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# AMERICAN SPECIES OF AMELANCHIER

BY  
GEORGE NEVILLE JONES

Price \$1.50

NAT.  
HIST.

THE UNIVERSITY OF ILLINOIS PRESS  
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1946

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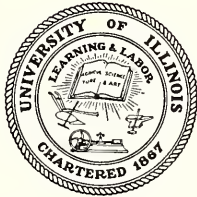
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# ILLINOIS BIOLOGICAL MONOGRAPHS

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AMERICAN SPECIES OF  
AMELANCHIER

WITH 14 MAPS AND 23 PLATES

BY  
GEORGE NEVILLE JONES

CONTRIBUTION FROM THE DEPARTMENT OF BOTANY  
OF THE UNIVERSITY OF ILLINOIS

THE UNIVERSITY OF ILLINOIS PRESS  
URBANA  
1946

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## I. INTRODUCTION

AMELANCHIER is a genus of shrubs and small trees belonging to the subfamily Pomoideae of the Rosaceae and including not more than two dozen species widely distributed in North America, Europe, northern Africa, and eastern Asia. Some kinds are highly ornamental and are planted for the showy early white flowers, as well as occasionally for the more or less edible fruits. Only the American species are included in this paper. Their number is eighteen. Two others formerly included in Amelanchier, inhabiting Guatemala and Mexico (and southern Texas), have been transferred to the genus Malacomeles, and are treated in another paper.

The origin of the generic name Amelanchier is not definitely known, but probably it has been derived from the Provençal name of the European *Amelanchier ovalis* Medic. The American amelanchiers are known by the common names serviceberry, sarviceberry, sarvis, maycherry, juneberry, shadblow, shadbush, shadberry, shadblossom, shadflower, shadwood, sugar pear, wild pear, lancewood, boxwood, Canadian medlar, bilberry, snowy mespilus, saskatoon, and perhaps some others. These vernacular names are used as follows: serviceberry, because of the similarity of its fruit to that of the European service tree (*Sorbus torminalis* (L.) Crantz); juneberry because the berry-like fruits of certain species ripen in June; in the eastern part of the United States the names shadblow, shadberry, shadblossom, shadflower, and shadwood are used for certain species that are in bloom when shad begin to ascend the streams. Lancewood and boxwood have been applied to other species because their wood has been used for handles for tools. The name saskatoon, used in western Canada for the fruits of *Amelanchier alnifolia* Nutt. and the bushes on which they grow, originated with the Blackfoot Indians, who used the fruits either fresh or dried. The pemmican of the Indians was composed of dried and pulverized deer or buffalo meat to which was added saskatoon berries, the mixture then being stirred into boiling fat, and when cooled molded into cakes. Explorers and prospectors found the fruits a welcome addition to their food supply, and it is recorded that the fruit of *A. alnifolia* was used by the members of the Lewis & Clark Expedition when they ran short of other food. The foliage of some of the western species is a palatable forage for grazing animals. Some of the eastern species make a satisfactory stock on which to graft the pear and quince.

The species of Amelanchier are closely related and are sometimes somewhat difficult to distinguish. One or more is found in each province of Canada, and in every state in the United States. The earlier students of the North American flora, including Michaux, Pursh, Nuttall, Torrey, and Gray, took the view that the genus in the western hemisphere con-

sisted of only one, or at the most very few, highly variable species. This attitude characterized the understanding of the genus in the United States during the greater part of the nineteenth century. Subsequent students have, however, broken away from this viewpoint, and there now may be found in botanical literature nearly two hundred binomials and trinomials representing the species of *Amelanchier* in America.

In 1912 the late Professor K. M. Wiegand, of Cornell University, presented a tentative revision of *Amelanchier* in eastern North America, recognizing eight species, including three newly described by himself. Subsequently, he described three more. His work has been followed rather closely by almost all recent writers of manuals, floras, and check-lists. It now appears that some species were improperly typified, and that the assumption was made that some of the nomenclatural types were "hybrids" and therefore to be discarded. This policy has been the cause of a certain amount of confusion in the taxonomy and nomenclature of several species. Probably this inexact typification was at least partly responsible for the vagueness and haziness of the specific lines, with the result that many specimens were supposed to belong to hybrid plants rather than to true species. In later years, Wiegand (*Science*, n.s. 81:161-166. 1935) concluded that there are in eastern North America . . . six or seven good species with normal ranges coinciding in general with the geographical areas in eastern North America, and fitting in with the ranges of other plants. The hybrids were usually local. Circumstantial evidence, therefore, seemed to indicate that these true species had been in existence a long time, during which they had spread over wide areas, as for instance from Newfoundland to Georgia and Minnesota — over all the area having suitable habitat conditions. They were old enough to have become more or less static as far as distribution was concerned. The hybrids seem like swarms of bees, buzzing around for a time, only to disappear, leaving the fundamental species to continue through the ages. . . . It can not be denied that species may have arisen through hybridity, quite possibly in the ways suggested by many geneticists, but one can not become very enthusiastic. At least, it seems evident that species are not being formed every day, or even every year, or even every century, as some enthusiasts are inclined to think.

In the genus *Amelanchier*, as in many other genera of vascular plants, hybridization between different species doubtless sometimes occurs, and the hybrids are recognizable by those familiar with the species, but as Wiegand has already pointed out the hybrids constitute an insignificant element in the flora. Referring to the subject of hybridization in *Rubus*, Dr. L. H. Bailey (*Gentes Herbarum* 2:272, 273. 1932) writes as follows:

We do not elucidate the blackberry problem by the assumption of miscellaneous hybridity as if the species themselves were known and all the puzzles were mixed progeny: our work takes a new direction the moment we cease to invoke crossing as a way to escape from difficulties. The fact that certain forms are puzzling and of doubtful specific validity does not make them hybrids. Hybrids there may be, but the first effort is to determine the species which are supposed to spawn into mongrels. Hybridity is to be accepted only on evidence; it can not be determined by the examination of usual herbarium specimens.



Recent trends in taxonomic studies of vascular plants emphasize the importance of exact typification and detailed diagnosis and description, as well as critical examination of a large series of specimens from the total geographical area of each species. Through the application of this method it is usually possible to outline a much more precise concept of the specific entities, and to interpret more accurately the boundaries between species, than was possible in former times. The net result of this sharper delineation is that the number of puzzling "intermediates," "hybrids," "varieties," "forms," and other taxonomic *collectanea* is appreciably diminished.

In a recent study (*Gentes Herbarium* 5:912, 913. 1945), Bailey says:

The office of taxonomy is to distinguish and define the units, which we call genera and species, and then to name the units so that they may be assembled into larger classes: the word taxonomy signifies classification. When we confuse the definitions we obscure the program. Taxonomy is not primarily the discovery of all detectable differences or merely the keeping of records. We are to discover the significancies to use in schemes of arrangement. . . . Marked variations which presumably have some constancy and are associated with geography or environment may be named and formally described in a taxonomic program, but study of variation itself is not a nomenclatorial problem, and the naming of inconstant or fugitive differences may obscure the undertaking. Taxonomy, or classification, stresses agreements.

Apart from the frequent assumptions of hybridity, and the former uncertainty connected with the identity of the holotypes, one of the other principal causes of confusion in the taxonomy of *Amelanchier* is the fact that specimens showing mere variations of foliage have been not infrequently described as new varieties or even species. Anyone who studies *Amelanchier* in the field, or who examines large series of specimens in herbaria, is at once struck by the extraordinary variation of the foliage that occurs even in the same species, as manifested in different stages of development and from various habitats. There is a great deal of difference between the appearance of specimens collected in the spring when the leaves are of thin texture and more or less pubescent, and specimens from the same shrub or tree in late summer or autumn when the leaves are larger, frequently somewhat coriaceous, and, with the exception of two western species, nearly or quite glabrous. The leaves of young shoots are usually much larger, and of diverse shapes and types of indentation. In the present paper no attempt has been made to describe these leaves; probably such descriptions would be either impossible or useless; instead, the descriptions have been drawn up from average normal leaves of the flowering and fruiting branches. For several of the species the following stages must be recognized and correlated before all specimens can be correctly identified: (1) specimens with unopened flowers and very young leaves, (2) specimens with opened flowers accompanied by half-unfolded leaves, (3) specimens from which the petals have

dropped, but with young unfolded leaves and young fruits, (4) specimens with mature leaves and fruits, (5) specimens with mature leaves but no fruits, and (6) specimens consisting only of leaves of vigorous young shoots. When placed side by side, specimens of the same species in these different stages of development often show an almost incredible dissimilarity and have been not infrequently mistaken for different species. However, collections of these different stages made over a period of years from the same plant, as from plants in cultivation in the Arnold Arboretum, and in the collections of feral plants made by critical field botanists, show conclusively that these extraordinary variations and "intergrades" are not at all, or only very rarely, due to hybridism, as has been frequently supposed, but are well within the range of normal variation of the species, not only among individuals in different habitats and other ecological conditions, but among different specimens from the same shrub or tree.

The taxonomic value of the kind of serration of the leaf-blades has to be estimated with caution. Nearly every species has a characteristic type of serration, but the range of variation within the species is frequently greater than that found between species. The statements, e.g., "leaves finely toothed," or "coarsely toothed," commonly used as key characters, may be often somewhat misleading, even though attempts are made to give them a semblance of quantitative value by recording the number of teeth per centimeter on average leaves, or the total number of teeth found on average blades. This is inevitable, because many species, including *A. spicata*, *A. florida*, and *A. pallida*, may have the blades finely toothed when young, while the mature leaves have a coarser indentation with fewer or larger teeth. It is only by confining the statement of indentation to the leaves of the flowering branches, or the fruiting branches, respectively, and then only by using the most general characterizations, that it is at all possible to use this character as a practical guide to the specific identity of the specimen under observation.

Similarly, over-emphasis must not be placed on the habit of the plant, which varies, of course, according to the habitat. Three American species—*A. arborea*, *A. interior*, and *A. laevis*—are arborescent, and under favorable conditions may become small or even moderate-sized trees, but under adverse conditions, shrubs many years of age may be only a foot or two in height. Certain other species, e.g., *A. spicata*, are usually dwarf, but under exceptionally favorable conditions may reach a height of two meters. However, it can be safely predicted that the truly frutescent species will never become trees, no matter how suitable the environmental conditions may be. In the western part of the continent especially, altitude is an important factor affecting the appearance of the plant, as is

also the wetness or dryness of the habitat. Certain species, e.g., *A. florida*, characteristically found at or near sea-level, may ascend the mountains to an altitude of 5000 feet or higher, where they show corresponding variations in their foliage, habit of growth, and general appearance. All these ecological variations must be taken into consideration in attempting to define the species.

In Amelanchier, as in most other genera of flowering plants, by far the most useful taxonomic characters are to be found in the morphological peculiarities of the flowers and fruits. The number of carpels, the length, and degree of fusion of the styles, the amount of pubescence of the top of the ovary, the number of stamens, the shape and size of the petals, and the shape, size, and direction of growth of the calyx-lobes, as well as the character of the inflorescence, are the best and most reliable structural criteria for taxonomic purposes.

Several explanations, including the theory of frequent hybridization previously mentioned, have been advanced from time to time to account for the peculiar variations within Amelanchier and related genera. However, certain available cytological data, although at present rather meager, seem to provide a more plausible alternative theory. The genera of the Pomoideae, including Amelanchier, that have been studied cytologically have been found to have a basic chromosome number of seventeen, or are polyploids with a basic number of seventeen. K. Sax (Journ. Arnold Arb. 12:3-21. 1931) reports that the pure species of Amelanchier that he studied are diploids, but two natural interspecific hybrids are tetraploids. In the same year, A. A. Moffett (Proc. Roy. Soc. Lond. ser. B, 108:423-446. 1931) investigated four species of Amelanchier and found that they are tetraploids. The chromosome number of the Pomoideae is a "secondary basic number (unbalanced relative to the primary basic number) and the derived series of polyploids ( $2n = 34, 51, 68$ ) are secondary polyploids." As previously noted, the great variation within the genus Amelanchier often makes taxonomic study extremely difficult. "Such a condition is to be expected from a group of complex polyploids, whose polyploidy furnishes a mechanism for the segregation of numerous variations, but whose general character is evidently determined by their characteristic balance." It seems possible, therefore, that polyploidy may have played a more important part in the differentiation of genera and species in this subfamily than has heretofore been realized, since a change in chromosome balance is usually accompanied by a change in the morphological characters of the plant.

The following description of the wood of Amelanchier is taken from S. J. Record & R. W. Hess, *Timbers of the New World*, Yale University Press, 1943, pp. 447-448:

Heartwood brown or reddish brown, usually absent from small specimens; sapwood thick, slightly brownish; appearance of lumber usually marred by numerous brown lines (pith flecks). Luster medium. Odor and taste absent or not distinctive. Hard, heavy, compact, tough, and strong; sp. gr. (air-dry) 0.85; weight 53 lbs. per cu. ft.; texture fine and uniform; grain straight to irregular; rather easily worked, taking a good polish; dark heartwood durable. Of no commercial possibilities because of the scarcity and small size of the trees.

In the preparation of this paper, it has been necessary to study botanical material in several herbaria. For the loan of specimens, and for other courtesies, I wish to express my appreciation to the curators who have so generously placed the necessary specimens at my disposal. For assistance in the completion of this work I am particularly grateful to Dr. E. D. Merrill, Professor Alfred Rehder, and Dr. A. C. Smith, all of the Arnold Arboretum; to Dr. M. L. Fernald and Dr. L. B. Smith, of the Gray Herbarium; to Dr. J. M. Greenman, of the Missouri Botanical Garden; to Dr. F. W. Pennell and Mr. Bayard Long, of the Academy of Natural Sciences of Philadelphia; to Dr. H. A. Gleason and Mr. G. L. Wittrock, of the New York Botanical Garden; to Dr. Th. Just, of the University of Notre Dame, for the opportunity of examining material in the Greene Herbarium; to Dr. C. O. Rosendahl and Dr. E. C. Abbe, of the University of Minnesota; and to Dr. H. L. Mason, of the University of California, for a few specimens from Lower California. Thanks are due Dr. Leon Croizat of the Arnold Arboretum for nomenclatural and bibliographical assistance.

In the citation of specimens, the name of the herbarium to which the particular specimen belongs is indicated by the following standard abbreviations: (AA) Arnold Arboretum, (GH) Gray Herbarium, (NE) New England Botanical Club, (MBG) Missouri Botanical Garden, (UI) University of Illinois, (Ph) Academy of Natural Sciences of Philadelphia, (NY) New York Botanical Garden, (ND) University of Notre Dame, (Minn.) University of Minnesota, and (UC) University of California. Because of the large amount of material studied, it has been practicable to cite only part of the collections.

## II. TAXONOMY

### BIBLIOGRAPHY AND DESCRIPTION OF THE GENUS

- Amelanchier* Medicus, Phil. Bot. 1:135, 155 (1789), Geschichte 79 (1793); Moench, Meth. Pl. 682 (1794); Lindley in Trans. Linn. Soc. Lond. 13:100 (1822); De Candolle, Prodr. 2:632 (1825); Spach, Hist. Nat. Veg. Phan. 2:82 (1834); Hooker, Fl. Bor. Am. 1:202 (1834); Endlicher, Gen. Pl. 1237, 6345 (1836); Loudon, Arb. & Frut. Brit. 2:874 (1854); Torrey & Gray, Fl. N. Am. 1:473 (1840); Bentham & Hooker, Gen. Pl. 1:628 (1865); Wenzig in Linnaea 4:105 (1874); Decaisne in Nouv. Arch. Mus. Hist. Nat. Paris 10:133 (1874); Brewer & Watson, Bot. Calif. 1:189 (1880); Sargent, Silva N. Am. 4:125 (1892); Dippel, Handb. Laubh. 3:388 (1893); Focke in Engler & Prantl, Nat. Pflanzenf. 3<sup>:26</sup> (1894); Britton & Brown, Illustr. Fl. N. U.S. 2:237 (1897); Small, Fl. Se. U.S. 531 (1903); Britton, Man. Fl. N. States 517 (1901); Card in Bailey, Cyclop. Am. Hort. 57 (1904); Sargent, Man. Tr. N. Am. 360 (1905); Schneider, Illustr. Handb. Laubh. 1:731 (1906); Dalla Torre & Harms, Gen. Siphon. 207 (1907); Hough, Handb. Tr. N. States & Canada 439 (1907); Robinson & Fernald in Gray, New Man. Bot. (ed. 7) 459 (1908); Britton & Shafer, N. Am. Tr. 436 (1908); Coulter & Nelson, New Man. Rocky Mt. Bot. 265 (1909); Wiegand in Rhodora 14:117 (1912); Britton & Brown, Illustr. Fl. N. U.S. (ed. 2) 2:291 (1913); Rehder in Bailey, Stand. Cyclop. Hort. 272 (1914); Wootton & Standley in Contr. U.S. Nat. Herb. 19:322 (1915); Farwell in Rep. Mich. Acad. Sci. 17:172 (1916); Rydberg, Fl. Rocky Mts. 446 (1917); Bailey, Man. Cult. Pl. 378 (1924); Jepson, Man. Fl. Pl. Calif. 509 (1925); Wiegand & Eames, Fl. Cayuga Basin 246 (1926); Rehder, Man. Cult. Tr. & Shr. 388 (1927); Rosendahl & Butters, Tr. & Shr. Minnesota 213 (1928); Small, Man. Se. Fl. 635 (1933); Munz, Man. S. Calif. Bot. 229 (1935); Marie-Victorin, Fl. Laurent. 315 (1935); Jepson, Fl. Calif. 2:233 (1936); Nielsen in Am. Midl. Nat. 22:160 (1939); Rehder, Man. Cult. Tr. & Shr. (ed. 2) 386 (1940); Kearney & Peebles in U.S. Dept. Agric. Miscel. Publ. 423:392 (1942); Abrams, Illustr. Fl. Pac. States 2:470 (1944).
- Amelanchus* Rafinesque in Act. Soc. Linn. Bordeaux 6:265 (1834); Merrill in Proc. Am. Phil. Soc. 86:89 (1942).
- Amelancus* Rafinesque, Fl. Tellur. 3:5 (1836) [1837]; F. Mueller ex Vollmann, Fl. Bayern 453 (1914).
- Amelancher* Bub. Fl. Pyren. 2:580 (1900).

TYPE SPECIES: *Mespilus Amelanchier* L. = *A. ovalis* Medic.

Slender often scaly-barked shrubs or small trees with unarmed branches and slender terete branchlets; wood hard, ring-porous; pith slightly 5-sided, pale, continuous; leaves simple, deciduous, alternate, petioled, pinnately veined, usually serrate or sometimes entire; leaf-scars narrowly crescent-shaped; bundle-traces 3; stipules linear, caducous, free from the petiole; stipule-scars lacking; winter-buds solitary, sessile, conspicuous, with several imbricate scales; flowers perfect, regular, entomophilous, in racemes (rarely solitary or paired) terminating short leafy branchlets of the season, appearing shortly in advance of the foliage, or as the leaves unfold; pedicels bracteate at the base and bearing a second bract at or near the middle; bracts scarious, pubescent, linear, deciduous about the time the flowers open; hypanthium campanulate or urceolate, more or less adnate to the carpels, becoming globose or ellipsoid in fruit;

disk nectariferous; calyx 5-lobed or 5-cleft, the lobes narrow, entire, imbricate in aestivation, persistent, becoming revolute or reflexed on the fruit, or sometimes remaining erect or ascending; petals 5, white, or rarely pink, oblanceolate to narrowly oval; stamens 10-20, short, inserted on the rim of the calyx; filaments subulate, more or less persistent on the fruit; styles 2-5, free or united at the base or to the middle; carpels 2-5, more or less united to form an inferior, compound, 2-5-loculed ovary, each locule 2-ovuled, but in fruit nearly divided by a false partition growing from the back of each carpel, thus forming an incompletely 4-10-loculed pome with one seed in each locule if all mature; carpel-walls of firm texture, not bony; pome small, mealy or juicy, berry-like, edible but often insipid; seeds small, smooth, dark brown; no endosperm.

Species and varieties of *Amelanchier* have been placed under a number of generic names, including *Amelanchus*, *Amelancus*, *Aronia*, *Crataegus*, *Malus*, *Mespilus*, and *Pyrus*, and have been transferred from one generic category to another. *Amelanchier* occupies a distinct position in the Pomoideae by its usually racemose inflorescence, distinctive foliage, and type of fruit with the peculiar carpels which have a false partition growing from the back of each. This latter character is also present only in the closely related monotypic genus *Peraphyllum* of western United States, and in *Malacomeles* of Mexico and Guatemala.

## KEYS TO THE AMERICAN SPECIES

### KEY TO FLOWERING SPECIMENS

1. Styles normally 5 (rarely 4); stamens 20; fruit becoming purplish black at maturity, glabrous, usually juicy and edible, mostly 10-loculed.
2. Top of the ovary glabrous.
  3. Sepals more or less pubescent, at least on the ventral surface.
    4. Petals 3-9 mm. long; racemes erect; young leaves densely white-tomentose beneath; mature leaves elliptical or oval, serrulate acutish or obtuse and apiculate, the base rounded or acutish; Atlantic Coastal Plain.
    5. Racemes 2.5-6 cm. long, on leafy branchlets, the lower pedicels becoming 5-10 mm. long; petals oblanceolate; styles 4 mm. long, united beyond the middle; anthers 1 mm. long; fastigiately branched, alder-like shrubs, 3-8 m. tall, forming close bushy clumps; chiefly in swampy woods, moist thickets, or bogs.....7. *A. canadensis*
    5. Racemes 1-3 cm. long, compact, leafless, the precocious flowers on very short pedicels only 1-3 mm. long; petals elliptical; styles 2-3 mm. long, separate to below the middle; anthers 0.5-0.7 mm. long; low surculose colonial shrubs 0.2-1 m. high, forming loose colonies in open woods or sandy pine barrens.....8. *A. obovalis*
  4. Petals of the fully opened flowers 12-25 mm. long.
  6. Leaves short-acuminate at the apex, cordate or rounded at the base, usually ovate or obovate, finely serrate; racemes loose, becoming pendent or spreading, 4-12 cm. long; trees or tall shrubs of eastern North America.

