leaflets are less numerous; nine in most of the leaves and none with a greater number, a few having seven only. In the same herbarium 4473, from Spence's Bridge, in the same general region, has mostly 13 leaflets. The like is true in the case of number 63749, collected at Cascade, B. C., by Mr. J. M. Macoun in 1902. But all these specimens are in one and the same unsatisfactory condition of early flowering, with foliage, of course, not fully grown. They indicate, however, a northerly species, from which the two Washington species herein characterized are sufficiently distinct. Not, however, until mature foliage and fruiting panicles of it shall be brought to light can *R. occidentalis* be properly described.

26. RHUS ALBIDA, sp. nov.

Probably low, the branches not robust, very light-colored and, with the rachis and lower face of leaves, much whitened with bloom, even the upper face of foliage of a pale color and glaucescent: leaves 1.5–2.5 dm. long; leaflets about 13, not crowded, not deflected but spreading, subsessile, 4–6 cm. long, oval to oblong-lanceolate, abruptly acute or short-acuminate, saliently serrate, the serratures 10–14 on each side: fruiting panicle about 1 dm. high and quite broadly pyramidal, its branches only very delicately but rather densely velvety: drupelets much compressed and acutish.

As far as known this very beautiful *Rhus* is local on the San Francisco Mountain not far from Flagstaff in northern Arizona. The type specimen, sheet No. 410696 of the National Herbarium, was collected there, at an altitude of between 6000 and 7000 feet, August 18, 1901, by J. B. Leiberg, his distribution No. 5871. A perfect male flowering specimen is in my own herbarium, as collected by myself at the same station, July 13, 1889. Again, National Herbarium sheet 334404 holds a flowering branch from the same locality by D. T. MacDougal, his distribution No. 309, July 18, 1898. This, too, from an altitude of about 7000 feet. The late date of its flowering, as an ally of *Rhus glabra* in the generally torrid climate of Arizona, indicates the subalpine character of its habitat.

27. *RHUS ELEGANTULA*, sp. nov.

Branches slender, glabrous, of a distinctly pinkish brown underneath a coat of bloom: leaves small, 1.2–1.8 dm. long, the slender rachis quite white with bloom, its villous line very marked; leaflets 11–15, loosely arranged, spreading or slightly deflected, distinctly petiolulate, 4–6 cm. long, narrowly subfalcate-lanceolate, at least the long and slender acumination falcate, sometimes the whole leaflet, the serratures, about 8 on a side, more or less sharply prominent, the texture rather firm, color of upper face pale bluish-green, the lower whitish with bloom: fruiting panicle large in proportion to the foliage, commonly more than 1 dm. high, pyramidal but narrowly so, its branches thinly villous with ascending or spreading hairs: drupelets small, arranged upon simple racemose branches of the panicle, compressed, acutish.

Mountains of extreme southern Arizona along the Mexican boundary, the typical specimens from about Fort Apache, by Edward Palmer, June, 1890; these on sheet 19808 of the National Herbarium; others distributed by Dr. Palmer under his No. 585. Probably the same as a specimen from the Santa Catalina Mountains, September, 1896 by J. W. Toumey, U. S. Herbarium sheet 441724. Lastly rather larger specimens, but otherwise true to the character, have come in this season from the Huachuca Mountains, sent by Mr. J. C. Blumer, who collected them late in August, 1906.

28. *RHUS SORBIFOLIA*, sp. nov.

Shrub apparently low and not stout, the young branches and lower face of foliage not whitened, hardly paler than glaucescent: leaves small, only 1–2 dm. long, spreading away from the stem divaricately, or even a trifle deflected, the petiole and rachis rather slender; leaflets few, only 9 or 11 and loosely arranged, dull deep green above, glaucescent beneath, of small size, 2.5–6 cm. long, oval to oblong-lanceolate, sessile by an abruptly acutish base, at apex subulate pointed rather than acuminate, rather remotely and sharply serrate, the serratures only 7–9 on each margin: panicle of staminate flowers pyram-

idal, 12 cm. long: sepals triangular, acute; petals twice as long, oblong, obtuse, the anthers equaling them.

Type from mountains west of Las Vegas, New Mexico, G. R. Vasey, 1881; U. S. Herbarium No. 19510. Species with most characteristic habit and foliage.

29. RHUS ASPLENIFOLIA, sp. nov.

Shrub evidently dwarf or at least low, the leafy branches short, slender, tortuous, glabrous, glaucous: leaves small, about 1.5 dm. long, the rachis slender, deeply and narrowly furrowed and the hairy line obvious; leaflets only 7-9, pale green above, moderately glaucous beneath, oblong-lanceolate to lanceolate, 3.5-5.5 cm. long; subsessile, acuminate, very irregularly and somewhat incisely serrate, even coarsely so, the serratures now and then so deep and large as to amount to lobes rather than serratures: only a staminate panicle seen, this narrowly pyramidal, 5 cm. long.

Type from Wolf Creek, Wyoming, July 12, 1896, A. Nelson, distributed to U. S. Herbarium, under No. 2303, mounted on U. S. Herbarium sheet 285144. Manifestly intermediate between the Nebraskan *R. cismontana* and the characteristic species of Arizona; the foliage peculiar.