7. Leaves at flowering time about half-grown, nearly or quite glabrous, or only sparsely pubescent, bright green or bronze purple; sepals lanceolate, acuminate; racemes glabrous or nearly so; fruit sweet and juicy; lowest fruiting pedicels mostly 2.5-5 cm. long. . . . .5. *A. laevis*
7. Leaves at flowering time scarcely unfolded, densely white-tomentose beneath; sepals oval-lanceolate, abruptly pointed; racemes sericeous; fruit somewhat dry, mealy and tasteless, falling early; lowest fruiting pedicels 1-2.5 cm. long. . . . .6. *A. arborea*
6. Leaves obtuse or acute at the apex, not acuminate; racemes erect or ascending, 2-5 cm. long; shrubs 1-3 m. tall; western North America.
8. Petals 16-25 mm. long, 5-7 mm. wide above the middle; styles 3-4 mm. long; anthers 1-1.5 mm. long; leaf-blades thin, green, oval, 2.5-5 cm. long at maturity. . . . .14. *A. cusickii*
8. Petals 12-16 mm. long, 3-4 mm. wide above the middle; styles 2-2.5 mm. long; anthers 0.8 mm. long; leaf-blades at maturity firm, pallid, suborbicular, 1.5-3 cm. long. . . . .15. *A. basalticola*
3. Sepals, hypanthium, and pedicels perfectly glabrous, glaucous; whole plant perfectly glabrous; petals 8-12 mm. long; western United States. . . . .16. *A. pumila*
2. Top of the ovary tomentose, usually densely so, rarely with only a few trichomes.
9. Leaves permanently puberulent or finely tomentulose, at least on the lower surface; petals 5-11 mm. long; shrubs of western United States.
10. Sepals lanceolate to deltoid-lanceolate; hypanthium and pedicels sparsely pubescent to glabrous; leaves with 7-9 pairs of lateral veins; second-year twigs usually brown and glabrous; top of hypanthium constricted on the fruit; California, southern Oregon and western Nevada. . . . .17. *A. pallida*
10. Sepals linear or narrowly lanceolate to linear-spatulate; hypanthium and pedicels usually more or less densely lanate; leaves with 11-13 pairs of lateral veins; second-year twigs often puberulent, gray; hypanthium not at all or only slightly constricted on the fruit; Montana to New Mexico, westward to Lower California and eastern Oregon. . . . .18. *A. utahensis*
9. Leaves at maturity glabrous or somewhat pubescent, never finely puberulent; the young leaves either glabrous or glabrescent (occasionally tardily so), or else densely floccose-tomentose, at least on the lower surface.
11. Leaves usually more or less densely tomentose or floccose beneath at flowering time; shrubs or trees of the eastern half of North America. (Occasional specimens of the cordilleran *A. alnifolia* with tardily glabrescent leaves might also be sought here, as well as *A. arborea* var. *alabamensis*, whose flowers are unknown.)
12. Petals 4-10 mm. long; dwarf colonial shrubs 0.2-2 m. tall; leaves usually with 7-9 pairs of irregular lateral veins anastomosing near the usually rather finely serrate margins. . . . .9. *A. spicata*
12. Petals (of the fully opened flowers) 11-22 mm. long; shrubs (or small trees) 2-6 m. tall; leaves with 11-13 pairs of regular parallel conspicuous lateral veins, the uppermost extending into the teeth; margins coarsely serrate-dentate. . . . .10. *A. sanguinea*
11. Leaves not densely tomentose at flowering time, unfolded and more than half-grown, soon becoming nearly or quite glabrous on both surfaces.
13. Leaves finely serrate, the teeth mostly 6-10 per cm., and 20-40 on each margin of average leaves of the flowering and fruiting branches.
14. Flowers in 3-12-flowered racemes; petals oblanceolate, 8-13 mm. long; leaf-blades mostly rounded or slightly cordate at the base.
15. Leaves usually elliptical or somewhat obovate, unfolded and more than half-grown and dull green and glabrous at flowering time, obtuse or acute at the apex, the base rounded; a

- low, stoloniferous, diffusely-branched shrub 0.3-1 m. tall; western Newfoundland, St. Paul I., the Magdalen Is., Anticosti I., and the coast of Quebec along the Gulf of St. Lawrence.....2. *A. fernaldii*
15. Leaves ovate or oval.
16. Racemes 2-4 cm. long; leaves ovate, shortly acuminate, unfolded and more than half-grown and nearly or quite glabrous at flowering time; slender shrub 1-3 m. tall; Quebec to Massachusetts and Vermont, and adjacent New York.....3. *A. neglecta*
16. Racemes loose, 4-7 cm. long; leaves oval, acute, unfolded but not fully grown at flowering time, the lower surface sparsely floccose-pubescent, varying to nearly or quite glabrous, sometimes the pubescence remaining until the petals have fallen; straggling or arching shrubs 2-3 m. tall, or small trees 7-8 m. tall; Minnesota, Wisconsin, and northern Michigan.....4. *A. interior*
14. Flowers mostly in pairs or threes (or solitary), one terminal and the others in the axils of the upper leaves; blades glabrous, flat, oval, acute at each end; petals oval, 6-9 mm. long; a several-stemmed, loosely caespitose shrub 0.5-3 m. tall; Labrador and Newfoundland to the mountains of New England and New York to the Pocono Plateau, Pennsylvania, westward through Ontario to northern Michigan, and northwestern Minnesota.....1. *A. bartramiana*
13. Leaves more coarsely serrate, the teeth usually not more than 2-5 per cm., and only 5-20 on each margin of average blades.
17. Petals 6-10 mm. long, 2-3.5 mm. wide.
18. Petals glabrous throughout; mature leaves relatively thin, the lower surface pale green; low shrubs 30-90 cm. tall; Gaspé Peninsula, Quebec, westward to the region about Lake Superior.....11. *A. gaspensis*
18. Petals pilosulous on the inside of the claw; mature leaves somewhat coriaceous, glaucous beneath; shrub or small tree 2-4 m. tall; Rocky Mountains and Great Plains of western North America.....12. *A. ahnifolia*
17. Petals 12-25 mm. long.
19. Petals 12-15 mm. long (rarely shorter), 3-3.5 mm. wide; sepals deltoid-lanceolate, 2-2.5 mm. long; styles 2-2.5 mm. long; anthers 0.5-0.7 mm. long; summit of the ovary densely tomentose; Pacific Slope, from Alaska to northern California, west of the Cascade Mountains.....13. *A. florida*
19. Petals 16-25 mm. long, 5-7 mm. wide; sepals lanceolate, acuminate, 3.5-5 mm. long; styles 3-4 mm. long; anthers 1-1.5 mm. long; summit of ovary nearly glabrous or with a ring of tomentum around the base of the styles; British Columbia to eastern Washington, eastern Oregon, Idaho, northern Utah, and western Montana.....14. *A. cusickii*
1. Styles 4, 3, or 2 (rarely 5); stamens 10-15 (-18); petals 5-10 mm. long; racemes erect or ascending, 2-4 cm. long; fruit usually small, 3-8-loculed, often drying brownish before maturity.
20. Petals oblanceolate.
21. Leaves at maturity glabrous.
22. Hypanthium sparsely pubescent outside at flowering time; western Washington and adjacent southern British Columbia.....13a. *A. florida* var. *humptulipensis*



22. Hypanthium glabrous; southwestern United States and adjacent Mexico; glabrous forms of.....18. *A. utahensis*
21. Leaves more or less puberulent or tomentulose, at least beneath; Rocky Mt. region, New Mexico to Montana, westward to eastern Oregon, southeastern California and adjacent Mexico.....18. *A. utahensis*
20. Petals oval or obovate; leaves puberulent (rarely glabrous); southwestern Oregon, California, and adjacent Nevada.....17. *A. pallida*

## KEY TO FRUITING SPECIMENS

1. Leaves glabrous at maturity, or rarely slightly pubescent beneath, never permanently puberulent.
  2. Styles normally 5; fruit glabrous and purplish black when ripe, usually juicy and edible, mostly 10-loculed.
  3. Top of the ovary tomentose, or tomentulose, rarely becoming nearly glabrous with age.
    4. Average leaves of the fruiting branches finely and sharply serrate or serrulate; the lanceolate teeth usually 5-10 per cm.; species occurring east of the 100th meridian.
    5. Style-base (as seen on the young fruit) thickened and tapering into the conical top of the densely tomentose ovary; styles on the young fruit 4-6 mm. long; sepals 3-4 mm. long, divaricate or reflexed, sublanceolate; hypanthium more or less constricted below on the young fruit.
      6. Leaves oval or ovate, usually acute at each end, the petioles 4-12 mm. long; fruits solitary or in pairs or threes, or on robust specimens 4 or more in a somewhat corymbose raceme, ellipsoid-ovoid or somewhat pyriform, the larger 1-1.5 cm. in diameter when fully mature.....1. *A. bartramiana*
      6. Leaves mostly elliptical or somewhat obovate, obtuse or acute at the apex, the base rounded; petioles 1-2.5 cm. long; fruits subglobose, 6-10 mm. in diameter at maturity, 5-10 in a slender raceme.....2. *A. fernaldii*
    5. Style-base not conspicuously thickened, the top of the ovary rounded or flattish; styles on the young fruit 2-3 mm. long; sepals reflexed or revolute, mostly oblong-lanceolate or triangular-lanceolate; leaf-base usually rounded or subcordate.
      7. Sepals 3-4 mm. long, reflexed; hypanthium not constricted on the young fruit.
        8. Young leaves densely white-tomentose; tree 5-10 m. tall; mature leaves ovate or oval, acute or acuminate; Arkansas and Alabama.....6a. *A. arborea* var. *alabamensis*
        8. Young leaves green and glabrous or nearly so from the first.
          9. Leaves ovate, shortly acuminate; shrubs 1-3 m. tall; flowers in erect or ascending racemes 2-4 cm. long; Quebec to Massachusetts and Vermont, and adjacent New York...3. *A. neglecta*
          9. Leaves oval, acute; straggling or arching shrubs 2-3 m. tall, or small trees 7-8 m. tall; flowers in nodding racemes 4-7 cm. long; Minnesota, Wisconsin, and northern Michigan.....4. *A. interior*
  7. Sepals 1.5-2.5 mm. long, usually revolute; hypanthium noticeably constricted on the young fruit; leaves commonly oval, acutish or obtuse, densely white-tomentose beneath when young; dwarf succulose colonial shrubs 0.2-2 m. tall.....9. *A. spicata*
4. Average leaves usually more coarsely toothed, the ovate teeth mostly 3-6 per cm.

10. Lower surface of mature leaves often pale green, but not glaucous; fruits 6-8 mm. in diameter at maturity; species occurring east of the 100th meridian.
11. Tall straggling shrubs or small trees 2-6 m. tall; blades coarsely dentate-serrate, the lower surface, the petioles, and the rachis and pedicels of the young fruiting racemes often retaining traces of pubescence; lateral veins usually 11-13 pairs, conspicuous, parallel, the upper ones ending in the teeth; styles on the young fruit mostly 3-5 mm. long.....10. *A. sanguinea*
11. Low shrubs 0.3-2 m. tall; principal lateral veins of the leaves fewer and less regular; styles on the young fruit 2-3 mm. long.
12. Principal lateral leaf-veins mostly 9-11 pairs, the upper ones usually extending to the margin and ending in the teeth, the others anastomosing at their tips; racemes and mature leaves quite glabrous; low, much-branched shrubs 30-90 cm. tall, often forming dense thickets; Gaspé Peninsula, Quebec, westward to the region about Lake Superior.....11. *A. gaspensis*
12. Principal lateral veins mostly 7-9 pairs, somewhat irregularly and distantly arranged, usually anastomosing before reaching the margin; racemes, petioles, and lower part of underside of blades often retaining traces of grayish tomentum; low stoloniferous colonial shrubs 0.2-2 m. tall; Newfoundland to eastern North Dakota, southward to Missouri and Georgia .....9. *A. spicata*
10. Lower surface of leaves usually glaucous; the margins ordinarily rather coarsely toothed, chiefly on the upper half of the usually obtuse blade; fully developed fruits normally 1-1.5 cm. in diameter; shrubs 2-4 m. tall, or small trees, of western North America.
13. Mature blades usually more or less suborbicular, subcoriaceous; petals 6-10 mm. long; species of the Rocky Mountains and Great Plains.....12. *A. alnifolia*
13. Mature blades frequently oval and of thinner texture; petals 12-15 mm. long; species of the Pacific Slope, Alaska to northern California, west of the Cascade Mountains.....13. *A. florida*
3. Top of the ovary glabrous, rarely with a few trichomes.
14. Leaves finely and sharply serrate or serrulate almost to the base of the blade, the teeth usually 6-11 per cm., 20-60 on each side of average blades; eastern North America.
15. Low colonial surculose shrubs 0.2-1.5 m. tall; fruiting pedicels mostly 3-8 mm. in length; sepals on the fruit usually erect or divaricate.....8. *A. obovatis*
15. Tall shrubs or small trees; lower fruiting pedicels becoming 1-5 cm. long.
16. Sepals on the fruit usually erect or ascending, rarely somewhat reflexed; fruiting racemes erect, compact, the lower pedicels 1-2 cm. long; leaves usually elliptical, varying to narrowly obovate, oblanceolate, or oval, the apex acute, or obtuse and mucronate; shrubs 2-8 m. tall, somewhat fastigiately branched; chiefly Atlantic Coastal Plain.....7. *A. canadensis*
16. Sepals on the fruit reflexed or recurved, rarely remaining erect or divaricate; fruiting racemes loose, the lower pedicels longer; leaves ovate or oval, short-acuminate or acute at the apex, the base cordate or rounded; small trees 10-20 m. tall, or tall shrubs, with ascending or spreading branches.

- 17. Sepals lanceolate to subulate, acuminate, 3-4.5 mm. long on the fruit; lowest fruiting pedicels mostly 2.5-5 cm. long; blades, and usually the petioles, completely glabrous; fruit sweet and succulent.....5. *A. laevis*
- 17. Sepals triangular-lanceolate or oblong-lanceolate, abruptly pointed, 2-3 mm. long on the fruit; lowest pedicels 1-2.5 cm. long; petioles, and often the underside of the blades (at least near the base), frequently retaining some pubescence at maturity; fruit somewhat dry, mealy, insipid.....6. *A. arborea*
- 14. Leaves more coarsely serrate, the teeth 3-6 per cm., 3-15 on each side of average blades; apex obtuse or acutish; winter buds conical, acute; shrubs 1-3 m. tall; western North America.
- 18. Sepals more or less pubescent within.
  - 19. Sepals deltoid, 3-3.5 mm. long; petals 16-25 mm. long; leaves thin, green, mostly 2.5-5 cm. long, mostly oval....14. *A. cusickii*
  - 19. Sepals linear-lanceolate, 4-5 mm. long; petals 12-16 mm. long; leaves at maturity firmer, pallid, suborbicular, 1.5-3 cm. long.....15. *A. basalticola*
  - 18. Sepals, hypanthia, and pedicels perfectly glabrous, glaucous; whole plant perfectly glabrous; petals 8-12 mm. long.....16. *A. pumila*
- 2. Styles 3 or 4; petals 6-10 mm. long.
  - 20. Calyx and ovary pubescent; western Washington and southern Vancouver Island.....12a. *A. florida* var. *humptulipensis*
  - 20. Calyx and ovary glabrous; Nevada and Arizona; glabrous forms of....  
.....18. *A. utahensis*
- 1. Leaves usually permanently puberulent or tomentulose, at least beneath, varying to cinereous (rarely glabrous); petioles pubescent (except shade forms); styles usually 4, 3, or 2 (rarely 5); fruit usually small, 3-6-loculed, often sparsely pubescent at first, frequently drying brownish before maturity; shrubs of western United States and Lower California.
  - 20. Hypanthium more or less constricted on the young fruit; sepals lanceolate to deltoid-lanceolate; styles 4 or 3 (rarely 5), united below; leaves entire to serrate, usually with 7-9 pairs of lateral veins; southwestern Oregon, California, and adjacent Nevada.....17. *A. pallida*
  - 20. Hypanthium not at all constricted on the fruit; sepals subulate-lanceolate to linear-spatulate; styles 2, 3, or 4, free nearly to the base; leaves usually coarsely toothed, varying to nearly entire, usually strongly reticulate and with 9-13 pairs of lateral veins; Rocky Mountain region, New Mexico to Montana, westward to eastern Oregon and Lower California.....18. *A. utahensis*

### III. DESCRIPTION AND DISCUSSION OF SPECIES

#### 1. AMELANCHIER BARTRAMIANA (Tausch) M. Roemer

(Plates I and XI)

*Mespilus canadensis* var.  $\delta$  *oligocarpa* Michx. Fl. Bor. Am. 1:291 (1803).

*Pyrus oligocarpa nana* Donn ex Muhlenberg, Cat. Pl. Am. Sept. 49 (1813).

*Pyrus bartramiana* Tausch in Flora 21:715 (1838).

*Aronia praecox* Neumann ex Tausch, l.c., pro syn.

*Amelanchier canadensis* var.  $\xi$  *oligocarpa* Torrey & Gray, Fl. N. Am. 1:474 (1840);

Torrey, Fl. N.Y. 1:226 (1843); Walpers, Rep. Bot. Syst. 2:55 (1843); Gray,

Man. 131 (1848); Farwell in Rep. Mich. Acad. Sci. 17:175 (1916).

*Amelanchier bartramiana* M. Roem. Syn. Mon. 3:145 (1847); Wiegand in Rhodora

14:158, pl. 96 (1912); Britton & Brown, Illustr. Fl. N. U.S. (ed. 2) 2:293, fig.

2334 (1913); Rehder in Bailey, Stand. Cyclop. Hort. 273, fig. 188 (1914); Hoff-

mann in Proc. Boston Soc. Nat. Hist. 36:280 (1922); Pease in ibid. 37:267

(1924); Rehder, Man. Cult. Tr. & Shr. 390 (1927); Rydberg, Fl. Prairies &

Plains 438 (1932); Marie-Victorin, Fl. Laurent. 317, fig. 91 (1935); Nielsen

in Am. Midl. Nat. 22:189, pl. 15 (1939); Rehder, Man. Cult. Tr. & Shr. (ed. 2)

389 (1940).

*Amelanchier oligocarpa* M. Roem. Syn. Mon. 3:145 (1847); Watson & Coulter in

Gray, Man. Bot. (ed. 6) 167 (1889); Dippel, Handb. Laubh. 3:391, fig. 196

(1893); Britton & Brown, Illustr. Fl. N. U.S. 2:239, fig. 1990 (1897); Keeler,

Our Northern Shr. 196 (1903); Schneider, Illustr. Handb. Laubh. 1:737, figs.

411, 412 (1906); Britton, Man. N. States 518 (1901), (ed. 3) 518 (1907); Card

in Bailey, Cyclop. Am. Hort. 57 (1904); Robinson & Fernald in Gray, New

Man. Bot. (ed. 7) 460 (1908); Jones & Rand in Bull. Vermont Agr. Exp. Sta.

145:101 (1909); Apgar, Ornam. Shr. U.S. 182, fig. 280 (1910); Clements,

Rosendahl, & Butters, Minnesota Tr. & Shr. 153 (1912); Bean, Tr. & Shr.

Brit. Isles 1:189 (1914).

*Amelanchier sanguinea* sensu Decaisne in Nouv. Arch. Mus. Hist. Paris 10:136

(1874). Non *A. sanguinea* (Pursh) DC.

*Amelanchier arguta* Nuttall ex Britton, Man. N. States (ed. 2) 1066 (1905), (ed. 3)

1076 (1907).

*Amelanchier canadensis* var. *pauciflora* Farwell in Rep. Mich. Acad. Sci. 17:175

(1916).

A several-stemmed loosely caespitose shrub 0.5-3 m. tall; stems ascending, slender; bark grayish brown; twigs slender, glabrous, brown, with small oval lenticels; winter buds small, brown, lanceoloid, acuminate, the scales glabrate except the ciliolate margins; leaves flat and imbricate in the bud, glabrous from the first, about half-grown at flowering time, firm and pale green and slightly glaucous beneath at maturity; blades of the flowering and fruiting branches oval, varying to elliptical, obovate, or sub-orbicular, 3-6 cm. long, 1.5-4 cm. wide, usually acutish at each end, or the base cuneate, less commonly somewhat rounded; principal lateral veins 10-16 pairs, not prominent, irregularly spaced, curved upward, forking and anastomosing near the margin, often with shorter intermediate ones; margins finely and sharply serrate or serrulate or sometimes double-serrate to below the middle or near the base of the blade, the teeth obliquely acuminate, 6-10 per cm., 20-40 on each margin; stipules caducous, linear, sericeous, about 1 cm. long; petioles usually short, glabrous

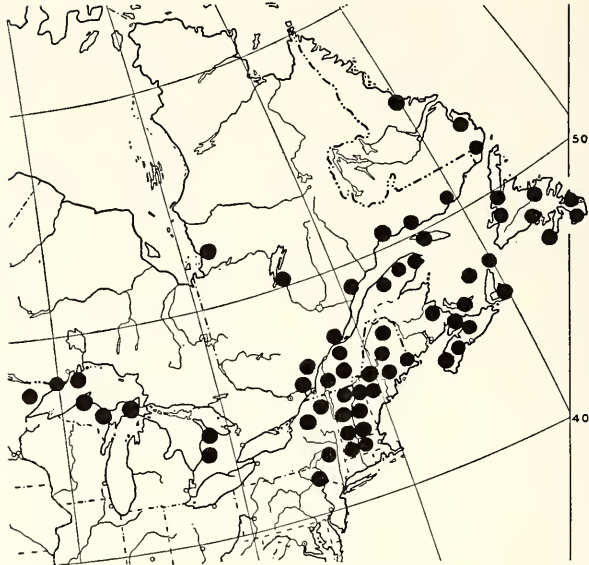
or sparingly ciliolate, those of the leaves of the fruiting branches mostly 4-12 mm. long; flowers solitary or few together, one terminal, the others in the axils of the upper leaves, the pedicels slender, glabrous, 1-3 cm. long; petals white, oval, obtuse, widest near the middle, 6-9 mm. long; stamens longer than the styles; filaments glabrous; anthers 1 mm. long, sepals lanceolate, acuminate, glabrous outside, tomentulose within; fruits solitary or in pairs or threes, or on robust specimens 4-6 in a somewhat corymbose raceme, but usually only one or two of them developing to full size at maturity; hypanthium more or less constricted on the young fruit; sepals on the fruit varying from nearly erect to divaricate or reflexed, (3-) 4-5 mm. long, glabrous outside, tomentulose within, lanceolate-subulate; styles 5 (or 4), united below the middle, 4-5 mm. long, tomentose at the base; ovary densely tomentose, tapering into the somewhat thickened style-base; mature fruits ellipsoid-ovoid or somewhat pyriform, glabrous, dark purple, glaucous, edible but insipid, ripening in July or August, the larger ones 1-1.5 cm. in diameter; pedicels glabrous, 1-3 cm. long; seeds few, or only 1 maturing, dark brown, smooth, glabrous, asymmetrically ovoid or lanceoloid, 3.5-4.5 mm. long, 2-3 mm. thick.

TYPE LOCALITY: [Northeastern] North America. Isotype in the herbarium of the Missouri Botanical Garden. Phototype in the herbarium of the Arnold Arboretum of Harvard University.

RANGE: Mountain woods, cold swamps and bogs, or in wet rocky soil, often at medium or higher altitudes, from Labrador and Newfoundland to the mountains of New England and New York, to the Pocono Plateau, Pennsylvania, westward through Ontario to northern Michigan and north-eastern Minnesota. Flowering from May 15 to June 10; fruit ripe in July and August.

LABRADOR: Caribou I. in 1860, *Chapin* (UI); Petty Harbour, *Bishop* 371 (GH, AA), Hopedale, *Bishop* 370 (GH, AA); Makkovik, *Stecker* 19 (GH); Red Bay, *Sandborger* 20 (GH); Betchewan, *Abbe* 1136 (GH).

QUEBEC: East Main, east coast of James Bay, *Potter* 487 (GH); Mt. Sherrick, *Potter* 486 (GH); L. Mistassini, Aug. 12, 1885, *Macoun* (GH); Orford, Sherbrooke Co., *Pease* 11969 (GH); St. Agathe des Monts, June 1, 1903, Aug. 26, 1902, *Jack* (AA); Brion I., Magdalen Islands, *St. John* 1903 (GH); Thetford, Megantic Co., *M.-Victorin* 11214 (AA); Black Lake, Megantic Co., *Fernald & Jackson* 10107 (GH); Lac Saint-Jean, *M.-Victorin* 15589 (AA); St. Pierre, *Arsène* 311 (GH); Anticosti I., *M.-Victorin & Rolland-Germain* 27901 (GH), 27899 (GH, AA); Matamek River, *Bowman* 26, 237, 402 (GH); Rimouski Co., *Collins & Fernald* in 1904 (GH), *Fernald & Collins* 1100 (GH), *Rousseau* 26228 (GH, AA), 26771 (AA); Harrington, *Abbe* 1151 (GH); Saguenay Co., *St. John* 90526, 90527, 90528, 90529 (GH), *Robinson* 782 (GH), July 14, 1892, *Kennedy* (GH); Sept-Iles, Gaspé Co., *M.-Victorin & Rolland-Germain* 18707, 18708, 18709 (GH); Mt. Albert, *Collins & Fernald* in 1905 (GH), *Fernald & Collins* 233 (GH), *M.-Victorin, et al.* 17436 (GH, AA); Table Top Mt., *Fernald & Collins* 614 (GH), *Rousseau & Fortier* 31441, *M.-Victorin, Rolland-Germain, & Jacques* 33486, 33467 (GH); Montagne Ste.-Anne, *M.-Victorin, et al.* 17433 (GH, AA).



MAP 1.—Range of *Amelanchier bartramiana*.

NEWFOUNDLAND: Avalon Bay, *Fernald & Wiegand* 5574, 5574a, 5576, 5578, 5755 (GH); Valley of Exploits River, *Fernald & Wiegand* 5597, 5600, 5602, 5736, 5737, 5739, 5742, 5743, 5744, 5749, 5751, 5752, 5754 (GH), 5738 (GH, AA); Conception Bay, *Howe & Lang* 1203 (GH); St. John Bay, *Fernald, Long, & Fogg* 1789 (GH); Spruce Brook, *Kennedy* 17 (GH); Crabbes Station, *Kennedy* 257 (GH); Notre Dame Bay, *Fernald & Wiegand* 5535, 5745, 5746, 5756 (GH); Bay of Islands, *Fernald, Long, & Fogg* 292 (GH), *Fernald & Wiegand* 3554, 5748, 5750 (GH), *Mackenzie & Griscom* 10327 (GH), *Howe & Lang* 1081 (GH); Bonne Bay, *Kimball* 102 (GH); Hermitage Bay, *W. Palmer* 1340 (GH).

NEW BRUNSWICK: Bass River, June 1, 1871, July 2, 1875, *Fowler* (GH); Serpentine River, *Hay* 63 (GH); Kent Co., May 29, 1868, *Fowler* (GH).

NOVA SCOTIA: Ohio, *Jack* 3106 (GH); Weymouth, *Jack* 3344 (GH); Folley, *Bean, White, & Linder* 21459 (GH, AA); St. Paul I., *Perry & Roscoe* 244 (GH).

PRINCE EDWARD ISLAND: Queens Co., *Fernald, Long, & St. John* 7596, 7597 (GH).

MAINE: Mt. Katahdin, July 1900, *Fernald* (GH, NE); Somerset Co., Aug. 18, 1896, *Fernald* (NE), *Fernald & Pease* 25133 (NE), *St. John & Nichols* 2332 (NE); Franklin Co., *Furbish* in 1894 (NE), *Chamberlain & Knowlton* in 1902 (NE); Orono, May 14, 1892, *Fernald* (NE); Penobscot Co., *Fernald* in 1897 (NE); Marshfield, Aug. 2, 1916, *Knowlton* (NE); Greenville, *Fernald* 257 (GH, NE); Winn, *Fernald & Long* 13782 (NE); South Poland, *Furbish* in 1893 (NE); Fort Kent, *Fernald* 2314 (GH, NE).

NEW HAMPSHIRE: "White Mts., N. Hampshire," *Nuttall* (type coll. of *A. arguta*) (GH); Crawford Mill Pond, June 4, 1881, *Faxon* (GH, NE); Jaffrey, *Rand & Robinson* 616 (GH); Mt. Moosilanke, July 12, 1886, *Faxon* (GH); May 11, 1895, *Churchill* (GH, NE); Franconia, May 31, 1892, *Faxon* (GH, NE), *Fernald & Smiley* 11720 (NE); Tuckerman's Ravine, *Sargent* in 1879 (AA), *Eggleston* 2369 (GH, UI), July 6, 1888, *Faxon* (GH, NE), July 17, 1891, *Kennedy*

(NE); Mt. Washington, *Greenman* 1058 (GH, MBG), July 12, 1855, *Wm. Boott* (NE); Mt. Ingalls, *Pease* 11205 (NE); Whitefield, *Pease* 16683 (NE, UI); Mt. Madison, *Pease* 10216 (NE); Carter Notch, *Pease* 4090 (NE); Carroll, *Pease* 14372 (NE); Stewartstown, *Pease* 16662 (NE); Sugarloaf Mt., *Pease* 13482 (NE); Berlin, *Pease* 25275 (NE); Pittsburg, *Pease* 10312 (NE).

VERMONT: Mt. Mansfield, July 3, 1897, *Williams* (GH, NE), *Churchill*, July 5, 1897 (NE), *Greenman* 936 (MBG), *Pringle* in 1878 (AA), *Eggleston* in 1893 (GH); Willoughby, July 8, 1898, *Kennedy* (NE); Woodford, June 20, 1925, *Carpenter, Churchill, & Knowlton* (NE); Mt. Killington, June 18, 1899, *Eggleston* (NE, UI), May 1913, *Dutton* (GH, NE); Rutland, *Eggleston* 1960, 1964 (GH, NE); Barton, May 24, 1923, *Knowlton* (NE); Coventry, May 19, 1932, *Knowlton* (NE); Craftsbury, May 19, 1932, *Knowlton* (NE); Greensboro, May 18, 1938, *Knowlton* (NE); Lowell, May 23, 1935, *Knowlton* (NE); Lunenburg, July 9, 1915, *Woodward* (NE); Sutton, May 20, 1932, May 18, 1933, *Knowlton* (NE); Searsburg, *Pease* 19561 (NE); Stratton, *Eggleston* 1962 (GH), *Blanchard* 5 (GH, AA).

MASSACHUSETTS: Mt. Greylock, June 2, 1901, *Churchill* (GH, NE), June 16, 1901, *Williams* (GH), June 25, 1916, *Hoffmann* (NE), *G. N. & F. F. Jones* 16170 (UI); Florida, July 3, 1909, July 14, 1916, *Hoffmann* (NE); Hubbardston, *Weatherby, Smith, et al.*, Pl. Exsicc. Gray. 959 (GH, UI); Ashburnham, May 19, 1924, *Knowlton* (NE).

NEW YORK: Canton, *Phelps* 1588, 1589 (GH); Essex Co., *House* 7264, 9468, 10227 (GH); Tug Hill Plateau, *Hotchkiss* 2290 (GH); Mt. McIntyre, *Muenschler & Clausen* 4020 (GH).

PENNSYLVANIA: Pocono Mts., July 27, 1893, *Porter* (GH).

ONTARIO: Wingham, *Morton* 2691 (UI); Long Lake, *Jennings* 14015 (GH); Sandy Inlet, *Krotkov* 5384 (GH).

MICHIGAN: Keweenaw Peninsula, *Farwell* 52d (GH), *Fernald & Pease* 3360 (GH); *Gwinn*, June 6, 1909, *Harrison* (GH); Isle Royale, *Cooper* 46 (GH).

MINNESOTA: Vermilion Lake, *Arthur, Bailey, & Hokway* B407 (GH).

An examination of a part of the type collection from the Bernhardt Herbarium, now in the Missouri Botanical Garden, leaves no doubt of the identity of this species, or that it is the same as Michaux's *Mespilus canadensis* var. *δ oligocarpa*, as shown by a comparison of phototypes in the Gray Herbarium and the Arnold Arboretum.

*Amelanchier bartramiana* is usually to be distinguished by the small flowers occurring mostly in pairs or threes or solitary, one terminal and the others in the axils of the upper leaves, which are oval, acute at each end, short-petioled, finely serrate, and quite glabrous from the first. The styles on the young fruits are thickened at the base and taper into the conical top of the densely tomentose ovary. It has been usually assumed that the number of flowers and fruits never exceeds 1-3, or 4, and that occasional robust specimens bearing a larger number in a somewhat corymbose inflorescence must belong to plants of hybrid origin that have resulted from crosses with either *A. laevis* or *A. spicata*. That this need not necessarily be the case is shown by certain specimens that evidently possess all the other diagnostic characters usually attributed to *A. bartramiana*. It may be pointed out, however, that when the number of fruits exceeds two or three, usually only the terminal ones attain full size at maturity, the others remaining small and failing to develop.

*Amelanchier arguta* Nuttall ex Britton, published in 1905 without citation of a type or any definite reference to the source of the name, does not differ in any essential respect from *A. bartramiana* (Tausch) M. Roem. One of Nuttall's specimens, from "White Mts., N. Hampshire, also on Wachusett Mt., Mass.," has been examined in the Gray Herbarium.

A specimen (*Weatherby, Smith, & Rollins* 6909) collected near Hubbardston, Worcester County, Massachusetts, on May 23, 1939, appears to be a hybrid between *A. bartramiana* and *A. canadensis*. The collection data on the label of the specimen are: "Low, loosely caespitose shrub in bushy flats. With parents, flowering later than *A. bartramiana*."

## 2. AMELANCHIER FERNALDII Wieg.

(Plates I and IV)

*Amelanchier fernaldii* Wiegand in *Rhodora* 22:149 (1920).

Low surculose, straggling, diffusely branched shrubs 0.3-1 m. tall, growing in colonies or large clumps; bark of the branches gray or brown, smooth; twigs glabrous; winter buds small, conical, acute, glabrous or nearly so; leaves conduplicate in the bud, unfolded and more than half-grown, dull green and glabrous at flowering time, of rather thin texture; mature blades firm, elliptical or somewhat obovate, glabrous on both sides, paler beneath, darker green and often somewhat impressed-veined above, 5-8 cm. long, 1.5-4.5 cm. wide, the apex obtuse or acute, the base rounded; lateral veins irregular, 7-13 pairs; margins sharply serrate from near the base, the acuminate teeth 4-10 per cm., 15-35 on each side of average leaves of the flowering and fruiting branches; stipules linear, caducous, 0.5-1 cm. long, 0.5-1 mm. wide, glabrous or pubescent; petioles slender, glabrous or sparsely pilose, 1-2.5 cm. long on average leaves; flowers small, in erect or ascending, loose, 3-8-flowered racemes 2-4 cm. long; rachis and pedicels glabrous; petals 5, white, glabrous, oval or oblanceolate, obtuse, 8-11 mm. long, 5-6 mm. wide; stamens 20, the filaments glabrous, 2-4 mm. long; anthers 1 mm. long; hypanthium campanulate, 4-5 mm. in diameter, glabrous; sepals linear-lanceolate, acuminate, tomentulose within, glabrous outside, 3-5 mm. long, erect or soon irregularly divaricate; styles 5, glabrous, united near the base, 3-4 mm. long; summit of the ovary densely tomentose; mature fruits 6-10 mm. in diameter, 10-loculed, glabrous, purplish black and juicy at maturity; pedicels 3-4 cm. long; seeds brown, smooth, obliquely lanceoloid, acute at each end, 4-5 mm. long, 2-2.5 mm. wide.

TYPE LOCALITY: Grindstone, Grindstone Island, Magdalen Islands, Quebec, Canada. Type in the Gray Herbarium of Harvard University.



RANGE: In wet woods and thickets, borders of swamps, "lime barrens or strongly calcareous shores and swamps" (Wiegand, l.c.), or damp hollows in sand dunes, western Newfoundland, St. Paul Island, the Magdalen Islands, Anticosti Island, and the coast of Quebec along the Gulf of St. Lawrence. Flowering from the end of June to the latter part of July; fruit ripening in July and August.

NEWFOUNDLAND: Table Mt., Port au Port Bay, *Fernald & St. John* 10840, 10841 (GH), 10842 (GH, AA); Old Port au Choix, St. John Bay, *Fernald, Long, & Fogg* 1792 (GH).

NOVA SCOTIA: St. Paul Island: Ethel Lake, *Perry & Roscoe* 243 (GH).

PRINCE EDWARD ISLAND: Bothwell, *Fernald & St. John* 11083 (AA).

QUEBEC: Magdalen Islands: Grindstone Island, *Fernald, Long, & St. John* 7592 (GH, TYPE), 7590 (GH), *Fernald, Bartram, Long, & St. John* 7586 (GH), 7589 (AA, GH); Coffin Island, *Fernald, Bartram, Long, & St. John* 7587 (GH); Brion Island, *St. John* 1909 (GH); Anticosti Island, *M.-Victorin & R.-Germain* 27898 (GH); Riviere Vaureal, *M.-Victorin & R.-Germain* 27900 (GH); Grand River, Gaspé Co., *Fernald* in 1904 (GH); Cap Original, *M.-Victorin, R.-Germain, & Jacques* 33216 (GH); Sept-Iles, *M.-Victorin & R.-Germain* 18710, 18711 (GH); Isle-aux-Coudres, *M.-Victorin* 4318 (AA, GH); Grand Barachois, *M.-Victorin & R.-Germain* 9507 (GH, AA); Anse Pleureuse, *M.-Victorin, R.-Germain, & E. Jacques* 33436, 33439 (GH).

Although *A. fernaldii* has some characteristics suggesting a hybrid origin, it "seems to form a definite unit, not a fluctuating hybrid" (Wiegand, l.c.), and may be regarded as a small endemic species of the region about the Gulf of St. Lawrence. From *A. bartramiana* it is to be distinguished by its racemose inflorescence, elliptical leaves with longer petioles, and longer petals and smaller fruits.

The leaves of *A. fernaldii* are the same general shape as those of *A. canadensis*, but there is little likelihood of the two species being confused. The leaves of the former are glabrous, flat, and often nearly full-grown at flowering time, while those of the latter are folded, less than half-grown, and densely whitish tomentose. Also, the flowers of *A. fernaldii*, with their woolly-topped ovaries, and their longer sepals, are in nearly glabrous, looser racemes.

### 3. AMELANCHIER NEGLECTA Egglest.

(Plates I and V)

*Amelanchier neglecta* Eggleston, in herb.

Slender-stemmed, shrubs 1-3 m. tall, with grayish brown bark and glabrous twigs; winter buds small, glabrous, conical; leaves conduplicate in the bud, unfolded and more than half-grown and nearly or quite glabrous at flowering time; mature blades ovate or oval, glabrous throughout, paler beneath, of firm texture, 5-6 cm. long, 2-3 cm. wide, the apex usually shortly acuminate, the base rounded or subcordate; lateral veins

7-11, curved, anastomosing toward the edge of the leaf; margins finely and sharply serrate nearly to the base, the teeth 7-9 per cm., 20-30 on each margin of average leaves of flowering and fruiting branches; stipules linear, fugacious, slightly pubescent; petioles of mature leaves 1-2 cm. long, glabrous; flowers small, in erect or ascending 7-10-flowered racemes 2-4 cm. long; rachis and pedicels glabrous; petals 5, white, glabrous, narrowly oval, mostly 8-10 mm. long, about 4 mm. wide; stamens 20, the filaments glabrous, 2-3 mm. long; anthers 1 mm. long; hypanthium campanulate, 3-4 mm. in diameter, glabrous; sepals linear-lanceolate, acuminate, tomentulose within, glabrous outside, 3-4 mm. long, soon recurved or reflexed; styles 5, glabrous, united near the base, 3-4 mm. long; summit of the ovary densely tomentose; mature fruits 8-10 mm. in diameter, subglobose, 10-loculed, glabrous, purplish black and juicy at maturity; pedicels 15-25 mm. long; seeds smooth, brown, asymmetrical, obliquely lanceoloid, acute at each end, 4-5 mm. long.

TYPE LOCALITY: Rutland, Vermont. Collected by W. W. Eggleston in 1899. Type in the Gray Herbarium of Harvard University.

RANGE: Growing at the edge of clearings, in damp thickets and open woods that have been recently burned, or on ledges and talus, or in mossy spruce barrens, southern Quebec, Prince Edward Island and Nova Scotia to Massachusetts, Vermont, and adjacent New York. Flowering in May and June; fruits ripening in July and August.

QUEBEC: Gaspé Bay, Aug. 23, 1897, *Jack* (AA); Montmagny, *Rousseau* 24557 (AA, GH); Lac Long, *Rousseau* 24552 (GH); Montmorency Falls, *Macoun* 66927 (GH); Ottawa River, *Bro. Rolland* 7214 (GH).

NEW BRUNSWICK: Woodstock, *Fernald & Long* 13764 (GH).

NOVA SCOTIA: Meteghan, *Fernald & Long* 21450 (GH).

PRINCE EDWARD ISLAND: Charlottetown, *Fernald & St. John* 7578 (GH); Mt. Stewart, *Fernald, Bartram, Long, & St. John* 7581 (GH).

MAINE: Fort Fairfield, *Fernald* 37 (NE); Northport, *Furbish* in 1891 (NE); Brownville, *Parlin* 1811 (GH); East Livermore, *Furbish* in 1878 (NE); Dover, June 29, 1894, *Fernald* (NE); Fort Kent, *Fernald* 2312 (GH, NE); Oxford, *Chamberlain* in 1907 (NE); Moxie Mt., Aug. 25, 1902, *Collins & Chamberlain* (NE); Cutler, July 7, 1902, *Kennedy, et al.* (GH); Mt. Katahdin, July 17, 1900, *Churchill*



MAP 2.—Range of *Amelanchier neglecta*.

(NE); Isle au Haut, *Hill* 1614 (NE); Orono, *Fernald*, July 6, 1892, *Furbish* in 1891 (NE); Winn, *Fernald & Long* 13768, 13769 (NE); City Camp, July 17, 1900, *Fernald* (AA, NE, GH); Jonesboro, Aug. 1, 1932, *Knowlton* (NE); Roque Bluffs, July 11, 1908, *Knowlton* (NE).

NEW HAMPSHIRE: Flume, *Sargent* in 1879 (AA); Gorham, *Cusick* in 1887 (GH); Randolph, *Moore* 4189 (GH), *Pease* 670 (NE); Crawford House, June 6, 1881, *Faxon* (GH); Franconia, June 26, 1895, *Faxon* (GH); Colebrook, *Fernald & Pease* 16825 (NE); Carroll, *Pease* 14374 (NE); Pittsburg, *Pease* 10995 (NE); Shelburne, July 12, 1882, *Deane* (NE); Baldface Mt., *Pease* 16044 (NE); Stewartstown, July 19, 1917, *Fernald & Pease* (NE); Gilmanton, *Cushman & Sanford* 1217 (NE); Gilford, *Harris & Pease* 26551 (NE); New Hampton, *Pease* 26527 (NE); Plymouth, *Fernald* 11719 (NE); Mt. Agassiz, July 1871, *Collins* (NE).

VERMONT: Manchester, *Day* 379 (GH, NE); Johnson, *Grout*, June 8, 1895 (NE); Willoughby, May 26, 1904, May 19, 1905, *Kennedy* (NE); Orange, May 17, 1932, *Knowlton* (NE); Sutton, May 20, 1932, *Knowlton* (NE); Brandon, May 26, 1912, *Knowlton* (NE); Rutland, *Eggleston* 1118, 1173, 1174, 1175, May 12, June 21, July 7, 1899 (TYPE coll., GH, NE).

MASSACHUSETTS: Westminster, May 10, 1912, *Hunnewell & Wiegand* (NE); Hanging Mt., July 12, 1906, *Hoffmann* (NE); Lanesboro, May 19, 1920, *Hoffmann* (NE); Florida, June 5, 1920, July 14, 1916, *Hoffmann* (NE); Sheffield, May 24, 1920, *Hoffmann* (NE).

NEW YORK: Black Lake, St. Lawrence Co., *Muenschler & Maguire* 2319 (GH), 2320 (MBG); Washington Co., *Burnham* 21 (GH); Newcomb, *House* 10189 (GH).

*Amelanchier neglecta* has often been regarded as a natural hybrid between *A. bartramiana* and *A. laevis* because in several respects it appears to be somewhat intermediate between these two species. It resembles *A. laevis* in the conduplicate vernation of the finely toothed, usually acute, or shortly acuminate leaves that are quite glabrous, even at flowering time. It is, however, of smaller stature than *A. laevis*, and differs in the constantly tomentose ovary, shorter petals, and longer styles. It also shows some resemblance to *A. bartramiana*, but differs in the habit of growth, and in the smaller, usually more numerous, constantly racemose flowers and fruits. The usually ovate, short-acuminate leaves, which are rounded or cordate at the base, are of different color and texture, and are longer-petioled than those of *A. bartramiana*. At flowering time they are often slightly pubescent beneath, and unfold with the flowers, whereas in *A. bartramiana* the glabrous flat leaves precede the flowers. The subglobose fruits have shorter styles, and the top of the ovary shows a tendency to be flattened instead of conical, and the broader and shorter sepals are closely reflexed. Whether *A. neglecta* is really a hybrid, or whether it is a species with a series of somewhat intermediate characters, remains to be proved. Its relative abundance over a fairly extensive area, as well as the apparent constancy of its taxonomic characters, suggests that it is a species of equal rank with *A. laevis*, *A. fernaldii*, *A. interior*, and *A. bartramiana*.

## 4. AMELANCHIER INTERIOR Nielsen

(Plates I and VII)

*Amelanchier laevis* sensu Rosendahl & Butters, Tr. & Shr. Minnesota 217 (1928), ex p. Non Wiegand, 1912.

*Amelanchier interior* Nielsen in Am. Midl. Nat. 22:185, pl. 13 (1939).

*Amelanchier intermedia* sensu Nielsen, op. cit. 184, pl. 12, ex p. Non Spach, 1834.

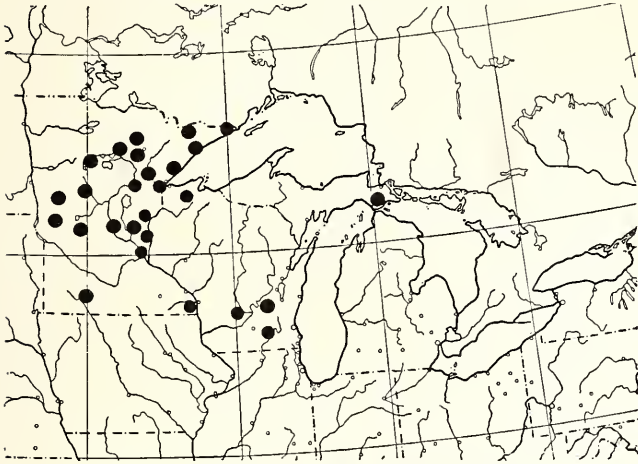
*Amelanchier wiegandii* Nielsen, op. cit. 180, pl. 10.

Straggling shrubs or small trees up to 8 m. tall; winter buds reddish brown, narrowly ovoid, acute or acuminate, sometimes curved, the lateral 6-9 mm. long, the terminal 8-13 mm. long; bud-scales ciliate; leaves ovate or broadly oval, or elliptical, conduplicate in the bud, unfolded but scarcely fully grown at flowering time, green and sparsely pubescent beneath when young, soon glabrous; mature blades 3-7 cm. long, 2-5 cm. wide, the apex acute or shortly acuminate, the base subcordate or rounded, usually quite glabrous on both surfaces when fully mature; lateral veins 8-11 pairs, not prominent, regularly arranged, usually curved upward and becoming indistinct before reaching the margin; margins finely and evenly serrate or serrulate nearly or quite to the base; teeth 5-6 per cm., 20-30 on each side of average leaves; stipules linear, pubescent, deciduous; petioles slender, 1.5-3 cm. long, glabrous at maturity; flowers in loose, nodding, glabrous, 7-12-flowered racemes 4-7 cm. long, the lower pedicels 12-25 mm. long; petals 5, white, oblanceolate or narrowly obovate, obtuse, 8-13 mm. long, 4-5 mm. wide; stamens about 20, the filaments glabrous; anthers 0.6-0.8 mm. long; hypanthium broadly cup-shaped, 3-5 mm. in diameter, glabrous outside, slightly constricted on the young fruit; sepals triangular-lanceolate, 3-3.5 mm. long, acuminate, pubescent within, usually recurved from the middle after anthesis; styles 5, glabrous, 3-4 mm. long, usually united to the middle; top of the ovary densely white-tomentose; mature fruit globose, purplish black, glaucous, glabrous, 6-8 mm. in diameter, sweet, juicy, edible; lower pedicels 2-4 cm. long; seeds brown, smooth, obliquely lanceoloid, somewhat flattened, about 5 mm. long, 2-3 mm. wide.

TYPE LOCALITY: "East River road at junction with Seymour Avenue, S. E. Minneapolis," Hennepin County, Minnesota. Collected in 1935 by Etlar L. Nielsen. Type in the Herbarium of the University of Minnesota.

RANGE: Dry open woods, sandy wooded slopes, or on wooded bluffs along rivers, Minnesota, Wisconsin, and northern Michigan. Flowering in May and June; fruits maturing in July and August.

MINNESOTA: Caribou Lake, Nielsen 1379 (Minn.); Tofte, Breckenridge & Nielsen 3161 (Minn.); Clarks Bay, Grand Portage, Breckenridge, Nielsen, & Moore 3229 (TYPE of *A. wiegandii*, Minn.), Moore & Nielsen 3653 (Minn.); Grand Rapids, Nielsen 1060, 1063, 1064, 1066, 1069 (Minn.); Cohasset, Nielsen 1055 (Minn.); Two Harbors, Nielsen 1376 (Minn.); Finland, Moyle & Nielsen 1944 (Minn.); Baptism River, Nielsen 3170 (Minn.); Itasca Park, Nielsen 1931, 2485, 2521, 2547, 3113, 3124, 3127, 3129, 3131, 3133, 3136, 3137, 3138, Grant 2862 (GH); Detroit Lakes, Zech 152, 161, 168, 195 (Minn.); Carlton, A. & E. Mattioli 7, 13, 20 (Minn.); Pelican Rapids, Butters 1342 (Minn.); Perham, July 13, 1926, Rosen-

MAP 3.—Range of *Amelanchier interior*.

dahl (GH); St. Cloud, *Nielsen* 2669 (Minn.); Center City, July 1892, *Taylor* (GH); Coon Lake, *Nielsen* 1091, 1301 (Minn.); Ham Lake, *Nielsen* 1082 (Minn.); St. Paul, *Rosendahl & Butters* 2578 (GH); Minneapolis, *Nielsen* 2961 (TYPE, Minn.); Mendota, *Rosendahl* 5198 (Minn.); Hastings, *Nielsen* 1820 (Minn.); Red Wing, *Nielsen* 1804 (Minn.); Spring Grove, *Rosendahl* 439, 4935 (GH), 4937 (AA), *Rosendahl & Butters* 3892 (GH).

WISCONSIN: Delton, *Fassett* 2825 (GH); Milford, *Fassett* 7128 (GH); Devils Lake, *Fassett* 3051 (GH); Drummond, *Cheney* 4447 (GH).

MICHIGAN: Foley Creek, near St. Ignace, *Mackinac Co., Benner* 6708 (GH).

This shadbush has the general aspect of *Amelanchier laevis* Wieg., but differs from that species in its smaller stature, wool-top ovary, somewhat shorter fruiting pedicels, and in the smaller flowers in shorter racemes. Until it was described as a distinct species by Nielsen in 1939 it had been variously labeled *A. laevis*, *A. sanguinea*, or *A. arborea*, or as a hybrid between *A. bartramiana* and *A. sanguinea*, or between *A. laevis* and *A. spicata*.

The leaves at flowering time are usually unfolded but not fully grown, and in the majority of specimens the lower surface is sparsely floccose-pubescent, varying to nearly or quite glabrous. Only rarely do the leaves at this time remain folded and retain sufficient pubescence to give them a whitish or grayish appearance, but by the time the petals have dropped, this tardily-retained pubescence has disappeared.

*Amelanchier wiegandii* Nielsen is regarded as a synonym of *A. interior*. In the original publication it appears in the key next to *A. interior*, from which it is said to differ in the carinate blades and acute sinuses of the leaf-teeth. These characters are, however, quite intangible. In a tabular comparison it was contrasted with *A. sanguinea*, from which it is widely separated.

## 5. AMELANCHIER LAEVIS Wieg.

(Plates I and VI)

- Pyrus botryapium* sensu Bigelow, Fl. Bost. 120 (1814), (ed. 2) 196 (1824). Non L.f. 1781, nec *Amelanchier botryapium* Borkh. 1803.
- Amelanchier canadensis* sensu Torrey & Gray, Fl. N. Am. 1:473 (1840); Watson & Coulter in Gray, Man. (ed. 6) 166 (1889); Sargent, Silva N. Am. 4:127, pl. 194 (1892); Britton & Brown, Illustr. Fl. N. U.S. 2:237, fig. 1985 (1897); Clark in Bull. Vermont Agr. Exp. Sta. 73:68 (1899); Britton, Man. 517 (1901), (ed. 3) 517 (1907); Small, Fl. Se. U.S. 531 (1903); Sargent, Tr. N. Am. 360 (1905); Robinson & Fernald in Gray, New Man. Bot. (ed. 7) 459 (1908); Britton & Shafer, N. Am. Trees 437 (1908); Jones & Rand in Bull. Vermont Agr. Exp. Sta. 145:99 (1909); Silva Tarouca, Freiland-Laubb. 139, fig. 123 (1913); Coker & Totten, Tr. N. Car. 60 (1916); Farwell in Rep. Mich. Acad. Sci. 17:173 (1916). Non *Mespilus canadensis* L. 1753.
- Amelanchier botryapium* sensu Emerson, Tr. Massachusetts 443 (1846); Decaisne in Nouv. Arch. Mus. Hist. Nat. Paris 10:135 (1874). Non Borkh. 1803.
- Amelanchier canadensis* var. *botryapium* Gray, Man. Bot. 130 (1848), (ed. 2) 126 (1856).
- Amelanchier lancifolia* Hort. ex Hand-list Trees & Shrubs Kew 1:217 (1894), pro syn. *A. canadensis* sensu Torrey & Gray.
- Amelanchier stricta* Hort. ex ibid.
- Amelanchier laevis* Wiegand in Rhodora 14:154, pl. 96 (1912); Small & Carter, Fl. Lancaster Co., Pennsylvania 154 (1913); Rehder in Bailey, Stand. Cyclop. Hort. 273 (1914); Deam, Tr. Indiana 177, pl. 76 (1921); Sargent, Man. Tr. N. Am. (ed. 2) 395, fig. 351 (1922); Silva Tarouca, Freiland-Laubb. (ed. 2) 95, fig. 85 (1922); Hoffmann in Proc. Boston Soc. Nat. Hist. 36:280 (1922); Pease in ibid. 37:67 (1924); Bailey, Man. Cult. Pl. 379 (1924); House in N.Y. State Mus. Bull. 254:411 (1924); Wiegand & Eames, Fl. Cayuga Basin 248 (1926); Rehder, Man. Cult. Tr. & Shr. 390 (1927); Sudworth in U.S. Dept. Agric. Misc. Circular 92:134 (1927); Rosendahl & Butters, Tr. & Shr. Minnesota 217 (1928), ex p.; Peattie, Fl. Indiana Dunes 219 (1930); Rydberg, Fl. Prairies & Plains 437 (1932); Deam, Tr. Indiana (ed. 2) 189, pl. 77 (1932); Small, Man. Se. Fl. 636 (1933); Marie-Victorin, Fl. Laurent. 317, fig. 91 (1935); Coker & Totten, Tr. Se. States 208 (1936); Nielsen in Am. Midl. Nat. 22:188, pl. 14 (1939); Deam, Fl. Indiana 532 (1940); Rehder, Man. Cult. Tr. & Shr. (ed. 2) 389 (1940); G. N. Jones, Fl. Illinois 154 (1945); Weatherby & Adams in Contr. Gray Herb. 158:50 (1945).
- Amelanchier laevis* f. *nitida* Wiegand in Rhodora 13:155 (1912).
- Amelanchier laevis* var. *cordifolia* Ashe in Journ. Elisha Mitchell Sci. Soc. 34:138 (1918).
- Amelanchier laevis* var. *nitida* Fernald in Rhodora 23:267 (1922).

A small tree 10-13 m. tall, or a shrub, with spreading branches; bark reddish brown, longitudinally fissured in age; twigs slender, glabrous; winter buds lanceoloid, the scales ciliate; leaves of firm texture, ovate or oval, varying to slightly obovate, conduplicate in the bud, glabrous or nearly so from the first, often bronzy, about half-grown at flowering time, folded lengthwise and glaucous-purplish, soon entirely glabrous, and when mature dark green and slightly glaucous; mature blades 4-6 cm. long, 2.5-4 cm. wide, short-acuminate or acute at the apex, rounded or subcordate at the base; lateral veins 12-17 pairs with short intermediate ones, unequally distant, sinuous, slightly upcurving, anastomosing near the margin, the uppermost widely spreading; margins finely and sharply serrate nearly

to the base, the teeth subulate, callus-tipped, 6-8 per cm., 35-45 on each margin of average leaves; stipules and bracts purplish green, deciduous, sericeous; petioles slender, 12-25 mm. long; flowers large and showy; racemes many-flowered, flexuous, spreading or drooping, 4-12 cm. long, glabrous or nearly so; pedicels glabrous, slender, the lower 1.5-3 cm. long; petals white, oblanceolate or narrowly oval, obtuse, 12-22 mm. long, 3-4 mm. wide; stamens about 20, 3-4 mm. long, the filaments glabrous; anthers 1 mm. long; hypanthium campanulate, 3-5 mm. broad, glabrous, very slightly or not at all constricted below; sepals lanceolate, 3-4 mm. long, acuminate, glabrous outside, tomentulose within, becoming reflexed on the fruit, or sometimes merely divaricate; styles 5, glabrous, 3-4 mm. long, free to below the middle; summit of the ovary glabrous; fruit globose, purple or nearly black, 6-8 mm. in diameter, glaucous, sweet, succulent, edible; lower pedicels 2-5 cm. long; seeds chestnut brown, smooth, asymmetrically ovoid or semi-ellipsoid, somewhat compressed, 4-4.5 mm. long, 2-2.5 mm. wide when fully developed.

TYPE LOCALITY: Wellesley, Massachusetts. Collected by K. M. Wiegand, May and June, 1911. Type in the Gray Herbarium of Harvard University.

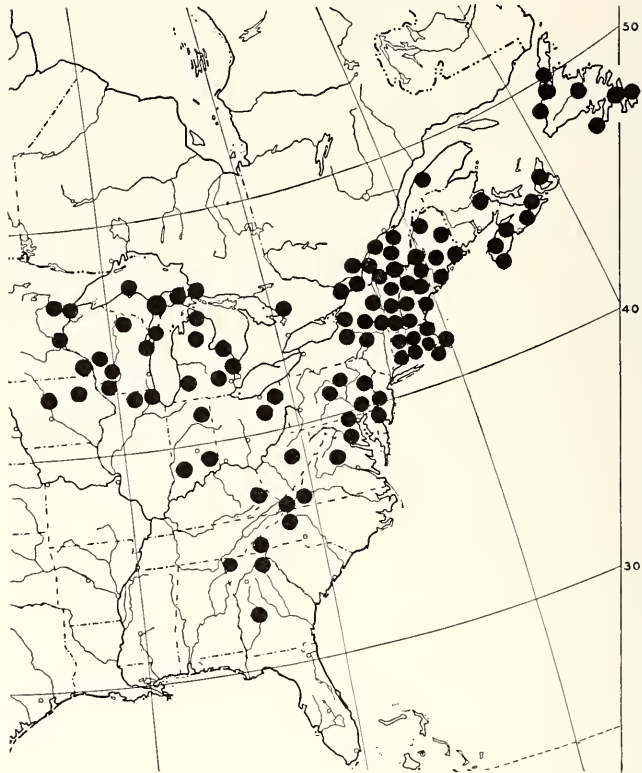
RANGE: In dry open woodlands, roadside thickets, cool ravines and hillsides, or damp wooded slopes and banks, from Newfoundland to Minnesota, southward to Missouri, Indiana, and Georgia; flowering in the southern part of the range from the middle of April, in the north to the middle of June; fruit ripe in June and July. Common names: serviceberry, juneberry, maycherry.

QUEBEC: Bolton, July 25, 1926, *Knowlton* (GH); Longueuil, *M.-Victorin* 4319 (AA, GH), 11219, 9503 (AA); Caughnawaga, May 27, 1900, *Jack* (AA); *Bic, Fernald & Pease* 25135 (GH), *Louis-Marie, et al.* 34433 (GH); La Trappe, *Louis-Marie* 145 (GH); *Berthier-en-Bas, Rousseau* 24549 (GH); Saint-Raphael, *Rousseau* 24567, 24562, 24559 (GH); Kingsmere, *Macoun & Malte* 88016 (GH); Shawnigan Falls, *Chamberlain & Knowlton* in 1923 (GH).

NEWFOUNDLAND: Donovans, *Fernald & Wiegand* 5755 (GH); St.-Pierre, *Arsène* 310 (GH); near St. Johns, *Bishop* 373 (GH), *Fernald & Wiegand* 5567, 5568, 5569, 5570, 5580 (GH); Whitbourne, *Fernald & Wiegand* 5545, 5547, 5578a (GH); Cape St. George, *Mackenzie & Griscom* 11102 (GH); French Island, *Fernald, Long, & Fogg* 290 (GH); Lomond, *Fernald, Long, & Fogg* 1791 (GH); Grand Falls, *Fernald & Wiegand* 5552 (GH); Rushy Pond, *Fernald & Wiegand* 5542, 5599 (GH).

NEW BRUNSWICK: Shediac Cape, July 25, 1914, *Hubbard* (GH); Kent, May 30, 1870, *Fowler* (GH).

NOVA SCOTIA: Boylston, *Hamilton* in 1890 (GH); Newport, *Dill* in 1894 (AA); Truro, *Jack* 628 (AA); Middleton, *Long* 21447 (GH), 21448 (GH, AA); Cape Breton Island, *Macoun* 19043 (GH), *Nichols* 557, 168 (GH); Digby, *Howe & Lang* 265, 297 (GH); Marshalltown, *Jack* 3187, 3188 (AA); Meteghan, *Fernald & Long* 21451 (GH); Weymouth, *Fernald, et al.* 21441 (GH), 21442 (GH, AA); Armdale, *Fernald, Bartram, & Long* 23943, 23944, 24761 (GH); Halifax, *Jack* 680, 3648, 3671 (AA).



MAP 4.—Range of *Amelanchier laevis*.

PRINCE EDWARD ISLAND: Bothwell, *Fernald & St. John* 11082 (GH).

MAINE: Boothbay, *Fassett* 446 (NE), *Grover & Smith* in 1922 (UI); Kennebunkport, *Koehler* 2 (GH); North Berwick, May 1894, *Parlin* (GH); Vassalboro, *Chamberlain* 34 (NE); South Poland, *Furbish* in 1895 (NE); Mt. Livermore, *Furbish* in 1896 (NE); Monticello, *Fernald & Long* 13763 (AA, NE); Brunswick, *Furbish* in 1892 (NE), May 19, 1897, *Chamberlain* (NE); Cumberland, *Chamberlain* 533 (NE); West Baldwin, *Furbish* in 1900 (NE).

NEW HAMPSHIRE: Mason, May 15, 1915, *Batchelder* (NE); Lebanon, May 3, 1889, *Kennedy* (GH, NE); Peterboro, *Batchelder* 3 (NE); Mt. Agassiz, *Collins* in 1871 (NE); Whitefield, July 4, 1896, *Deane* (NE); Stark, *Pease* 17476 (NE); Franconia, *Faxon* in 1892 (GH, NE); Hooksett, July 11, 1926, *Batchelder* (NE); Dover, *Hodgdon* 195, 2244, 2245 (NE); Barrington, *Hodgdon & Dunn* 2772 (NE); Gorham, *Pease* 16010 (NE); Jaffrey, July 19, 1891, *Deane* (GH, NE).

VERMONT: Pownal, *Floyd* 845 (NE); Sunderland, May 18, 1935, *Pease* (NE); Peacham, May 10, 1889, *Blanchard* (NE); Burlington, May 24, 1914, *Knowlton* (NE); Brunswick Springs, *Sanford* 1066 (NE); Island Pond, *Sanford* 1193 (NE); Johnson, June 3, 1895, *Grout* (NE); Barton, May 24, 1923, *Knowlton* (NE); Willoughby, May 28, 1904, *Kennedy* (NE); Roxbury, *Winslow*, July 18, 1916 (NE); Jamaica, *Moldenke* 9502 (UI); Stratton, June 25, 1914, *Wheeler* (NE); Hartford, June 12, 1920, *Eaton & St. John* (NE).

MASSACHUSETTS: Barnstable, *Child, Knowlton, Bird, & Bean* 16377 (NE); Oak Bluffs, *Seymour* 1224 (GH, NE); Chilmark, *Seymour* 1223 (GH, NE); Mag-



nolia, *Weatherby & Perry*, May 12, 1936, Pl. Exsicc. Gray. 663, 664 (GH, UI); Wellesley, *Wiegand* 2136 (GH, TYPE of *A. laevis*); Coleraine, May 11, 1912, *Batchelder, Kennedy, & Williams* (NE); Whately, *Harger & Fernald*, May 17, 1913 (NE); Granville, *Knowlton & Hunnewell* in 1913 (NE); Amherst, *Seymour* 3501 (NE); Ayer, *Ordway & Bullard*, May 30, 1934 (NE); Nantucket I., *Bicknell* 4835 (NE); Plymouth, *Fernald & Hunnewell* 15192 (NE); Dorchester, May 5, 1889, *Churchill* (NE); Florida, *Fernald & Long* 9623 (NE, GH); Lanesboro, May 22, 1916, *Churchill* (NE); Becket, *G. N. & F. F. Jones* 13716, 13750, 13781, 15323 (UI).

CONNECTICUT: Oxford, *Harger* 3 (GH); Stratford, *Eames* 1 (GH); Southington, *Bissell* in 1901 (GH); Groton, *Graves* in 1901 (GH); Winchester, *Harger* 10 (GH); Waterbury, *Blewitt* 1512 (NE); Glastonbury, *Weatherby* 2861 (NE); Oly Lyme, *Woodward* in 1918 (NE); Andover, *Weatherby* 5280 (NE); Middletown, *Blewitt* 1798 (NE); Hamden, *Blewitt* 1797 (NE).

RHODE ISLAND: Westerly, Aug. 21, 1913, *Bissell, Harger, & Weatherby* (NE); Little Compton, July 27, 1919, *Collins* (NE); Barrington, May 30, 1911, *Winslow* (NE); Cumberland, *Hunnewell* 4129 (NE); Providence, *Collins* in 1902 (GH); Hopkinton, *Fernald, Woodward, & Collins* in 1919 (NE); Smithfield, *Chamberlain* 52 (NE, AA); Prudence Island, *Sanford* 10215 (NE); Lincoln, *Fernald* 9624 (NE).

NEW YORK: Hudson Falls, April 27, 1915, *Burnham* (GH); French Mt., *Burnham* 12 (GH); Judd's Falls, *Wiegand* 2572 (AA, GH); Newcomb, *House* 7961 (GH); North Harpersfield, *Topping* 223 (UI); Stockholm, *Phelps* 1591 (GH); Canton, *Phelps* 567 (GH).

NEW JERSEY: Palmyra, *Long* 14522, 16257 (Ph); Georgia, *Long* 52074 (Ph); Sharptown, *Long* 18378 (Ph); Green Creek, *Stone* 11932 (Ph).

PENNSYLVANIA: Saylorsburg, *Long* 6633 (GH); Lancaster Co., April 25, 1891, *Heller* (GH, Ph); Pocono Plateau, *Harshberger* in 1904 (GH); Reitz Gap, *Wahl* 29 (GH); Trout Run, *Wahl* 298 (GH); Slateford, *Long* 50001 (Ph); Bake Oven Knob, *Pretz* 2363a, 3246 (Ph); Trexlertown, *Pretz* 5919 (Ph); Alburtis, *Pretz* 9090 (Ph); Fleetwood, *Long* 12515 (Ph); Lenhartsville, *Long* 12867 (Ph); Huffs Church, *Wilkens* 6666 (Ph); Schubert, *Wilkens* 5129 (Ph); Nockamixon Narrows, *Benner* 2393 (Ph); Smithville, *Tanger* 3036 (Ph); Brickerville, *Tanger* 3044, 3045 (Ph); Gap, *Long* 30691 (Ph); Hopeland, *Long* 41781 (Ph); Unionville, *Pennell* 82 (Ph); Nottingham Barrrens, *Pennell & Long* 7559 (Ph); Landenburg, *Long* 8476 (Ph); St. Peters, *Long* 33631 (Ph); Exton, *Long* 32022 (Ph); Elam, *Long* 32349 (Ph).

DELAWARE: Vandyke, *Long* 48444 (GH, Ph); Coochs Bridge, *Benner* 9567 (Ph); Centreville, June 13, 1898, *Commons* (Ph); Newark, May 11, 1922, *Meredith* (Ph).

MARYLAND: Baltimore, May 15, 1910, *Churchill* (GH); Golt, Montgomery Co., *Hunnewell* 5885 (GH); Elkton, *Randolph* 121 (GH); Elk Neck, *Pennell* 24805 (Ph); North East, *Long* 54418, 57028 (Ph).

WEST VIRGINIA: Canaan Valley, July 21, —, *Burke* (AA).

DISTRICT OF COLUMBIA: Brightwood, *Smiley* in 1881 (GH).

VIRGINIA: Hopewell Gap, *Allard* 4353 (GH); White Top Mt., *Britton & Vail* in 1892 (AA), June 28, 1892, *Small* (GH); Brushy Mt., June 17, 1892, *Small* (GH).

NORTH CAROLINA: Highlands, *Harbison* 2 (AA); Macon Co., *Harbison* 510, 913 (AA).

GEORGIA: Rabun Co., *Duncan* 3282 (GH); Trenton, *Hermann* 10191 (GH).

ONTARIO: Cornwall, May 28, 1913, May 29, 1914, *Jack* (AA).

MINNESOTA: Mabel, *Spondee* in 1928 (AA); Duluth, July 1, 1914, *Butters* (GH); near Minneapolis, *Nielsen* 1868 (Minn.); Ham Lake, *Nielsen* 1872 (Minn.); Lake City, *Rosendahl & Nielsen* 1852 (Minn.).

WISCONSIN: Black Falls, July 6, 1914, *Lake* (AA); Mud Bay, *Pease* 18044 (GH); Devils Lake, May 25, 1899, *Cheney* (GH); Trout Lake, *Fassett* 13745 (GH); Kilburn, June 1, 1893, *Pammel* (AA); Brown Co., *Schuette* in 1904 (AA); Barneveld, *Fassett* 2826 (GH).

MICHIGAN: Wolverine, *Gleason* 708 (AA); Grayling, *Piper* in 1922 (AA); Port Huron, May 17, 1912, *Dodge* (AA); Mackinac I., July 4, 1912, *Hunnemwell* (GH); Sault Ste. Marie, *Newins* 8141 (AA); Ann Arbor, *Hermann* 6471 (GH); Homestead, *Hermann* 7259 (GH); Gwinn, June 6, 1909, *Harrison* (GH); Lansing, *Bailey* in 1887 (GH); Keweenaw Co., *Farwell* in 1889 (GH).

OHIO: Portage Co., *Webb* 1180 (GH); Berea, May 1897, *Watson* (UI).

KENTUCKY: Lynch, *McFarland* 18 (GH).

INDIANA: Miller, *Chase* 197 (UI); Martin Co., *Deam* 12868 (GH); Versailles, *Deam* 16116 (AA); Albion, *Deam* 33798 (AA).

ILLINOIS: Lake Forest, *Harper* in 1890 (AA); Oregon, May 16, 1883, *Waite* (UI); Wabash Co., *Schneck* in 1883 (UI); Lake Zurich, *Hill* 321889 (UI); Barrington, *Chase* 1047 (UI).

IOWA: Fayette, *Fink* in 1894 (GH); Decorah, Aug. 5, 1933, *Tolstead* (Minn.).

*Amelanchier laevis* is the most noticeably ornamental and graceful of the eastern American serviceberries, and it is rather surprising that such a common and conspicuous species should not have received a specific name until so treated by Wiegand in 1912. It is most closely related to *A. arborea*. Besides its glabrous or nearly glabrous leaves, that are often more or less purplish tinged when young, it differs from *A. arborea* in the more spreading branches, and in the slender, flexuous, pendulous, looser inflorescence and somewhat larger flowers. The mature leaves are usually more abruptly pointed than those of *A. arborea*, rounded (scarcely cordate) at the base, and the blades are green above, paler beneath, and completely glabrous almost from the first. In general, it may be noted that it has somewhat longer petals, narrower sepals, and the fruits are longer-pedicelled, more succulent, and of a sweeter flavor. The seeds of *A. laevis* are very similar to those of *A. arborea*, but in a large series show a tendency to be very slightly smaller, lighter brown, and somewhat smoother. This trend is, however, not sufficiently tangible for descriptive purposes.

## 6. AMELANCHIER ARBOREA (Michx.f.) Fern.

(Plates I and VIII)

*Mespilus nivea* Marshall, *Arbustr. Am.* 90 (1785), nomen dubium.

*Pyrus botryapium* sensu Wangenheim, *Nordam. Holzarten* 90, pl. 28 (1787); Tausch in *Flora* 21:714 (1838). Non L.f. 1781.

*Amelanchier canadensis* sensu Walter, *Fl. Carol.* 148 (1788); Darlington, *Fl. Cestrica* (ed. 3) 86 (1853); Sargent, *Silva N. Am.* 4:127, pl. 194 (1892), ex p.; Dippel, *Handb. Laubh.* 3:392 (1893); Britton & Brown, *Illustr. Fl. N. U.S.* 2:237, fig. 1985 (1897); Mohr in *Contr. U.S. Nat. Herb.* 6:545 (1901); Mackenzie & Bush, *Man. Fl. Jackson Co., Missouri* 108 (1902); Keeler, *Our Native Tr.* 153 (1902); Small, *Fl. Se. U.S.* 531 (1903); Card in *Bailey, Cyclop. Am. Hort.* 57 (1904); Dame & Brooks, *Handb. Tr. New Engl.* 116, pl. 59 (1904); Sargent, *Man. Tr. N. Am.* 360, fig. 283 (1905); Blanchard in *Torreya* 7:97 (1907); Hough, *Handb. Tr. N. States & Canada* 243, figs. 282, 283, 284 (1907); Emerson & Weed, *Our Tr.* 191 (1908); Britton & Shafer, *N. Am. Tr.* 437, fig. 383 (1908); Rogers, *Tree Book*, pl. opp. p. 298 (1908); Apgar, *Ornam. Shr. U.S.* 182, fig. 277 (1910); Blakeslee & Jarvis, in *Bull. Storrs Agr. Exp. Sta.* 69:492-493 (1911); Stone, *Pl. So. N.J. in Rep. N.J. State Mus.* 1910:488 (1911);

Clements, Rosendahl, & Butters, *Minn. Tr. & Shr.* 151 (1912); Wiegand in *Rhodora* 14:150, pl. 96, fig. 6 (1912); Silva Tarouca, *Freiland-Laubh.* 139, fig. 123 (1913); Britton and Brown, *Illustr. Fl. N. U.S.* (ed. 2) 2:292, fig. 2329 (1913); Small, *Florida Tr.* 30 (1913); Small, *Shr. Florida* 29 (1913); Rehder in Bailey, *Stand. Cyclop. Hort.* 273 (1914); Bean, *Tr. & Shr. Brit. Isles* 1:188 (1914); Burns & Otis in *Bull. Vermont Agr. Exp. Sta.* 194:145 (1916); Rydberg, *Fl. Rocky Mts.* 446 (1917); Hitchcock & Standley, *Fl. Dist. Columbia* 178 (1919); Sargent, *Man. Tr. N. Am.* (ed. 2) 394, fig. 350 (1922); Hoffmann in *Proc. Boston Soc. Nat. Hist.* 36:280 (1922); House, *N.Y. State Mus. Bull.* 254:411 (1924); Bailey, *Man. Cult. Pl.* 379 (1924); Wiegand & Eames, *Fl. Cayuga Basin* 248 (1926); Rehder, *Man. Cult. Tr. & Shr.* 390 (1927); Sudworth in *U.S. Dept. Agric. Misc. Circular* 92:134 (1927); Pepono, *Fl. Chicago Area* 342 (1927); Rosendahl & Butters, *Tr. & Shr. Minnesota* 218 (1928); Miller & Tehon, *Native & Naturalized Tr. Illinois* 203, pl. 66 (1929); Peattie, *Fl. Indiana Dunes* 219 (1930); Rydberg, *Fl. Prairies & Plains* 436 (1932); Deam, *Tr. Indiana* (ed. 2) 189, pl. 76 (1932); Small, *Man. Se. Fl.* 636 (1933); Palmer & Steyermark in *Ann. Missouri Bot. Gard.* 22:557 (1935); Marie-Victorin, *Fl. Laurent.* 316, fig. 91 (1935); Griscom in *Rhodora* 38:48 (1936); Coker & Totten, *Tr. Se. States* (ed. 2) 207 (1937); Munns in *U.S. Dept. Agric. Misc. Publ.* 287:137, pl. 133 (1938); Nielsen in *Am. Midl. Nat.* 22:183, pl. 11 (1939); Steyermark, *Spring Fl. Missouri* 255, pl. 68, fig. 1 (1940); Rehder, *Man. Cult. Tr. & Shr.* (ed. 2) 388 (1940); Deam, *Fl. Indiana* 532 (1940). Non *Mespilus canadensis* L. 1753.

*Mespilus amelanchier*  $\beta$  *nivea* Castiglioni, *Viagg. St. Uniti* 2:293 (1790).

*Mespilus canadensis* var.  $\beta$  *cordata* Michx. *Fl. Bor. Am.* 1:291 (1803).

*Mespilus arborea* Michx.f. *Hist. Arb. Am. Sept.* 3:68, pl. 11 (1810), *N. Am. Sylva* 2:70, pl. 66 (1818), (ed. 3) 2:60, pl. 66 (1859).

*Aronia arborea* Barton, *Comp. Fl. Philadelphia* 1:228 (1818).

*Aronia botryapium* sensu Elliott, *Sketch Bot. S. Car. & Ga.* 1:557 (1821). Non Pers. 1807.

*Amelanchier ovalis* var.  $\beta$  *subcordata* DC. *Prodr.* 2:632 (1825).

*Aronia subcordata* Rafinesque ex DC., *ibid.*

*Malus microcarpa* Rafinesque ex DC., *ibid.*

*Aronia cordata* Rafinesque, *Med. Fl.* 2:196 (1830) nom. nud.

*Amelanchier botryapium* sensu Spach, *Hist. Nat. Veg. Phan.* 2:85 (1834); Torrey, *Fl. N. Mid. States* 203 (1826); Darlington, *Fl. Cestrica* 294 (1837); Farwell in *Rep. Mich. Acad. Sci.* 17:175 (1916). Non Borkh. 1803.

*Pyrus wangenheimiana* Tausch in *Flora* 21:715 (1838).

*Aronia nivea* Neumann ex Tausch, *ibid.*

*Amelanchier canadensis* var.  $\alpha$  *botryapium* Torrey & Gray, *Fl. N. Am.* 1:473 (1840); Torrey, *Fl. N.Y.* 1:225 (1843); Walpers, *Rep. Bot. Syst.* 2:55 (1843); Gray, *Man. Bot.* 130 (1848); Brendel, *Fl. Peoriana* 47 (1887); Chapman, *Fl. S. U.S.* (ed. 3) 141 (1897); Schneider, *Illustr. Handb. Laubh.* 1:734, fig. 409 (1906); Robinson & Fernald in Gray, *New Man. Bot.* (ed. 7) 460 (1908).

*Amelanchier wangenheimiana* M. Roem. *Syn. Mon.* 3:146 (1847).

*Amelanchier canadensis* var. *tomentula* Sargent, *Man. Tr. N. Am.* 361 (1905); Schneider, *Illustr. Handb. Laubh.* 1:734 (1906); Robinson & Fernald in *Rhodora* 11:47 (1909).

*Amelanchier intermedia* sensu Blanchard in *Torreya* 7:98 (1907), ex p. Non Spach 1834.

*Amelanchus canadensis* Vollmann, *Fl. Bayern* 453 (1914).

*Amelanchier canadensis* f. *nuda* Palmer & Steyermark in *Ann. Missouri Bot. Gard.* 25:772 (1938); Rehder, *Man. Cult. Tr. & Shr.* (ed. 2) 388 (1940).

*Amelanchier arborea* Fernald in *Rhodora* 43:563, pl. 672, fig. 2 (1941); G. N. Jones, *Fl. Illinois* 154 (1945).

*Amelanchier austromontana* sensu Fernald in *op. cit.* 566. Non Ashe 1918.

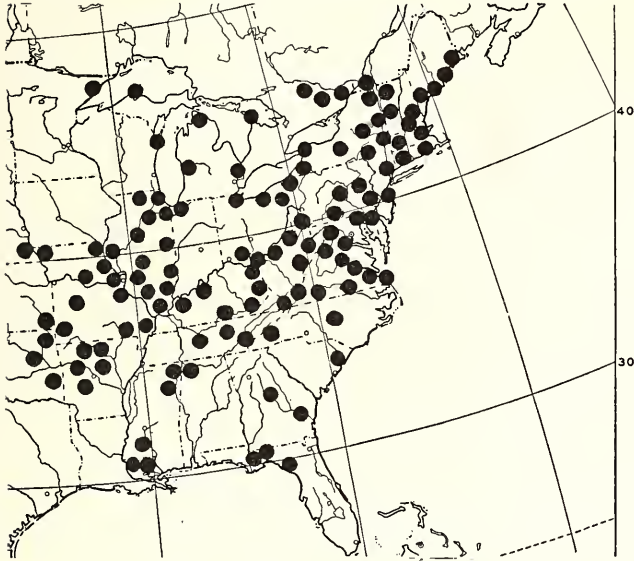
A small tree 5-20 m. tall, with a maximum trunk diameter of 40 cm., or an irregularly branched shrub, the stems solitary or few together, not growing in clumps; branches ascending; bark grayish brown, longitudinally fissured on old stems, that of the young stems gray, smooth, and often somewhat striped; twigs of the season pubescent at first, soon glabrous, brown and slightly glossy; winter-buds lanceoloid, acuminate, glabrous; leaves conduplicate in the bud, small, densely white-tomentose, mostly folded at flowering time; blades 4-10 cm. long, 2-2.5 cm. wide, ovate or oval, or slightly obovate, short-acuminate or acute at the apex, cordate or rounded at the base; mature leaves thick, firm, dark green and glabrous above, paler beneath and pilose at least along the midvein, becoming nearly or quite glabrous in age; lateral veins 11-17 pairs, unequally distant, sinuous, anastomosing and indistinct toward the margin; margins sharply and finely and often somewhat doubly serrate almost or quite to the base, the teeth ascending, incurved, slender, 6-10 per cm., mostly 50-60 on each side of average leaves; stipules linear, caducous, pilose; petioles 1-2 cm. long; flowers 2-2.5 cm. in diameter, fragrant, appearing early, usually before the leaves have unfolded; racemes spreading or somewhat pendulous, 4-10 cm. long, 4-10-flowered; pedicels grayish pubescent, the lower 8-17 mm. long; petals oblanceolate, 12-18 mm. long, 2-5 mm. wide, white, or sometimes pinkish; stamens about 20, 3-4 mm. long, the filaments glabrous; anthers 0.6-0.8 mm. long; hypanthium campanulate, 2.5-3 mm. in diameter, glabrous or somewhat floccose; sepals triangular-lanceolate, acute, 2-3 mm. long, tomentulose on both sides, becoming strongly reflexed from the base after anthesis; styles 5 (or 4), about 4 mm. long, glabrous, the free portion 2-3 mm. long; summit of ovary glabrous; fruit globose, purple (rarely whitish), 6-10 mm. in diameter, scanty, somewhat tasteless, falling early; lower pedicels 1-2.5 cm. long; seeds 3-10, dark brown, nearly smooth, glabrous, 4.5-5 mm. long, 2-3 mm. wide when fully developed, asymmetrically lanceoloid, somewhat flattened.

TYPE LOCALITY: "Hab. . . . a Canada ad Virginiam et in montibus Carolinae." Phototypes in the Gray Herbarium and the Arnold Arboretum.

RANGE: In dry woods and open ground, and on wooded hillsides, from Maine to Minnesota, southward to Louisiana and Florida. Flowering from the end of March to the end of May; fruits ripening in June and July.

QUEBEC: Longueuil, *M.-Victorin* 11222 (AA); Aylmer, *Rolland* 57, 58, 59 (GH); Kingsmere, *Macoun & Malte* in 1913 (GH); Ile Bigras, *M.-Victorin* 24547 (GH); Oka, *M.-Victorin* 24546 (GH); Grosse-Isle, *M.-Victorin* 15586 (AA); Montmorency Falls, Aug. 20, 1895, *Jack* (AA).

MAINE: Monhegan Island, *Jenney, Churchill, & Hill* 3264 (NE); Mt. Desert I., *Rand*, July 1899 (NE); Lincolnville, *Rosbach* 1102 (NE); Northport, *Rosbach* 1136 (NE); Orono, *Harvey* in 1898 (UI); Milford, *Fernald* 13767 (GH); West Pembroke, *Fernald* 1885 (GH).

MAP 5.—Range of *Amelanchier arborea*.

NEW YORK: Pavilion, *Hill* in 1859 (UI); New York, *Burnham* 1162 (GH); New London, *House* 11870 (GH); Sylvan Beach, *House*, May 16, 1918 (GH); Albany, *House* 7787 (GH); Middlefield, *Hunnewell* 6889 (GH); Spencer, *Eames & Dean* 4293 (GH); Canton, *Phelps* 1581, 1582 (GH); Black Rock Forest, *Raup* 7410, 7727 (GH).

VERMONT: Plainfield, *Eggleston* 1959 (GH); Twin Mts., *Eggleston* 1182, 1957 (GH); Pittsford, *Eggleston* 1183 (GH); Townshend, *L. A. Wheeler* in 1915 (GH); Charlotte, May 22, 1922, *Knowlton* (NE); Newport, May 24, 1923, *Knowlton* (NE); W. Fairlee, June 10, 1933, *Anderson, et al.* (NE).

NEW HAMPSHIRE: Walpole, May 26, 1917, *Bean & Fernald* (NE); Lebanon, *Fernald, Hunnewell, & Blanchard* in 1920 (NE); Wolfboro, *H. E. Sargent* 24 (GH).

MASSACHUSETTS: Canton, May 5, 1895 *Williams* (NE); Plainfield, June 14, 1913, *Forbes* (NE); Brimfield, May 20, 1916, *Knowlton* (NE); Montague, May 13, 1911, *Fernald* (GH, NE); Erving, *Hunnewell, Macbride, & Torrey*, May 14, 1915 (NE); Whately, May 17, 1913, *Harger & Fernald* (NE); Shelburne Falls, May 11, 1912, *Bean & Knowlton* (NE); West Orange, May 10, 1912, *Hunnewell & Wiegand* (NE); Shutesbury, *Tower & Seymour* 3674 (NE); Northfield, May 11, 1912, *Fernald & Floyd* (NE); Rowe, *Fernald & Long* 9621 (GH); Andover, *Pease* 678 (NE).

CONNECTICUT: Waterbury, *Blewitt* 2038 (NE); Glastonbury, *Wright* in 1916 (GH); Middlebury, Apr. 23, 1896, *Shepardson* (NE); Danbury, *Blewitt* 2039 (NE); Tariffville, May 17, 1913, *Winslow & Hill* (NE); Southington, *Blewitt* 1802 (NE), *Bissell* in 1901 (GH); East Hartford, May 18, 1913, *Briggs* (NE); Kent, *Eames* 8287 (NE); Barkhamsted, *Blewitt* 1805, 3650 (NE); Watertown, *Blewitt* 2036, 3501 (NE); Winstead, *Blewitt* 1804 (NE); Thomaston, *Weatherby* D2157 (NE).

RHODE ISLAND: Portsmouth, June 10, 1911, *Collins* (NE); Cumberland, *Hunnewell* 4128 (NE); Lincoln, May 30, 1919, *Collins* (NE).

NEW JERSEY: Woodglen, *Long* 52340 (Ph); Pennville, *Long* 52160 (Ph); Charlestown, *Long* 46255 (Ph); Little York, *Long* 46808 (Ph); Tumble Falls, *Hermann* 4016 (Ph); Drea Hook, *Long* 53736 (Ph); Bordentown, *Long* 3107 (Ph); Smithville, *Long* 9610 (Ph); Cranbury, *Long* 51868 (Ph); Deerfield, *Long* 32089 (Ph); Pennington, *Long* 50133 (Ph); Palmyra, *Long* 11943, 13516, 14514, 14519 (Ph); Somerdale, *Long* 11605 (Ph).

PENNSYLVANIA: Safe Harbor, Apr. 18, 1889, *Heller* (GH); Lenhartsville, *Wilkins* 1097 (GH); Ohio Pyle, May 21, 1910, *Bartram* (GH); Pleasant Valley, June 9, 1923, *Benner* (GH); Wagontown, Apr. 25, 1925, *Stone* (GH); Reseca Falls, June 9, 1918, *Bartram* (GH); Perkiomen Creek, *Long & St. John* 2479 (GH); Fairview, *Wahl* 34 (GH); Mercersburg, *Adams & Wherry* 4662 (GH); Linfield, *Long* 11883 (GH); Rosscommon Creek, *Long* 6586 (GH); Bernville, *Stoudt & Hermann* 2779, 2784 (GH).

DELAWARE: Deakyneville, *Long* 58228 (Ph); Mount Cuba, *Long* 32282 (Ph).

WEST VIRGINIA: Panther Mt., *Rydberg* 9052 (AA); White Sulphur Springs, *Hunnell* in 1914 (GH), *Harbison* 7095 (AA); Aaron's Run, Monongalia Co., *Myers* 415 (UI); Ravenswood, May 14, 1939, *Balsar* (GH).

VIRGINIA: Williamsburg, *Grimes* 2560 (GH); Massanutten Mts., *Allard* 4498 (GH); Rye Valley, June 11, 1892, *Small* (GH); Holston River, Aug. 8, 1892, *Small* (AA); Hot Springs, *Hunnell* 4029 (GH); Wytheville, *Svenson* 7779 (GH); near Wylliesburg, *Palmer* 39994 (AA); near Antioch, *Allard* 2819 (GH); near Aldie, *Allard* 2516, 2584 (GH); Beverly, *Allard* 220 (GH); High Point, *Allard* 4342 (GH); Little Neck, *Fernald & Long* 3959 (GH); Great Neck, *Fernald, Griscom, & Long* 4650 (GH); Pungo, *Fernald & Griscom* 4425 (GH); Indian Point, *Fernald & Long* 11698, 11845 (GH); Clarendon, *Blake* 10557 (GH); Emporia, *Fernald & Long* 8291 (GH, Ph); Cleopus, *Fernald & Long* 13040 (GH, Ph); Surry Court-house, *Fernald & Long* 13039 (GH, Ph); Richmond, *Fernald & Long* 7063 (GH, Ph); Gary Church, *Fernald & Long* 7064 (GH, Ph); Homeville, *Fernald & Long* 7065 (GH, Ph); Waverly, *Fernald & Long* 7067 (GH, Ph); South Hill, *Fernald & Long* 7069 (GH, Ph); Burt, *Fernald & Long* 7450 (GH, Ph); Ingersoll, *Fernald & Long* 11844 (GH, Ph); Scotland, *Fernald & Long* 13041 (GH, Ph).

MARYLAND: May 16, 1905, *Hitchcock* (UI); Oakwood, *Tanger* 3025 (Ph); Golt, *Tidestrom* 11882 (GH); Bald Friar, *St. John & Long* 1009 (GH), 8059 (Ph); Middle Neck, *Long* 37298 (GH, Ph); Elk Neck, *Long* 37719 (Ph); Providence Mill, *Benner* 4883 (Ph).

NORTH CAROLINA: Linville, *Randolph* 1200 (GH); Salisbury, *Harbison* 6 (AA); Raleigh, *Harbison* 30 (AA); Chapel Hill, *Harbison* 15 (AA); Ridge Crest, *Davis* 1462 (UI).

SOUTH CAROLINA: Santee Canal, *Ravenel*, s.n. (GH); Anderson, *Palmer* 42440 (AA).

GEORGIA: Holton, *Harper* 1806 (GH, AA); N. Georgia, *Wright* in 1875 (GH); Wayne Co., *Eyles* 6894 (GH); Lookout Mt., July 1898, *Ruth* (UI).

FLORIDA: River Junction, *Harbison* 1415 (AA); Round Lake, *Harbison* 4 (AA); Caryville, Mar. 30, 1927, *Hume* (AA); Lake Tamonia, *Griscom* 21578 (GH); Aspalaga Bluff, Apr. 26, 1924, *Small* (GH).

ONTARIO: Niagara, *John Macoun* 34296 (GH); Killaloe, May 1903, *Jack* (A); Stokes Bay, *Krotkov* in 1934 (GH); Belleville, May 16, 1878, *Macoun* (GH).

WISCONSIN: Jacksonport, May 30, 1926, *Kraus, et al.* (GH).

MINNESOTA: Grand Portage, *Nielsen* 1630 (Minn.).

MICHIGAN: Bridgeton, *Hermann* 9625 (AA).

OHIO: Ironton, *Werner* 55 (GH); Toledo, *Sanford* 379 (GH); Garrettsville, *Webb* 84 (GH); Sugar Grove, *Horsey* 323 (AA); Urbana, Apr. 22, 1838, *Samples* (UI); Berea Co., *Watson* in 1897 (UI); Otway, *Demaree* 11260 (AA).

INDIANA: Near Attica, *Deam* 22524 (AA); Liverpool, *Chase* 2035 (UI); Dune Park, *Chase* 2053 (UI); Fountain, *Deam* 23005 (UI); Clarke, *Moffatt* 190 (UI);

Bloomington, *Friesner* 9541 (UI); Pine, May 13, 1876, *Hill* (UI); Portland Arch, *G. N. Jones* 13143 (UI).

ILLINOIS: Camp Grant, *Mattoon* 13 (UI); Marshall Co., *Chase* 1795 (UI); Will Co., *Hill* 411912 (UI); Starved Rock, *Greenman, Lansing, & Dixon* 81 (GH), *Thone* 172 (UI); Peoria, *McDonald* in 1904 (GH, UI); Adams Co., *Evers* 52 (UI); Urbana, Aug. 11, 1899, *Clinton* (GH); Mahomet, Sept. 23, 1899, *Gleason* (GH); Homer, Sept. 16, 1899, *Clinton* (UI); Taylorville, Apr. 22, 1899, *Andrews* (UI); Carlinville, Apr. 12, 1890, *Andrews* (UI); Richland Co., *Ridgway* 2534 (AA); Grand Tower, May 3, 1902, *Gleason* 2404 (GH, UI), 1695 (GH); Wabash Co., Sept. 1886, *Schneck* (UI); Johnson Co., May 26, 1902, *Schneck* (UI); Vermilion River, *G. N. Jones* 13340 (UI); Wolf Lake, *G. N. Jones*, 12089 (UI); Franklin Creek, *G. N. Jones* 15840 (UI); Sangamon River, *G. N. Jones* 15618 (UI); Dixon Springs, *G. N. Jones* 11992 (UI).

MISSOURI: Painton, *Palmer* 34917 (AA); Monticello, *Palmer* 35890 (AA); La Grange, *Davis* 2227 (AA); Kahoka, *Palmer* 25860 (AA); Livonia, *Palmer* 41069 (AA); Thayer, *Palmer* 14684 (AA); Whiteside, *Davis* 49 (UI); Allenton, May 20, 1882, *Letterman* (AA); St. Charles Co., *Drouet* 1421 (AA); Jefferson Co., *Letterman* 2, 3 (AA); Webb City, *Palmer* 1602 (AA); Newton Co., *Palmer* 29927 (AA), *Bush* 85, 3509 (GH); McDonald Co., *Bush* 30, 85a, 85b, 85c (GH); Wright City, *Davis* 1259 (AA); Oronogo, *Bush* 1602 (GH, UI), 1602A (GH); Hannibal, *Davis* 113 (AA), 704 (GH, AA), 2011 (AA, UI), 4646 (UI).

KENTUCKY: Louisville, *Fischbach* 228 (GH); Chalybeate Springs, *Schacklette* 261 (GH); Monticello, *Smith & Hodgdon* 3872 (GH); South Portsmouth, *Demaree* 11245 (AA).

ARKANSAS: Hardinville, *Palmer* 26350 (GH); Hamburg, *Demaree* 18743 (UI); Baxter, *Bush* 15250 (AA); Hot Springs, *Palmer* 24470 (AA); Little Rock, *G. M. Merrill* 1965 (UI); Nogo, *G. M. Merrill* in 1933 (UI); Van Buren, Apr. 29, 1910, *Brown* (AA); Shirley, *Palmer* 33207 (AA); Izard Co., *Palmer* 35564 (AA); Eureka Springs, *Palmer* 5616 (AA).

TENNESSEE: Knoxville, *Ruth* 317 (GH); Spence Field, *Sharp & Svenson* 7278 (GH); Craggie Hope, *Svenson* 346 (GH).

ALABAMA: Huntsville, *Hubricht* B2011 (MBG); Selma, "cultivated and more or less naturalized," *Cocks*, no number or date (AA).

MISSISSIPPI: Rockport, *Harbison* 11 (AA); Tishomingo City, *Harbison* 40 (AA); Mooreville, *Palmer* 39015 (AA).

LOUISIANA: Covington, Apr. 22, 1910, *Cocks* (AA).

NEBRASKA: Nemaha, *Bates* 5992 (AA).

KANSAS: Baxter Springs, *Bush* 10380 (AA, UI).

OKLAHOMA: Near Page, *Palmer* 20761, 20764 (AA); near Ottawa, *Stevens* 2427 (AA); Ottawa Co., *Palmer* 29915 (AA).

*Amelanchier arborea* is an arborescent species with acuminate, cordate, finely serrate leaves that are pubescent at flowering time, long narrow petals, glabrous ovary, five styles, and somewhat dryish fruits, that has been called *A. canadensis* by many botanists. It is closely related to *A. laevis* and to *A. interior*. The bark is shallowly fissured and grayish brown. When the leaves are about one-third grown the spreading or drooping racemes of white flowers cover the tree. The flowers are therefore conspicuous in early spring when most other trees are leafless. The wood is sometimes used for fishing poles, or for handles for tools. The fruits of *A. arborea*, unlike those of other eastern American species are scanty, scarcely edible, and fall early.

It has been pointed out by M. L. Fernald (*Rhodora* 43:562-563. 1941) that the first clear account of this species was that of *Mespilus canadensis* var. *β cordata* Michx. 1803. "In 1810, the younger Michaux, evidently taking the name from his father's first word of diagnosis, elevated *M. canadensis* var. *β cordata* to specific rank as *M. arborea* Michx.f. . . . Here, then, is the first perfectly clear name for *Amelanchier canadensis* sensu Wiegand." It is interesting to note, however, that the error of misapplying the name *A. canadensis* to *A. arborea* (Michx.f.) Fern. did not originate with Wiegand in 1912, for no fewer than twenty previous authors had misused the name *A. canadensis* in this sense. Apparently the earliest binomial which might apply to this species is *Mespilus nivea* Marsh. However, Marshall's account, more of a horticultural commentary than a botanical description, "is altogether too vague, unless an original specimen of it can eventually be discovered. Its transfer into *Amelanchier* would merely lead to the doubt which surrounds so many names unfortunately taken up from Marshall's inadequate and often merely impressionistic accounts." (Fernald, l.c.)

*Pyrus wangenheimiana* Tausch, based on material growing in the Leibnitz garden at Prag, is represented by a sheet in the Bernhardt Herbarium at the Missouri Botanical Garden, which through the kindness of the curator, Dr. J. M. Greenman, I have had the opportunity of examining. This sheet is probably part of the original Tausch exsiccati and may therefore be regarded as authentic. It has two specimens, one of mature leaves, and the other consisting of a young flowering branch. Although labeled by Wiegand in 1912 "a probable hybrid" between *A. canadensis* (sensu auth.) and *A. laevis* Wieg., it is evidently quite typical *A. arborea* (Michx.f.) Fern.

The leaves of *A. arborea* usually retain even at maturity some pubescence on the lower surface, at least toward the base of the blades and on the petioles. On certain specimens, however, especially those collected from plants in exposed situations, the leaves are not infrequently glabrous at maturity. Such specimens, which in the absence of fruits are sometimes not easily distinguished from *A. laevis*, have been named *A. arborea* f. *nuda* by Palmer & Steyermark.

The taxonomic identity of certain specimens from Westminster, Vermont, collected by W. H. Blanchard in 1903 and 1907, and distributed as "*A. intermedia* Spach" and "*A. saxatilis* Blanchard" is not yet determined. In 1912, Wiegand was confronted with the same problem, which he likewise was apparently unable satisfactorily to solve. The specimens are, as Wiegand has said, difficult to understand because they do not belong to any species now recognized. He suggested that they may have been of hybrid origin, and concluded that they need more study in the



field. With this view I am in complete accord, but am at present unable to add any further clarifying statement beyond the suggestion that possibly the specimens represent hybrids between *A. arborea* and *A. bartramiana*.

6a. AMELANCHIER ARBOREA var. **alabamensis** (Britt.) n. comb.

*Amelanchier alabamensis* Britton in Britton & Shafer, N. Am. Tr. 439, fig. 386 (1908); Wiegand in Rhodora 14:132, 240 (1912); Small, Man. Se. Fl. 636 (1933).

A small tree resembling *A. arborea*, but differing in the tomentose top of the ovary; flowering specimens unknown.

TYPE LOCALITY: In sandy land three miles south of Auburn, Lee Co., Alabama, Mar. 19, and May 28, 1898, *F. S. Earle & C. F. Baker* 1610 (TYPE, in the herbarium of the New York Botanical Garden).

RANGE: Arkansas and Alabama.

ARKANSAS: Magazine Mt., Logan Co., *Palmer* 23222 (AA).

ALABAMA: Auburn, Lee Co., *Earle & Baker* 1610 (NY); Birmingham, Jefferson Co., *Palmer* 35329, 38948 (AA); Little Mountain, about four miles south of Tuscumbia, Colbert Co., *Harper* 3322 (GH, AA).

Little has been added to the meager knowledge of this peculiar plant since Wiegand studied it in 1912. It is here reduced to the varietal category because it appears probable that it is not a species of equivalent rank with *A. arborea*. Concerning the status of *A. alabamensis*, Wiegand (Rhodora 14:132, 1912) commented as follows: "In 1908 Britton described *Amelanchier alabamensis* from material collected by F. S. Earle and C. F. Baker three miles south of Auburn, Alabama. The writer has seen this material which was distributed by Earle and Baker, both the type specimen and also that which was sent to several other herbaria, but is still unable to form any satisfactory opinion regarding it. At flowering time the young leaves, hypanthium and sepals are like *A. canadensis* [*A. arborea*], but the summit of the ovary is hairy. The mature leaves are not distinctive but are more like those of *A. canadensis* [*A. arborea*]. Nowhere in any of the herbaria studied by the writer are there other specimens which will match these. Thus one is strongly forced toward the opinion that *A. alabamensis* is not a good species of the same grade as those with wide distribution, and that it is to be explained as a local hybrid or as a local environmental variety. Before this conclusion is finally reached however, a more extended search in the Southern States should be made, for this region is one from which little material of *Amelanchier* finds its way into the herbaria." Later in the same year Wiegand (l.c. 240) concluded that "a certain amount of woolliness on the summit of the ovary must be admitted among the allowable variations of *A. canadensis* [*A. arborea*] without, however, constituting a distinct

variety." In the view of the present writer the most appropriate procedure at present is to treat the Alabama plants as a variety of *A. arborea* until results of field studies are available to shed further light on the understanding of these plants. At the present time flowering specimens are unknown. Until these are at hand it seems inadvisable to relegate *A. alabamensis* to synonymy under *A. arborea*, or to follow Britton & Shafer, and Small in treating it as a distinct species.

#### 6b. × AMELANCHIER GRANDIFLORA Rehd.

*Amelanchier canadensis* × *laevis* sensu Wiegand.

*Amelanchier* (?) *botryapium lancifolia* Simon-Louis apud Zabel, Syst. Verz. Munden 19 (1878), nom. nud.

*Amelanchier canadensis grandiflora* Zabel in Beissner, Schelle, & Zabel, Handb. Laubh.-Ben. 191 (1903), nom. nud.

*Amelanchier lancifolia* hort. gall. ex Zabel, *ibid.*, pro syn.

*Amelanchier grandiflora* Rehder in Journ. Arnold Arb. 2:45 (Sept. 6, 1920); Man. Cult. Tr. & Shr. 390 (1927), (ed. 2) 388 (1940).

According to Sax (Journ. Arnold Arb. 12:9. 1931) this is a tetraploid hybrid between *A. arborea* and *A. laevis*. In the original publication, Rehder says that it differs from *A. arborea* in the larger flowers, the longer and more slender, less pubescent racemes, and in the purplish young leaves covered with a dense and more floccose tomentum which soon disappears entirely; from *A. laevis* it differs in the tomentose young leaves, the slightly villous racemes with more numerous flowers on shorter pedicels, and in the larger, more succulent fruit. "Among the many Amelanchiers grown at the Arboretum it is easily the most handsome and always attracts attention by the abundance of its large flowers set off effectively by the purplish foliage; it forms a large tree-like shrub with wide-spreading slender branches. As I saw it in 1893 in the Botanic Garden of the Forest Academy at Munden it formed a well-shaped small or medium-sized tree with spreading branches; it had been received from the nursery of Simon-Louis near Metz as *A. lancifolia*, a name which apparently was never published." (Rehder, l.c.). Accompanying the original description are a number of citations of specimens which have been referred to this hybrid by Wiegand. While there is little doubt that the plants in cultivation are actually of hybrid origin, almost all the specimens of feral plants that I have examined are clearly referable to either *A. laevis* or *A. arborea*. The following specimens of cultivated plants are in the herbarium of the Arnold Arboretum.

SPECIMENS OF CULTIVATED PLANTS: Bot. Gard. Munden, April 23 and July 3, 1893, *A. Rehder* (TYPE, AA); Arnold Arb. under no. 4406 (received from Munden in 1892) May 11, 1900, May 3, 1902, June 22, 1903, May 11 and July 6, 1912, May 14 and July 5, 1919; Arb. Spaeth, Berlin, May 8, 1909, *H. Jensen*.

## 6c. × AMELANCHIER GRANDIFLORA f. RUBESCENS Rehd.

*A. grandiflora* f. *rubescens* Rehder in Journ. Arnold Arb. 2:46 (1920), Man. Cult. Tr. & Shr. 390 (1927), (ed. 2) 388 (1940).

Flowers purple-pink in bud, tinged with pink when open.

Cultivated in the Durand-Eastman Park, Rochester, New York; specimens collected: May 16, 1920, *B. H. Slavin & J. Dunbar*.

"This handsome form agrees in its characters with the type except that the flowers are purple-pink in bud and suffused with pink when open. It is a seedling from a tree of typical *A. canadensis* [i.e., *A. arborea*] growing in Seneca Park, Rochester, and represented in our herbarium by specimens collected by *B. H. Slavin* and marked No. 10. The seedling described above, however, shows unmistakably the influence of *A. laevis* which is growing at the same locality."

## 7. AMELANCHIER CANADENSIS (L.) Medic.

(Plates II, IX, and X)

*Mespilus canadensis* L. Sp. Pl. 478 (1753), Syst. Veg. (ed. 13) 388 (1774); Miller, Gard. Dict. (ed. 8) no. 6 (1768).

*Mespilus virginiana* Miller, Gard. Dict. ed. 8; No. 11 (1768).

*Pyrus botryapium* L.f. Suppl. Pl. Syst. 255 (1781); Willdenow, Sp. Pl. 2:1013 (1799), Enum. Pl. 525 (1809); Pursh, Fl. Am. Sept. 339 (1814); Sprengel, Syst. Veg. 2:509 (1825).

*Crataegus racemosa* Lamarck, Encycl. Méth. Bot. 1:84 (1783); J. St. Hil. Expos. Fam. Nat. 2:182 (1805); Poiret in Lamarck, Encycl. Méth. Bot. Suppl. 1:292 (1810).

*Amelanchier canadensis* (L.) Medicus, Gesch. 79 (1793); Michaux, Fl. Bor. Am. 1:291 (1803); K. Koch, Dendrol. 1:180 (1869); Fernald in Rhodora 43:566, pl. 672, fig. 1 (1941); Weatherby & Adams in Contr. Gray Herb. 158:50 (1945).

*Crataegus amoena* Salisbury, Prodr. Stirp. Chap. Allert. 357 (1797), nomen illegit.

*Amelanchier botryapium* Borkhausen, Theor.-prakt. Handb. Forstb. 2:1260 (1803); DC. Prodr. 2:632 (1825); Hooker, Fl. Bor. Am. 1:202 (1834); Britton & Brown, Illustr. Fl. N. U.S. 2:238, fig. 1986 (1897); Mohr in Contr. U.S. Nat. Herb. 4:545 (1901); Card in Bailey, Cyclop. Am. Hort. 57 (1904); Britton, Man. Fl. N. States 517 (1901), (ed. 3) 517 (1907); Small, Fl. Se. U.S. 531 (1903); Keeler, Our Northern Shr. 192 (1903); Coker & Totten, Tr. N. Carol. 59 (1916).

*Aronia botryapium* Persoon, Syn. Pl. 2:39 (1807); Nuttall, Gen. Am. Pl. 306 (1818); Torrey, Fl. N. & Mid. U.S. 1:479 (1824); Eaton, Man. Bot. (ed. 6) 29 (1833).

*Aronia botryapium* var. *β racemosa* Persoon, l.c.

*Aronia ovalis* sensu Elliott, Sketch Bot. S.C. & Ga. 1:558 (1821). Non Persoon 1807.

*Pyrus ovalis* sensu Bigelow, Fl. Boston. (ed. 2) 195 (1824). Non Willdenow, 1796, nec *Amelanchier ovalis* Medicus 1793, nec Borkhausen 1803.

*Amelanchier intermedia* Spach, Hist. Nat. Vég. Phan. 2:85 (1834); M. Roemer, Syn. Mon. 3:146 (1847); Blanchard in Torrey 7:98 (1907) ex p.; Britton & Shafer, N. Am. Tr. 438, fig. 384 (1908); Stone, Pl. So. N.J. in Rep. N.J. State Mus. 1910:488 (1911); Britton & Brown, Illustr. Fl. N. U.S. (ed. 2) 2:292, fig. 2330 (1913); Wiegand in Rhodora 22:147 (1920); Hoffmann in Proc. Boston Soc. Nat. Hist. 36:280 (1922); House in N.Y. State Mus. Bull. 254:412 (1924); Wiegand & Eames, Fl. Cayuga Basin 248 (1926); Rehder, Man. Cult. Tr. & Shr. 390 (1927).

- Mespilus glabra* Nuttall ex Hooker, Fl. Bor. Am. 1:202 (1834).  
*Pyrus neumanniana* Tausch in Flora 21:76 (1838).  
*Aronia affinis* Neum. ex Tausch, *ibid.*  
*Amelanchier canadensis* var.  $\beta$  *oblongifolia* Torrey & Gray, Fl. N. Am. 1:473 (1840); Torrey, Fl. N.Y. 1:225 (1843); Walpers, Rep. Bot. Syst. 2:55 (1843); Gray, Man. Bot. 130 (1848), (ed. 2) 126 (1856); Watson & Coulter in Gray, Man. Bot. (ed. 6) 167 (1889).  
*Amelanchier ovalis* sensu Emerson, Tr. Massachusetts 444 (1846). Non Medicus 1793.  
*Amelanchier oblongifolia* M. Roemer, Syn. Mon. 3:147 (1847); Robinson & Fernald in Gray, New Man. Bot. (ed. 7) 460 (1908); Jones & Rand in Bull. Vermont Agr. Exp. Sta. 145:99 (1909); Wiegand in Rhodora 14:147, pl. 96 (1912); Clements, Rosendahl, & Butters, Minnesota Tr. & Shr. 151 (1912); Small, Florida Tr. 31 (1913), Shr. of Florida 29 (1913); Small & Carter, Fl. Lancaster Co. Pennsylvania 155 (1913); Bean, Tr. & Shr. Brit. Isles 1:189 (1914); Rehder in Bailey, Stand. Cyclop. Hort. 273 (1914); Hitchcock & Standley, Fl. Distr. Columbia 178 (1919); Silva Tarouca, Freiland-Laubh. (ed. 2) 96, fig. 86 (1922); Bailey, Man. Cult. Pl. 378 (1924); Rehder, Man. Cult. Tr. & Shr. 389 (1927); Rydberg, Fl. Prairies & Plains 437 (1932); Small, Man. Se. Fl. 636 (1933); Rehder, Man. Cult. Tr. & Shr. (ed. 2) 388 (1940).  
*Amelanchier neumanniana* M. Roem., l.c.  
*Amelanchier spicata* sensu Decaisne in Nouv. Arch. Mus. Hist. Nat. Paris 10:135, pl. 9 (1874). Non *Crataegus spicata* Lam.  
*Amelanchier canadensis* var. *obovalis* Britton, Stern, & Poggenberg, Prelim. Cat. 17 (1888) excl. syn.; Sargent, Silva N. Am. 4:128, pl. 195 (1892), pro maxime parte; Dippel, Handb. Laubh. 3:392 (1893); Schneider, Illustr. Handb. Laubh. 1:734, figs. 409, 410 (1906); Silva Tarouca, Freiland-Laubh. 139, fig. 124 (1913).  
*Amelanchier nantucketensis* Bicknell in Bull. Torr. Club 38:453 (1911).  
*Amelanchier canadensis intermedia* Ashe in Bull. Torr. Club 46:221 (1919).  
*Amelanchier sera* Ashe in op. cit. 222; Rehder, Man. Cult. Tr. & Shr. 390 (1927), (ed. 2) 388 (1940).  
*Amelanchier oblongifera* Ashe, l.c. (err. in transcr.).  
*Amelanchier longifolia* Stapf in Index Lond. 1:116 (1929) (err. in transcr.).  
*Amelanchier austromontana* sensu Fernald in Rhodora 43:566 (1941), ex p. Non Ashe 1918.

Shrub 2-8 m. tall, the stems slender, erect, fastigiately branched, forming close bushy clumps; bark of the twigs grayish, glabrous; winter buds small, dark brown, glabrous or nearly so; leaves thin, usually nearly exactly elliptical, varying to oval or narrowly obovate, conduplicate in the bud, unfolding at flowering time, the lower surface densely white-tomentose, soon glabrous throughout, or the midvein and petiole often remaining slightly pubescent; blades mostly 3.5-5 cm. long, 1.5-2.5 cm. wide, acutish, or rounded and mucronate at the apex, the base rounded, rarely subcordate or cuneate; lateral veins 9-13 pairs, irregularly and distantly arranged, usually curved upward toward the middle and becoming irregular and indistinct before reaching the margin; margins sharply serrate with low sharp teeth, the lower part of the blade nearly or quite entire; teeth 6-11 per cm., 25-40 on each margin on average leaves; petioles slender, 8-15 mm. long; flowers small, appearing with the leaves; racemes erect 2.5-6 cm. long, the rachis and pedicels whitish pubescent at first, the lower pedicels 5-10 mm. long; petals 5, white, oval or oblanceo-

late, obtuse, 3-9 mm. long, 2-3 mm. broad; stamens about 20, the filaments glabrous, 2-4 mm. long; anthers 1 mm. long; hypanthium campanulate, 3-5 mm. in diameter, tomentulose at the base or throughout, scarcely constricted on the fruit; sepals triangular-lanceolate, 1.5-2.5 mm. long, pilosulous within, mostly erect or ascending on the fruit; styles 5, glabrous, 4-5 mm. long, fused to near the middle; summit of ovary glabrous or nearly so; fruit globose or subglobose, 7-10 mm. in diameter, purplish black, glaucous, sweet, juicy, edible; lowest fruiting pedicels 1-2 cm. long; seeds brown, smooth, obliquely lanceoloid, 4-5 mm. long, 2-3 mm. wide.

TYPE LOCALITY: "Habitat in Virginia, Canada." Phototypes in the Gray Herbarium and in the herbarium of the Arnold Arboretum. Type in the Linnean Herbarium.

RANGE: A species chiefly of swamps and bogs, and in low ground in woods, from Newfoundland to Georgia, principally on the Coastal Plain. Flowering from the end of March to the latter part of May; fruit ripening in June and July. Common names: shadbush, thicket shadblow, wild pear.

NEWFOUNDLAND: Topsail Road, July 1931, *Ayre* (GH); Salmonier Line, *Knowlton* in 1928 (GH).

NEW BRUNSWICK: Grand Manan, *Weatherby* 7029 (GH); Bass River, June 2, 1869, *Fowler* (GH).

NOVA SCOTIA: Bridgewater, *Fernald & Long* 23946 (GH); Dartmouth, *Jack* 684 (AA); Barrington, *Fernald, Long, & Linder* 21456 (GH); Maccan, *Jack* 3583 (AA); Truro, *Jack* 3639 (AA); Port Mouton, *Bissell & Graves* 21457 (GH); Ohio, *Jack* 3108 (AA); Yarmouth, *Bissell, Pease, Long, & Linder* 21440 (GH); Arcadia, *Pease & Long* 21453 (GH); Goven Lake, *Fernald, Bartram, & Long* 23937 (GH).

PRINCE EDWARD ISLAND: Bothwell, *Fernald & St. John* 11085 (GH).

MAINE: Orono, May 1898, *Harvey* (UI); Waldo Co., *Hyland* 699 (GH); Jonesport, *Hyland* 753 (GH); Stillwater, May 12, 1896, *Merrill* (NE); South Poland, *Furbish* in 1893 (NE); Gilead, *Furbish* in 1897 (NE); Brunswick, *Furbish* in 1892 (NE); West Baldwin, *Furbish* in 1900 (NE); North Berwick, May 9, 1897, *Fernald* (NE); Trotts Island, May 22, 1895, *Fernald* (NE); Alfred, *Fernald & Long* 13772 (AA, NE); York, *Bicknell* 4840 (NE); Wells, *Furbish* in 1898 (NE).

NEW HAMPSHIRE: Wolfeboro, *Sargent* 21 (GH); Winchester, May 11, 1912, *Flint* (NE); Andover, *Jack* 3948 (AA); Dover, *Hodgdon* 2597 (NE); Barrington, *Hodgdon* 2773 (NE); Merrimac Co., July 14, 1933, *Bullard* (NE); Bennington, June 29, 1908, *Coville* (AA); Epping, *Pease* 24229 (NE); Derry, May 10, 1913, *Batchelder* (NE); Charlestown, *Woodward & Bean* 17116 (NE).

VERMONT: Westminster, May 14, 1902, *Blanchard* (GH); Bellows Falls, May 10, 1915, *Knowlton* (NE).

MASSACHUSETTS: Plymouth, *Fernald & Hummel* 15200 (NE); Nantucket Island, *Bicknell* 4815, 4847, 4851, 4858, 4862a, 4868, 4879 (NY), 4816, 4850 TYPE collection of *A. nantucketensis* (NY, NE), 4849 (NY, GH), 4857 (NE), *Day* 57 (NY), 75 (NY, GH, NE); Lexington, *Kennedy* 3260 (NE); Concord, *Kennedy* 2360 (GH); Amherst, *Seymour* 3493 (NE); Salem, July 4, 1925, *Mackintosh* (NE); Chicopee, *Seymour* 571 (GH); Wellesley, *Wiegand* 2131, 2132 (GH); Blue Hill, Milton, *Palmer* 20185 (AA); Harwich, *Fernald & Long* 18542 (NE); Haverhill, *Harris* 423 (NE); Yarmouth, June 1916, *Winslow & Sanford* (NE);

Brewster, *Fernald* 18546 (GH, NE); Barnstable, *Fernald & Long* 16869, 18543 (NE); West Tisbury, *Seymour* 1222 (GH, NE); Revere, June 28, 1882, *Young* (NE); New Bedford, May 7, 1910, *Hervey* (NE); Mt. Wachusett, May 11, 1897, *Bailey* (NE); Douglas, *Fernald* 15191, 15198, 15199 (NE); Lunenburg, *Fernald & Bean* 14160 (NE); Leicester, *Hunnell & Wiegand* 2137, 2139, 2140, 2143 (NE).

CONNECTICUT: Coventry, *Weatherby* in 1935, Pl. Exsicc. Gray. 662 (GH); Franklin, *Woodward* in 1915 (NE); East Putnam, June 10, 1922, *Eaton & Fassett* (NE); Southington, *Bissell* in 1901 (GH, NE); Waterford, *Graves* in 1901 (GH); Middlebury, July 4, 1910, *Blewitt* (GH); Kent, *Weatherby* 4916 (NE); New Haven, Apr. 26, 1878, *Allen* (NE); Waterbury, *Blewitt* 1508, 1801 (NE).

RHODE ISLAND: Warwick, Apr. 17, 1910, *Hope* (NE); Barrington, May 30, 1911, *Winslow* (NE); Charlestown, *Collins* in 1919 (NE); South Kingston, *Gilbert, Rehder, & Smith* 833 (NE); East Providence, *Wiegand* 991 (NE); Block Island, *Fernald & Long* 9625 (GH, NE); Little Compton, July 27, 1919, *Collins* (NE).

NEW YORK: Niagara Falls, July 8, 1898, *Schneck* (UI); Waterloo, *Wiegand* 2541 (GH); Oneida Lake, *Muenschler & Spalteholz* 16175 (GH); Oswego, *Wiegand* 15627 (GH); Preble, *Wiegand* 2539 (GH); Glens Falls, *Burnham* 11 (GH); Round Marsh, *Dudley* 56 (GH); Peekskill, *McKelvey* in 1933 (AA); Brooklyn, May 1, 1886, *Stabler* (GH); Ithaca, *Wiegand & Eames* 2515, 2517, 2518 (GH).

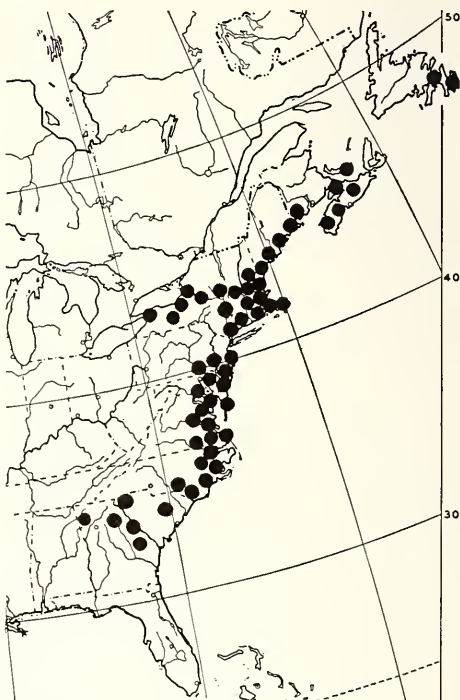
NEW JERSEY: Riverton, Apr. 29, 1879, *Eisicle* (AA); Millville, *Adams* 339 (GH); Merchantville, *St. John & Long* 1063 (GH); Lakewood, *Byhouwer & Kobuski* 50 (AA); Egg Harbor City, *Hunnell* 6031 (GH); Hammonton, May 27, 1923, *Bassett* (GH); Medford, *Long* 26820 (GH); Forked River, *Moldenke* 10580 (UI); Lakehurst, May 15, 1910, *Mackenzie* (GH); Island Heights, *Muenschler* 50 (GH).

PENNSYLVANIA: Philadelphia, May 1, 1926, *McDowell* (GH); Franklin Co., *Jennings* 1581 (GH); Brandomore, July 26, 1925, *Stone* (GH); Folsom, *Long* 58240 (Ph); Timicum, *Stone* 6484 (Ph); Morrisville, *Long* 34224 (Ph); Bacton, *Long* 31233 (Ph); Harmonyville, *Long* 33309, 33615 (Ph); Nottingham, *Long* 33330 (Ph); Fontaine, *Long* 32689 (Ph).

DELAWARE: Vandyke, *Tidestrom* 11947 (GH); Townsend, April 8, 1909, *Long* (Ph); Wilmington, *A. Commons* in 1875 (Ph).

DISTRICT OF COLUMBIA: North Takoma, May 2, 1897, *Williams* (AA); Naucks, June 1, 1913, *Steele* (AA).

MARYLAND: Elkton, *Wherry & Adams* 2775 (GH); Lanham, *Blake* 9324 (GH); Riggs Mill, Prince Georges Co., *Blake* 9362 (GH); Bacon Hill, *Long* 57005 (Ph); North East, *Long* 57021 (Ph); Principio Furnace, *Long* 54350 (Ph).



MAP 6.—Range of *Amelanchier canadensis*.

WEST VIRGINIA: Roland Park, Gabel Co., *Gilbert* 398 (GH).

VIRGINIA: Accomac, *Pease* 26992 (GH); Falmouth, *Wiegand & Manning* 1328 (GH); Richmond, April 13, 1887, *Kennedy* (GH); Clarendon, *Allard* 1229 (GH); Williamsburg, *Menzel* 403 (GH); Sebrell, *Fernald & Long* 7869 (GH, Ph); Franklin, *Fernald & Long* 9949, 11343 (GH, Ph); Lee's Mill, *Fernald & Long* 12096 (GH, Ph); Zuni, *Fernald & Long* 7068 (GH); Emporia, *Fernald & Long* 7070 (GH, Ph); Little Texas, *Fernald, Long, & Pease* 11700 (GH, Ph).

NORTH CAROLINA: Abbottsburg, *Harbison* 8 (AA); Pleasant Hill, *Fernald & Long* 7071 (GH, Ph); Hamlet, *Wiegand & Manning* 1330 (GH); Blount Creek, *Godfrey, White, & Shelbourne* 7038 (GH, MBG); Lumberton, *Wiegand & Manning* 1331 (GH).

SOUTH CAROLINA: Sumter, *Rehder* 955 (AA); Seneca, *Palmer* 35412 (MBG); Manning, *Stone* 65 (Ph).

GEORGIA: Augusta, *Sargent* in 1900 (AA); Graymont, *Harper* 819 (GH); Franklin, *Hermann* 10048 (GH).

In the flowering stage, this species may be recognized by the glabrous ovary, short petals, and the erect tomentose-lanate racemes; the densely pubescent leaves are about half unfolded. In the fruiting stage the rather firm elliptical or slightly obovate finely serrate leaves that are soon quite glabrous, dark green, smooth, and somewhat glossy above, paler beneath, with rounded base and acutish or rounded, often mucronulate apex, are distinctive. This species is apparently closely related to *A. spicata*, from which it usually may be distinguished by the somewhat different habit of growth, the elliptical leaves, glabrous top of the ovary, and the somewhat larger fruits, with erect or spreading sepals.

A peculiarity of *A. canadensis* has been well described by Wiegand (*Rhodora* 14:149. 1912): "As the fruit matures the inflorescence expands much less in this species than in others, the axis and pedicels remaining short. The shoots upon which the racemes are borne remain short also, while frequently there is a strong growth of leafy shoot beyond the inflorescence and as a result the inflorescence often appears to have been left far behind, and to have been lateral when really terminal. Unfortunately this condition is too frequently obscure to be of use as a distinguishing characteristic."

For some reason not apparent, the younger Linnaeus, when transferring his father's *Mespilus canadensis* to the genus *Pyrus*, gave it a new specific name, *botryapium*. However, the earliest name that applies to this species is clearly *Mespilus canadensis* L., which was transferred to *Amelanchier* by Medicus in 1793. In his discussion of certain eastern North American species of *Amelanchier*, Fernald (*Rhodora* 43:560-561. 1941) observes: "*Mespilus canadensis* L. Sp. Pl. 1:478. 1753 was published with unusual lack of involving references, merely the plant of Linnaeus's herbarium described, with a single reference to a description of Gronovius. . . . It is, therefore, unfortunate that, when he so clearly differentiated our species of *Amelanchier* and thus gave study to the genus a new and stimulating interest, Wiegand seems to have misunderstood the

basis of *A. canadensis*. He had had a comparison made by a botanist not familiar with the eastern species and he then used the Linnean name for the largest member of the genus, the large shrub or tree with cordate, ovate, or broadly ovate-oblong, sharply serrate leaves which, like those of true *A. canadensis* (*A. oblongifolia*), are pubescent beneath on unfolding, losing most of their pubescence with age." This is the species now called *A. arborea* (Michx.f.) Fern. For a more extended discussion of the nomenclatural history of *A. canadensis* (L.) Medic., the reader should consult the article just quoted.

*Pyrus neumanniana* Tausch, based on material growing in the Leibnitz garden at Prag, is represented by a sheet in the Bernhardt Herbarium at the Missouri Botanical Garden. This sheet is probably part of the original Tausch exsiccatae and may therefore be regarded as authentic. Wiegand, in 1912, labeled it "a probable hybrid" with *A. bartramiana* (Tausch) M. Roem. as one of the parents. Later the sheet was annotated in pencil by Professor Alfred Rehder: "*A. Botryapium* Borkh." It contains two specimens, a fruiting branch and a flowering one. The leaves are those of typical *A. canadensis* (L.) Medic., and match perfectly those of a photograph of the Linnean type. The small flowers, as well as the rather characteristic inflorescence, belong unmistakably to *A. canadensis*.

The binomial, *A. spicata* Decaisne, 1874, like that of K. Koch five years earlier, was based on the name *Crataegus spicata* Lam., but it is clearly evident from Decaisne's description ("vertice ovarii glabris, stylis coalitis"), as well as from the floral structures shown in the accompanying plate, and by the cited synonyms (i.e., *A. ovalis* Lindl., *Mespilus ovalis* Willd., and *M. canadensis*  $\beta$  *oblongifolia* Torr. & Gray), and the statement of geographical range, that Decaisne was dealing with *A. canadensis* (L.) Medic. instead of the plant that Lamarck had called *Crataegus spicata*. Hence, *A. spicata* sensu Dcne. is a synonym of *A. canadensis* (L.) Medic., not of *A. spicata* (Lam.) K. Koch, as it is sometimes cited.

In 1911, E. P. Bicknell described as *A. nantucketensis* Bickn. a "shrub 1.5 dm. to 2 m. high" with short petals and glabrous ovary. This was said to be common in low grounds about the borders of swamps on Nantucket Island, Massachusetts. From an examination of an isotype, it is evident that Bicknell's plants are a small form of *A. canadensis* (L.) Medic. This conclusion is supported by the fact that this species is not uncommon on Nantucket, and by Bicknell's statement that "intermediates" between his plant and *A. canadensis* (L.) Medic. have been found in the vicinity. It should be noted here that Bicknell's plants are not the same as those described four years earlier as *A. oblongifolia* var. *micropetala* by B. L. Robinson. The specimens cited by Robinson are apparently a small-flowered form of *A. spicata* (Lam.) K. Koch.

It may be worth noting that occasional specimens of *A. canadensis*



bear leaves somewhat resembling those of *A. spicata*. Such conditions are the probable basis for the statement by Robinson & Fernald in Gray's Manual (ed. 7, p. 460) under *A. oblongifolia* (T. & G.) Roem.: "Highly variable, passing into forms with broader elliptical or ovate-lanceolate acutish leaves of deeper green color (being the *A. spicata* of many auth., not C. Koch). Apparently intergrades with other species."

### 8. AMELANCHIER OBOVALIS (Michx.) Ashe

(Plates VIII, XXII, XXIII)

(?) *Mespilus amelanchier* sensu Walter, Fl. Carol. 148 (1788). Non L. 1753.

*Mespilus canadensis* var. *a obovalis* Michaux, Fl. Bor. Am. 1:291 (1803).

*Amelanchier oblongifolia* var. *β walteri* M. Roem. Syn. Mon. 3:147 (1847).

*Amelanchier canadensis* var. *obovalis* Sargent, Silva N. Am. 4:128 (1892), pro parte, excl. pl. 195.

*Amelanchier obovalis* Ashe in Bot. Gaz. 35:434 (1903); Sargent, Man. Tr. N. Am. 361, fig. 284 (1905), ex parte; Fernald in Rhodora 43:566, pl. 672, fig. 3 (1941).

*Crataegus canadensis obovalis* Sargent ex Ashe in l.c. (err. in transcr.)

*Amelanchier oblongifolia* sensu Wiegand in Rhodora 14:147 (1912), ex parte.

*Amelanchier stolonifera* Wiegand, in op. cit. 144, ex parte.

Low shrubs 0.2-1.5 m. tall, surculose, and forming loose colonies; winter buds conical, acute, reddish brown, dull, vernicose, the scales ciliate; twigs slender, soon glabrous; leaves commonly oval or elliptical, varying to slightly obovate, conduplicate in the bud, densely whitish tomentose beneath when young, unfolding after the flowers, which are on leafless or nearly leafless twigs; mature blades of rather firm texture, 2-5 cm. long, 1-3 cm. wide, the apex acutish, or obtuse and mucronulate, the base acute or rounded, or less commonly slightly subcordate, the upper surface dark green, dull, or somewhat glossy, smooth, the lateral veins not particularly prominent, the midvein impressed, the lower surface pale green, rather prominently veined, glabrous or nearly so at maturity, or with lingering traces of tomentum; lateral veins 7-9 pairs, irregularly and distantly arranged, usually curved upward and becoming irregular and indistinct before reaching the margin; margins sharply serrulate nearly or quite to the base, or frequently the lower third nearly or quite entire; teeth 6-9 per cm., 20-30 on each side of average leaves; stipules linear, pubescent, soon deciduous; petioles 5-15 mm. long, glabrous or slightly pubescent at maturity; flowers precocious, in short, dense, compact, erect, usually leafless, 4-10-flowered racemes 1-3 cm. long, the lower pedicels 1-3 mm. long; petals 5, white, glabrous, elliptical, minutely clawed, obtuse, 6-7 mm. long, 3-4 mm. wide; stamens 20, the filaments glabrous; anthers 0.6-0.7 mm. long; hypanthium saucer-shaped, 2-3 mm. in diameter, tomentulose outside, not at all constricted on the young fruit; sepals triangular, acute, 1-2 mm. long, pubescent within, divergent after anthesis; styles 5, glabrous, 2-3 mm. long, usually united below the middle; top of the ovary glabrous; mature fruits globose, purplish black, glabrous, 6-8 mm. in diameter, sweet, juicy, edible; fruiting racemes erect, compact, 2-3 cm.

long, 2-8-fruited (average 4); sepals on the fruit erect or divaricate, less commonly somewhat reflexed, glabrous, triangular-lanceolate, 2-3 mm. long; fruiting pedicels usually 3-8 mm. in length, or occasionally the lowest becoming 11 or even 14 mm. long; seeds reddish brown, smooth, obliquely lanceoloid, somewhat flattened, obtusish at each end, 4-5 mm. long, 2-2.5 mm. wide.

TYPE LOCALITY: "In Carolina inferiore." Type in Michaux's herbarium in the Museum d'Histoire Naturelle, Paris. Phototype in the Gray Herbarium.

RANGE: Open woods or sandy pine barrens along the Atlantic Coastal Plain, from Pennsylvania to Georgia; flowering in late March and early April; fruits ripening in May and June.

PENNSYLVANIA: Near Slatedale, *Pretz* 8296, 9260 (Ph); Point Pleasant, *Benner* 2703, *Long* 32883 (Ph); Naceville, *Long* 18759 (Ph); Yardley, *Long* 30300 (Ph); Spring House, *Long* 33071 (Ph); Wakefield, *Tanger* 3351 (Ph); Castle Rock, June 9, 1904, *Jahn* (Ph); Folsom, *Long* 58269 (Ph).

NEW JERSEY: Scott's, Middlesex Co., May 28, 1922, *Mackenzie* (Ph); Shark River Station, May 21, 1922, *Mackenzie* (Ph); Clarksburg, *Long* 45720 (Ph); Charleston Springs, *Long* 52012 (Ph); Chatsworth, *Long* 16451 (Ph); Clementon, *Long* 21005 (Ph); Ostrom, *Long* 48766 (Ph); Prospertown, *Long* 30603 (Ph); Friesburg, *Long* 35296 (Ph); Parkdale, *Long & Pennell* 7364, 7374 (Ph); Newtonville, *Long* 5915, 48268 (Ph); Fairview, *Long* 30773 (Ph); East Creek, *Long* 21590 (Ph); Wildwood Junction, *Bartram* 3220 (Ph); Browns Mills, April 30, 1905, *MacElwee* (Ph).

MARYLAND: Elkton, *Long* 54322 (Ph); Bacon Hill, *Long* 54368 (Ph); North East, *Long* 54423 (Ph).

VIRGINIA: McKenney, *Fernald & Long* 13950 (Ph); Petersburg, *Fernald, Long, & Smart* 5790, *Fernald & Long* 9947 (GH, Ph); Waverly, *Fernald & Long* 7072, 7870, 13042 (GH, Ph); Homeville, *Fernald & Long* 7073 (GH, Ph); Franklin, *Fernald & Long* 7448 (GH, Ph); Suffolk, *Fernald & Long* 7074 (GH, Ph); Whaleyville, *Fernald & Long* 7449 (GH, Ph); Lee's Mill, *Fernald & Long* 11846 (GH, Ph); Orion, *Fernald & Long* 13043 (GH, Ph); Emporia, *Fernald & Long* 11847 (GH, Ph).

NORTH CAROLINA: French Broad River, June 1898, *Biltmore Herbarium* 6706 (GH, AA).

SOUTH CAROLINA: Near Charleston, *Hunt* 2969, *Hunt & Martin* 1408, 2526 (UI).

*Amelanchier obovalis* (Michx.) Ashe is a dwarf surculose shrub, forming loose colonies, with the flowering or fruiting stems only 0.2-1.5 m. high, superficially resembling, but apparently quite distinct from, the widespread *A. spicata* (Lam.) K. Koch. At flowering time it may be distinguished from that species by the precocious flowers in compact racemes on leafless twigs, and by the glabrous ovary. It bears some structural resemblances to *A. canadensis* (L.) Medic, but differs in its smaller size and dissimilar growth-form, as well as the usually more oval leaves, somewhat shorter petals, and the shorter fruiting pedicels.

This species of dwarf shrubs was described by Michaux in 1803 as *Mespilus canadensis*, "Var. *a obovalis*: humilior; foliis oblongiuscule ovalibus . . . in Carolina inferiore." A phototype (Plate VIII, fig. 2)

shows Michaux's original labels "*Mespilus canadensis a obovalis*. Arbriss [eau] de deux pieds de haut. Carolines." Wiegand in 1912 treated it tentatively as a synonym of *A. canadensis* [*oblongifolia*], but it had been raised to specific rank by W. W. Ashe in 1903. After several seasons of field work in southeastern Virginia, Fernald & Long concluded that it is distinct, and in a recently published study (1941) of the flora of Virginia, Fernald has treated these plants as a separate species.

Thomas Walter's "*Mespilus Amelanchier?*" is somewhat doubtfully included here. Miss Nell Horner, Librarian of the Missouri Botanical Garden, kindly supplied the following transcript of the original description: "inermis, foliis ovato-lanceolatis, crenatis, tenellis tomentosiss adultioribus laevibus nitidis; floribus corymbosis."

## 9. AMELANCHIER SPICATA (Lam.) K. Koch

(Plates II, XII, XIII, XIV, XV, XVI)

- Crataegus spicata* Lamarek, Encycl. Méth. Bot. 1:84 (1783).  
*Pyrus ovalis* Willdenow, Berlin Baumz. 259 (1796), Sp. Pl. 2:1014 (1799), Enum. Pl. 525 (1809); Muhlenberg, Cat. Pl. Am. Sept. 49 (1813); Pursh, Fl. Am. Sept. 340 (1814); Sprengel, Syst. Veg. 2:509 (1825).  
*Amelanchier ovalis* sensu Borkhausen, Theor.-prakt. Handb. Forstbot. 2:1259 (1803); DeCandolle, Prodr. 2:632 (1825); Spach, Hist. Veg. Phan. 2:85 (1834); M. Roemer, Syn. Mon. 3:146 (1847); Dippel, Handb. Laubh. 3:390 (1893); Rehder in Bailey, Stand. Cyclop. Hort. 273 (1914). Non Medicus 1793.  
*Aronia ovalis* Persoon, Syn. Pl. 2:40 (1807); Torrey, Fl. N. Middle U.S. 479 (1824).  
*Amelanchier spicata* (Lam.) K. Koch, Dendrol. 1:182 (1869), as to name only, excl. syn. & descr.; Koehne, Deutsche Dendr. 256 (1893); Britton & Brown, Illustr. Fl. N. U.S. 2:238, fig. 1987 (1897); Britton, Man. Fl. N. States 517 (1901), (ed. 3) 519 (1907); Small, Fl. Se. U.S. 532 (1903); Card in Bailey, Cyclop. Am. Hort. 57 (1904); Schneider, Illustr. Handb. Laubh. 1:737, figs. 411, 412 (1906); Apgar, Ornarn. Shr. U.S. 182, fig. 279 (1910); Britton & Brown, Illustr. Fl. N. U.S. (ed. 2) 2:292, fig. 2331 (1913); Rehder, Man. Cult. Tr. & Shr. 389 (1927), (ed. 2) 388 (1940); G. N. Jones, Fl. Illinois 154 (1945).  
*Amelanchier canadensis* var. *spicata* Sargent, Silva N. Am. 4:129 (1892).  
*Amelanchier saxatilis* Blanchard in Torrey 7:99 (1907).  
*Amelanchier erecta* Blanchard, op. cit. 101.  
*Amelanchier intermedia* sensu Blanchard, l.c. Non Spach 1834.  
*Amelanchier oblongifolia* sensu Robinson & Fernald in Gray, Man. Bot. (ed. 7) 460 (1908), ex p. Non M. Roem. 1847.  
*Amelanchier oblongifolia* var. *micropetala* Robinson in Rhodora 10:33 (1908); Robinson & Fernald in Gray, New Man. Bot. (ed. 7) 460 (1908); Rehder, Man. Cult. Tr. & Shr. 389 (1927), (ed. 2) 388 (1940).  
*Amelanchier humilis* Wiegand in Rhodora 14:141, pl. 95 (1912); Clements, Rosendahl, & Butters, Minnesota Tr. & Shr. 153 (1912); Rehder in Bailey, Stand. Cyclop. Hort. 272 (1914); Rydberg, Fl. Rocky Mts. 447 (1917); House, N.Y. State Mus. Bull. 254, 413 (1924); Deam, Shr. of Indiana 145, pl. 58 (1924); Wiegand & Eames, Fl. Cayuga Basin 247 (1926); Rehder, Man. Cult. Tr. & Shr. 389 (1927); Rosendahl & Butters, Tr. & Shr. Minnesota 216 (1928); Peattie, Fl. Indiana Dunes 219 (1930); Palmer & Steyermark in Ann. Missouri Bot. Gard. 22:557 (1935); Marie-Victorin, Fl. Laurent. 316, fig. 91 (1935); Nielsen in Am. Midl. Nat. 22:171, pls. 5-8 (1939) (excl. syn.); Rehder, Man. Cult. Tr. & Shr. (ed. 2) 387 (1940); Steyermark, Spr. Fl. Missouri 255, pl. 68, fig. 2 (1940); Deam, Fl. Indiana 532 (1940).

- Amelanchier stolonifera* Wiegand in *Rhodora* 14:144, pl. 95 (1912), ex p.; Small & Carter, Fl. Lancaster Co., Pa. 155 (1913); Rehder in Bailey, Stand. Cyclop. Hort. 273 (1914); Hitchcock & Standley, Fl. Distr. Columbia 178 (1919); Hoffmann in Proc. Bost. Soc. Nat. Hist. 36:281 (1922); Pease in *ibid.* 37:267 (1924); House in N.Y. State Mus. Bull. 254:412 (1924); Wiegand & Eames, Fl. Cayuga Basin 247 (1926); Rehder, Man. Cult. Tr. & Shr. 389 (1927); Rosendahl & Butters, Tr. & Shr. Minnesota 219 (1928); Small, Se. Fl. 636 (1933); Marie-Victorin, Fl. Laurent. 316, fig. 91 (1935); Nielsen in Am. Midl. Nat. 22:177, pl. 2, b (1939); Rehder, Man. Cult. Tr. & Shr. 387 (1940).
- Amelancus spicata* Vollman, Fl. Bayern 453 (1914).
- Amelanchier botryapium* var. *obovalis* Farwell in Rep. Mich. Acad. Sci. 17:175 (1916).
- Amelanchier botryapium* var. *conferta* Farwell, l.c.
- Amelanchier botryapium* var. *micropetala* Farwell in op. cit. 176.
- Amelanchier austromontana* Ashe in Journ. Elisha Mitchell Sci. Soc. 34:138 (1918).
- Amelanchier beata* Ashe, l.c.
- Amelanchier micropetala* Ashe in Bull. Torr. Club 46:223 (1919).
- Amelanchier micropetala* var. *potomacensis* Ashe, l.c.
- Amelanchier stolonifera* var. *lucida* Fernald in *Rhodora* 23:267 (1922).
- Amelanchier humilis* var. *typica* Nielsen in Am. Midl. Nat. 22:171, pl. 5 (1939).
- Amelanchier humilis* var. *compacta* Nielsen, op. cit. 174, pl. 7.
- Amelanchier humilis* var. *campestris* Nielsen, op. cit. 176, pl. 6.
- Amelanchier humilis* var. *exserrata* Nielsen, op. cit. 177, pl. 8.
- Amelanchier mucronata* Nielsen, op. cit. 178, pl. 9.
- Amelanchier humilis* × *laevis* Deam, Fl. Indiana 532 (1940).
- Amelanchier canadensis* var. *micropetala* Rehder in Journ. Arnold Arb. 26:71 (1945).

Low, surculose colonial shrubs 0.3-2 m. tall; winter buds conical, acute, reddish brown, dull, vernicose, the scales ciliate; leaves commonly oval, varying to broadly ovate or suborbicular, conduplicate in the bud, unfolding before or with the flowers and usually about half-grown at anthesis (rarely the flowers on nearly leafless twigs), densely whitish tomentose beneath when young; mature blades 2.5-5 cm. long, 2-3.5 cm. wide, the apex acutish, or obtuse and more or less mucronate, the base rounded or less commonly subcordate, usually nearly or quite glabrous on both surfaces; lateral veins 7-9 pairs, not prominent, irregularly and distantly arranged, usually curved upward and becoming irregular and indistinct before reaching the margin; margins finely and evenly serrate nearly or quite to the base, or frequently the lower third almost or quite entire; teeth 5-8 per cm., 20-30 on each side of average leaves; stipules linear, pubescent, deciduous; petioles slender, 1-2 cm. long, glabrous or slightly pubescent at maturity; flowers in short, dense, erect, 4-10-flowered racemes 1.5-4 cm. long, the lower pedicels 6-18 mm. long; petals 5, white, or sometimes pinkish, oblanceolate, obtuse, 4-10 mm. long, 3-4 mm. wide; stamens about 20, the filaments glabrous; anthers 0.6-0.9 mm. long; hypanthium saucer-shaped, 3-4 mm. in diameter, glabrous or pubescent outside, more or less constricted on the young fruit; sepals triangular-lanceolate, acute, 2-3 mm. long, pubescent within, usually recurved from the middle after anthesis; styles 5, glabrous, 2-3 mm. long, usually united only near the base; top of

the ovary densely tomentose; mature fruit globose, purplish black, glaucous, glabrous, 6-8 mm. in diameter, sweet, juicy, edible; lower pedicels 1-3 cm. long; seeds brown, smooth, obliquely lanceoloid, somewhat flattened, about 5 mm. long, 2-3 mm. wide when well developed.

TYPE LOCALITY: Cultivated in the Jardin du Roi, Paris; said to have come originally from Canada. Phototype and fragment of holotype in the herbarium of the Arnold Arboretum. Type in the Museum d'Histoire Naturelle, Paris.

RANGE: On gravelly or rocky shores or river banks, sandstone or limestone cliffs and ledges, rocky summits, in woods or thickets, pine barrens, or sand dunes, from Newfoundland to Alabama, eastward to Missouri and Minnesota (and eastern North Dakota). Flowering from the beginning of April in the south to the middle of June (or somewhat later) in the northern part of its range; fruit ripening from July to September. Common names; low juneberry or shadblow.

NEWFOUNDLAND: Grand Falls, *Fernald & Wiegand* 5557 (GH), 5558 (AA, GH), 5559, 5561, 5562, 5563, 5605, 5608, 5623 (GH), 5633 (GH, AA); Rushy Pond, *Fernald & Wiegand* 5627, 5630, 5635 (GH); Birchy Pond Stream, *Fernald & Wiegand* 3553 (GH); Dildo Run, *Fernald & Wiegand* 5565 (GH); St. Johns, *Ayre* in 1932 (GH); Trepassy, *Fernald, Long, & Dunbar* 26759 (GH).

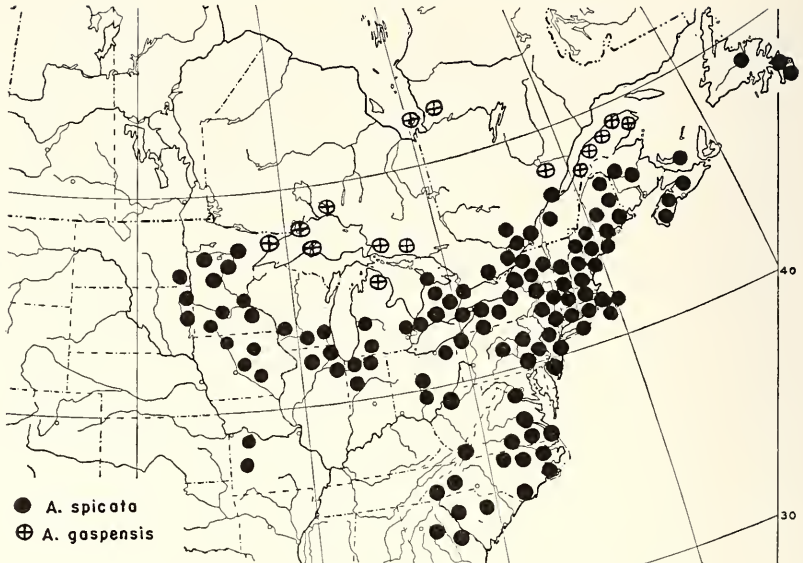
NOVA SCOTIA: Middleton, *Fernald, Pease, & Long* 21436 (GH), 21437 (GH, TYPE of *A. stolonifera* var. *lucida*, AA), 21435 (GH, AA), *Jack* 3209 (AA); Port Mouton, *Jack* 3479 (AA); Argyle, *Fernald & White* 21438 (GH), *Pease & Long* 21452 (GH, AA); Kemptville, *Fernald & Long* 23933 (GH); Goven Lake, *Fernald, Bartram, & Long* 23930 (GH); Gavelton, *Fernald, et al.* 23929 (GH); Tusket, *Jack* 3357 (GH, AA), 3762 (AA); Birchtown Brook, *Fernald & Long* 23934 (GH); Barrington, *Fernald, Long, & Linder* 21439 (GH); Springhill Junction, *Pease & Long* 21434 (GH); Shubenacadie Grand Lake, *Fernald, Bartram, & Long* 23931 (AA, GH), *Fernald & Bissell* 21433 (GH); Avonport, *Roland* 2047 (GH); Millville, *Roland* 41469 (GH); Bridgewater, *Fernald & Long* 23932 (GH), *Fernald, et al.* 21432 (GH), *Jack* 3514 (AA).

PRINCE EDWARD ISLAND: Dundee, *Fernald, Long, & St. John* 7593 (GH); Southport, *Fernald & St. John* 7585 (GH); Mt. Stewart, *Fernald, et al.* 7582, 7591, 7553 (GH); Charlottetown, *Fernald & St. John* 11080 (GH); Cavendish, *Fernald, Long, & St. John* 7595 (GH); Indian River, *Fernald, Long, & St. John* 7594 (GH); Tignish, *Fernald, Long, & St. John* 7584 (GH).

NEW BRUNSWICK: Boiestown, *Fernald & Pease* 25134 (GH); Portage Island, *Blake* 5677 (GH); Gorge of the Aroostock River, *Fernald* 1881 (GH); Woodstock, *Fernald & Long* 13781 (GH).

QUEBEC: Montmorency Falls, *Macoun* 66924 (GH); Lake Temiscaming, *M.-Victorin* 8237 (AA); Contrecoeur, *M.-Victorin & R.-Germain* 33110 (AA, GH); Longueuil, *M.-Victorin* 9504, 11221, 11223 (AA); North Wakefield, *Macoun* 85506 (AA); Oka, *M.-Victorin* 24545, 2087 (AA); La Trappe, *M.-Victorin & R.-Germain* 33130 (AA, GH), *Louis-Marie* 116 (GH); Deschenes, *Rolland* 13033, 13035 (GH); Windsor, July 25, 1923, *Knowlton* (GH).

MAINE: Ft. Fairfield, *Fernald* 1888 (NE); Clifton, *Fernald* 2644 (NE); Winn, *Fernald & Long* 13762 (AA, NE); Milford, *Fernald* 13760, 13773, 13774 (NE), 13775 (GH); Dover, *G. B. Fernald* 43 (NE); Fairfield, *Fernald & Long* 13766 (NE); Skowhegan, *Chamberlain* in 1903 (NE); Bald Mt., *Chamberlain & Knowlton* in 1902 (NE); Phillips, *Furbish* in 1894 (NE); Oxford, *Weatherby* in 1914 (NE); Whitneyville, *Knowlton* in 1908 (NE); Mt. Desert I., *Fernald* in 1892



MAP 7.—Range of *Amelanchier spicata* and *A. gaspensis*.

(NE, GH), *Williams* in 1899 (NE), *Rehder* in 1936 (AA); Isle au Haut, *Hill* 1700 (NE); *Matinicus, Long* 320, 335 (NE); *Rockland, Long* 852 (NE); *Rockport, Fernald* 9620 (NE); *West Bath, Furbish* in 1892 (NE); *Standish, Fernald & Long* 13777 (AA, NE); *Brunswick, Chamberlain* 228 (NE); *Kennebunkport, Koehler* 1 (GH); *York, Fernald* in 1900 (GH, NE).

VERMONT: *Essex Junction, Eggleston* 1176 (GH); *Burlington, Blake* 2496 (NE); *Barnet, May* 31, 1881, *Blanchard* (NE); *Snake Mt., near Weybridge, Brainard* in 1878 and 1898 (GH); *Rutland, Eggleston* 1179, 1180 (AA, NE, GH, UI); *Twin Mts., Eggleston* 185 (GH); *Arlington, Schweinfurth, et al.* in 1935 (NE); *Bellows Falls, Blanchard* 3 (AA, GH, TYPE coll. of *A. saxatilis*), *Blanchard* 4 (TYPE coll. of *A. erecta*, GH); *Westminster, Blanchard* 4 (GH, AA); *North Westminster, Blanchard* 4 (AA, GH).

NEW HAMPSHIRE: *Salem, May* 22, 1909, *Churchill & Purdie* (NE, GH); *Rindge, May* 31, 1913, *Batchelder* (NE); *Jaffrey, Rand & Robinson* 618 (GH); *Walpole, Fernald* 105 (GH), 72 (NE, GH), *Bean & Fernald* 17013, 17014 (NE); *New Hampton, Pease* 25912 (NE); *Alton, Pease* 25775 (NE); *Gilford, Pease* 26541 (NE); *Strafford, Pease* 24246 (NE); *Rollinsford, Hodgdon* 3192 (NE); *Dover, Hodgdon* 2600 (NE); *Durham, Hodgdon* 2845 (NE); *Bradford, Fernald & Svenson* 914 (NE); *Franklin, Jack* 3872 (AA); *Andover, Jack* 3946 (AA); *Shelburne, Pease* 25979 (NE); *Lake Umbagog, Pease* 16554 (NE); *Errol, Pease* 16990 (NE); *Ashland, Fernald* 15197 (GH, NE), 15204 (NE); *Bath, Pease* 19680 (NE); *Madison, Pease* 17890 (NE); *Ossipee Lake, Weatherby & Smith* (Pl. Exsicc. Gray 842) (GH, UI).

MASSACHUSETTS: *Washington, May* 31, 1909, *Hoffmann* (NE); *Lenox, May* 27, 1920, *Hoffmann* (NE); *West Stockbridge, May* 23, 1920, *Hoffmann* (NE); *Gt. Barrington, June* 21, 1915, *Hoffmann* (NE); *Sheffield, Aug.* 27, 1902, *July* 25, 1912, *Hoffmann* (NE); *Montague, May* 13, 1911, *Fernald* (NE, GH); *Sunderland, Manning & Seymour* 3687 (NE); *Shutesbury, Tower & Seymour* 3668, 3671 (NE); *Agawam, Weatherby* 4255 (NE); *Amherst, Seymour* 3512 (NE); *Northampton, Goodale & Markert* 76864 (NE); *Mt. Holyoke, Hubbard & Torrey* T352

(NE); Russell, *Fernald* 9626 (NE); Chicopee, *Murdoch & Torrey* T391 (NE); Lunenburg, *Fernald & Bean* 14132 (NE); Athol, June 19, 1935, *Churchill* (NE); Ashburnham, May 19, 1924, *Knowlton* (NE); Holden, *Blake & Fernald* 3645 (NE); Princeton, *R. H. Piper* 76881 (NE); Southbridge, May 19, 1916, *Woodward* (NE); Gloucester, *St. John* 11887 (NE); Andover, *Pease* 683 (NE); Sherborn, *Loomis* 856 (NE); Tyngsboro, *Pease* 23232 (NE); Wellesley, *Wiegand* 2133 (GH, TYPE of *A. stolonifera*); Blue Hill, Milton, June 10, 1900, *Williams* (GH), *Floyd* 801, 803, 980, 1008 (NE), May 11, 1903, and Sept. 22, 1900, *Rehder* (UI), May 7, 1899, *Kennedy & Fernald* (GH, TYPE of *A. oblongifolia* var. *micropetala*), May 6, 1899, *Churchill* (GH, NE), *Barlett* 846 (GH, UI); Mattapan, May 6, 1905, *Cheever* (NE); Plymouth, *Sanford* 626 (NE); Chilmark, *Seymour* 1708, 1709 (GH); West Tisbury, *Seymour* 4641 (NE); Harwich, *Fernald* 16867 (NE); Barnstable, *Woodward & Fernald* 15202 (NE); Sandwich, *Fernald & Long* 18548 (NE); Yarmouth, *Fernald & Long* 18551 (NE); Provincetown, *Greenman* 3024 (GH), *Fernald & Long* 18549 (AA, NE).

CONNECTICUT: Salisbury, *Blewitt* 2037 (NE), *Weatherby* 4070, 4070a, 4070b (NE); Sharon, *Weatherby* 3616 (NE); East Hartford, *Weatherby* 2018 (GH); Suffield, *Weatherby* 5370 (NE); Stafford, *Weatherby* D2103 (NE); Hamden, *Blewitt* 1796 (NE); Meriden, *Blewitt* 1795 (NE); Waterbury, *Blewitt* 1511, 1792, 1794 (NE); West Cheshire, *Blewitt* 2035 (NE).

RHODE ISLAND: Barrington, May 30, 1911, *Winslow* (AA, NE); South Foster, June 10, 1922, *Eaton & Fassett* (NE); Cumberland, *Chamberlain* 62 (NE).

NEW YORK: Stockholm, *Phelps* 1585 (GH); Canton, *Phelps* 1583, 1586 (GH); Clare, *Phelps* 1584 (GH); Newcomb, *House* 7265 (GH); Watertown, *House* 8943 (GH); Forestport, *Muenschler & Maguire* 2322 (GH); Ledyard, *Wiegand* 6594 (MBG), 6603, 6587, 6593 (GH); Leroy, *Hill* 231895 (UI); Junius, *Eames & MacDaniels* 4285 (GH); McKenney's, Tompkins Co., May 1895, *Wiegand* (GH, TYPE of *A. humilis*); Long Lake, *House* 10175 (GH); Hudson Falls, *Burnham* in 1897 (GH); Sand Lake, *Wiegand* 4290 (GH); Glenmont, *House* 17246 (MBG); Ronckonoma, July 5, 1908, *Harper* (GH); Babylon, *Svenson* 8012 (GH, MBG); Black Rock Forest, *Raup* 8094 (GH); Cahoonzie, *Muenschler, et al.* 15609 (GH); Sullivan Hill, Chimung Co., *Lucy* 818b (GH); Monroe Co., *Slavin* 203 (AA).

NEW JERSEY: Newport, June 2, 1894, *Dill* (AA); High Point, *Mackenzie* 4201 (GH); Chatsworth, *Eames* in 1894 (GH); Crowfoot, *Fogg* 4049 (GH, Ph); Charlotteburg, *Mackenzie* 3080 (GH); Elm, *Fogg* 1863 (Ph); Clementon, *Long* 20586 (Ph); Robbinsville, *Long* 51838 (Ph); Friesburg, *Long* 37315 (Ph); Mays Landing, *Pennell* 12027 (Ph); Jacksons Mills, *Long* 52088, 52094 (Ph); Cookstown, *Long* 30640 (Ph); Atsion, *Long* 25839 (Ph); New Gretna, *Long* 12504 (Ph); Holmeson, *Long* 52017, 52022 (Ph); Farmingdale, *Stone* 12684, *Brown* 216 (Ph); Spring Valley, *Long* 56467 (Ph).

PENNSYLVANIA: Wilkes Barre, *Palmer* 36296 (MBG); Easton, *Porter* in 1897 (GH); Fleetwood, *Long* 12556 (GH); Fairview, *Wahl* 47 (GH); State College, *Wahl* 33, 73 (GH); Almont, July 18, 1923, *Pretz* (GH); Point Pleasant, *Benmer* in 1926 (GH); Beaver Meadows, *Fogg* 16324 (GH); Danielsville, *Long* 48649 (Ph); North Bangor, *Long* 51076 (Ph); Shimerville, *Pretz* 11248 (Ph); Schnecks-ville, *Pretz* 12754 (Ph); Crackersport, *Pretz* 10767 (Ph); Germansville, *Pretz* 11762 (Ph); East Reading, *Wilkins* 471 (Ph); Schubert, *Wilkins* 5128 (Ph); Friedensburg, *Wilkins* 5168 (Ph); Emilie, *Benmer* 2926 (Ph); Bristol, *Benmer* 7533 (Ph); Wakefield, *Tanger* 3065 (Ph); White Oak, *Tanger* 3043 (Ph); Spring House, *Long* 32642 (Ph); Glen Riddle, *Pennell* 2708 (Ph).

WEST VIRGINIA: Ravenswood, *Balsler* 775 (GH, MBG).

VIRGINIA: Great Falls, *Hunnell* 5895 (GH); Ashland, *Wherry & Adams* 2768 (GH); Loretto, *Fernald & Long* 14178 (Ph).

NORTH CAROLINA: French Broad River, June 4, 1918, *Ashe* (GH); Williamston, *Palmer* 39808 (AA); Middlesex, *Godfrey & White* 7027 (GH, MBG); Raleigh, *Harbison* 30 (AA); Bolton, *Palmer* 39833 (MBG, AA); Highlands, *Harbison* 9, 194, 7236, 7240 (AA), *Magee* in 1901 (GH).

SOUTH CAROLINA: Calhoun Falls, *Harbison* 1 (AA); Camden, *Palmer* 42391 (MBG).

ALABAMA: Alpine, *Harbison* 846 (AA); Auburn, *Harbison* 813 (AA).

ONTARIO: Thunder Bay, *Pease* 26323 (GH); Tobermory, *Krotkov* 7517 (GH); Agawa Bay, *Pease* 18048 (GH); Britannia, *M.-Victorin* 15585 (AA); Dalhousie Lake, *Dunbar* 10 (AA); Rockcliffe, *Macoun* 80733 (MBG, AA); Summerstown, *Jack* in 1913 (AA); Jellicoe, *Jennings* 14521 (GH); Cornwall, *Jack* in 1914 (AA); Belleville, *Macoun* in 1878 (GH); Niagara, *Macoun* 34298 (GH); Port Edward, *Macoun* 34301 (GH); Sarnia, *Dodge* 57 (GH, AA).

OHIO: Painesville, *Werner* in 1892 (GH); Columbus, *Kellerman* in 1903 (GH); Georgesville, *Werner* 54 (GH).

MICHIGAN: Whitefish Point, *Fernald & Pease* 3359 (GH); Cheboygan, *Dodge* 20 (GH); Burt Lake, *Ehlers* 1183 (GH, UI); Alpena, *Wheeler* in 1895 (GH); Walhalla, *Palmer* 40470, 40471 (AA, MBG); Port Huron, *Dodge* 71, 73 (GH); Portage Lake, *Hermann* 6497 (MBG), 6486 (GH).

INDIANA: Tolleston, *Hill* in 1894 (UI); Sheffield, *Hill* in 1876 (UI); Hammond, *A. Chase* 990 (Ph, UI); Dune Park, *Hill* in 1898, *A. Chase* 709 (UI); Mongo, *Deam* 38196, 33770, 39083, 38194, 38195 (AA); Knox, *Deam* 38251 (AA); near Rainsville, *Deam* 23107 (AA).

ILLINOIS: Sag Bridge, *Hill* in 1913 (UI); Lake Zurich, May 9, 1899, *Hill* (GH, UI); Oregon, July 9, 1905, *Hill* (UI); Lombard, *Moffatt* 1610 (UI); Chicago, *Hill* in 1890 (UI); Calumet, *A. Chase* 702, 1745 (UI); Colehour, *Hill* in 1876 (UI); Barrington, *A. Chase* 1048 (UI); Mississippi Palisades State Park, *G. N. Jones* 17143 (UI).

WISCONSIN: Trout Lake, *Fassett* 13775 (GH); Cassian, *Palmer* 27795 (MBG), 27779, 27796 (AA); Marinette, *Schuette* in 1892 (GH); Dell Prairie, *Fassett* 2823 (GH); West Salem, *Fassett, et al.* 18359 (MBG); Dane Co., *Hale* in 1861 (GH, MBG); Vermont, *Fassett* 2818 (GH); Holcombe, *Fassett & Schmidt* 15708 (GH); Devils Lake, *Fassett* 2819, 2821 (GH); Delton, *Fassett* 2820 (GH); Barneveld, *Fassett* 2822 (GH).

MINNESOTA: Brule River, *Aiton* 1004 (UI); Itasca Park, *Moyle* 216 (MBG); near Duluth, *Lakela* 2873 (MBG); Cass Lake, *Pammel* 52 (GH); Big Sandy Lake, *Rosendahl* 4983 (GH), 4980 (AA); Perham, *Rosendahl* in 1926 (GH); Fergus Falls, *Blanchard* in 1908 (AA); Center City, *Taylor* in 1892 (GH); Fort Snelling, *Mearns* in 1891 (GH); Redwing, *Sandberg* 3 (UI).

NORTH DAKOTA: Enderlin, *Bergman* 1376 (MBG).

SOUTH DAKOTA: Big Stone Lake, *Williams* in 1894 (MBG); Warrens Woods, Brookings Co., *Thorner* in 1893 (GH, MBG).

IOWA: Estherville, *Wolden* 1075, 1043, 1047, 1074, 1078 (GH); Armstrong, *Cratty* in 1902 (MBG); Iowa Lake, *Cratty* in 1900 (MBG); Oak Grove State Park, *Hayden* 10489 (MBG); Fayette, *Fink* in 1894 (GH); Ames, *Pammel* 14 (AA).

MISSOURI: Sedalia, *Palmer* 30009 (AA, MBG); Holberg, *Steyermark* 18635 (MBG).

The identity of *Amelanchier spicata*, based on *Crataegus spicata* Lam., the earliest name for the species under discussion, has long been a matter of conjecture. Lamarck says his plant was growing in the Jardin du Roi, and was supposed to be a native of Canada. Considering the close connection that existed between Canada and France in the eighteenth century, there is no reason for supposing that it might have come from a more southerly region. Several theories and speculations have been set forth in an attempt to identify Lamarck's plant, but the conclusion that has had the widest influence on the choice of nomenclature is that of Wiegand, who, in 1912, supposed it to be of hybrid origin, hence unsuitable as the type,



and therefore to be dismissed from further consideration for nomenclatural purposes. A few botanists, including Britton and Schneider, continued to use the name *A. spicata* for the common and widespread low shrub of eastern North America with racemose flowers, tomentose ovary, and usually finely toothed, few-veined leaves, but a number of others attempted to apply in various senses half a dozen different names, the majority preferring to follow Wiegand and name their specimens either *A. humilis* or *A. stolonifera*.

The nomenclatural combination *A. spicata* was first made by Karl Koch in 1869. Although there is some doubt whether his brief description is applicable to *Crataegus spicata* Lam., and it is quite clear that the names appended in synonymy belong elsewhere, the fact remains that he expressly cites Lamarck's name as the basonym, hence Koch's binomial is the one to be used for this species.

In 1932, Professor Alfred Rehder of the Arnold Arboretum of Harvard University obtained a photograph as well as a fragment of Lamarck's type in the Museum d'Histoire Naturelle, Paris. This material, now in the herbarium of the Arnold Arboretum, effectively dispels the mystery that for a century and a half has surrounded the identity of *Crataegus spicata* Lam. The photograph shows two specimens, presumably from the same plant, one a short flowering branch, and the other a twig with mature leaves. (See Pl. XI, fig. 2.) The flowers are not quite open, but their size and other characteristics are apparent from a microscopic examination of a fragment of the holotype that is also in the herbarium of Arnold Arboretum. The leaf-specimen has nine leaves, some large and roundish, others smaller and oval. The apices vary from shortly acutish to rounded and mucronulate. The margins are finely serrate almost to the rounded base. From an examination of this phototype, and of the accompanying fragment of the type, it becomes clearly evident that Lamarck's *Crataegus spicata* is the common and widespread small serviceberry of eastern North America with racemose small flowers, tomentose top of ovary, and usually rather finely toothed, few-veined leaves. Recognizing the possibility that the shrubs under consideration may comprise a somewhat polytypic species, Wiegand in 1912 attempted to distinguish two different species in this general cycle of affinity, chiefly on the basis of the shape, venation, and indentation of the leaf-blades. Specimens with more coarsely toothed and conspicuously veined blades were named *A. humilis*, while those with finer indentation and fewer, less regular veins were called *A. stolonifera*. Unfortunately, however, these characters are so extremely variable as to render them practically useless. While it is true that the coarser toothed specimens appear at first glance to be somewhat different from the finer toothed ones, all intergradations may be found. There are no supporting characters of flowers and fruits, or of geographical distribution. It is

perfectly evident from an examination of the types, as well as hundreds of other specimens, including many identified and annotated by Wiegand, that *A. humilis* and *A. stolonifera* belong to the same species, the oldest name for which is *A. spicata* (Lam.) K. Koch. Even if one (or both) of Wiegand's proposals could be maintained as a specific entity, it would have to be designated by one of the older names, *A. erecta* or *A. saxatilis* of Blanchard, which were adequately published and well supported by ample exsiccatae five years before Wiegand published *A. humilis* and *A. stolonifera*. Although, as Wiegand has pointed out, Blanchard's distributed specimens are a somewhat mixed lot, this fact does not exclude his proposed species from consideration in the matter of nomenclatural priority.

It may be of passing interest to note the historical fact that as a result of an oversight *A. humilis* was published without mention of a type specimen. Somewhat later a type was selected, but it was a specimen collected by Wiegand in 1895, not one of those previously cited with the original description. Unfortunately, this specimen, which closely resembles the type of *A. stolonifera*, does not wholly agree with the original description and the statements in the key, which call for a plant with leaves "coarsely dentate-serrate." Although of no special importance now, the subject is mentioned here as one of the factors which may have contributed to the difficulty of accurately interpreting and delimiting the species under discussion.

The true identity of a low, small-flowered shrub described in 1908 by B. L. Robinson from Blue Hill, near Milton, Massachusetts, as *A. oblongifolia* var. *micropetala* has long been in doubt. Wiegand in 1912 discussed these small-flowered plants, and concluded that they are hybrids between *A. canadensis* and *A. spicata*, and designated them by the formula *A. oblongifolia* × *stolonifera*. In 1916, after careful field studies, C. A. Weatherby (*Rhodora* 18:48, 49) expressed the view that the reduced petals may be due to the teratological condition known as staminody. In 1919, Ashe elevated Robinson's variety to specific rank, on the view that the plants could not be hybrids because of their general distribution and local abundance. It now seems evident from a study of a series of specimens in the Gray Herbarium and in the herbarium of the New England Botanical Club that these plants are merely small-flowered representatives of the common and widespread *A. spicata* (Lam.) K. Koch.

In 1918, W. W. Ashe described, as *A. austro-montana*, a "shrub not exceeding 4 m. in height," based on specimens from the valley of French Broad River, Transylvania County, in southwestern North Carolina. It was said to have finely serrate leaves that are pubescent beneath when young, but glabrous at maturity. The flowers are described as appearing "largely" before the leaves in 7-10-flowered, nodding, pubescent racemes,

and the fruits are said to be 10-14 mm. thick, shining and almost black when ripe, with the sepals erect or nearly so. Ashe commented that his new species was "related to *humilis* in fruit characters." However, an iso-type of *A. austro-montana* in the Gray Herbarium (see Pl. XVI) which closely resembles the type of Wiegand's *A. stolonifera*, does not show some of the diagnostic characters of *A. austro-montana*, and in the shape, texture, serration, and indument of the leaves, the size, arrangement, and character of the fruit, the direction of the sepals, the shape, size, and direction of the flowering and fruiting racemes, as well as the structural characters of the flowers themselves, can be matched almost exactly by numerous specimens from nearly every part of the extensive geographical range of the common and variable *A. spicata* (Lam.) K. Koch.

## 10. AMELANCHIER SANGUINEA (Pursh) DC.

(Plates XVII, XVIII)

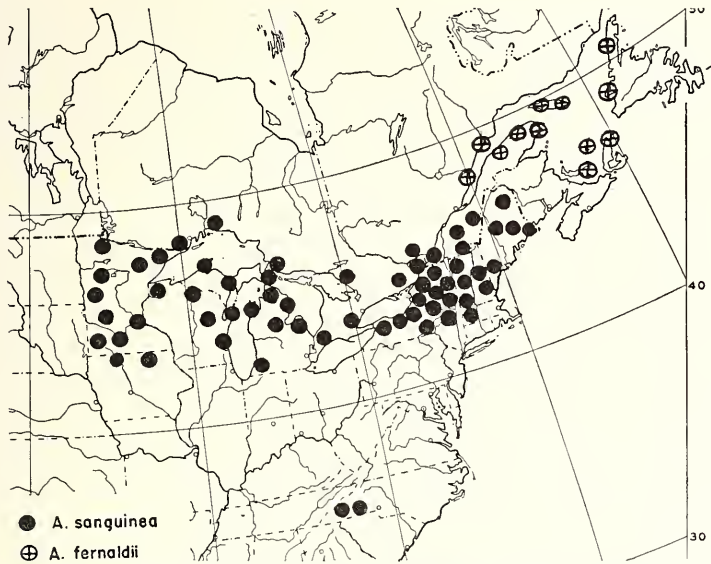
- Mespilus canadensis* var.  $\gamma$  *rotundifolia* Michaux, Fl. Bor. Am. 2:291 (1803).  
*Pyrus sanguinea* Pursh, Fl. Am. Sept. 340 (1814); Bigelow, Fl. Bost. (ed. 2) 196 (1824); Sprengel, Syst. Veg. 2:509 (1825).  
*Aronia sanguinea* Nuttall, Gen. Am. Pl. 306 (1818); Eaton, Man. Bot. N. Am. (ed. 6) 29 (1833).  
*Amelanchier sanguinea* DC. Prodr. 2:633 (1825); Spach, Hist. Nat. Veg. Phan. 2:86 (1834); Hooker, Fl. Bor. Am. 1:203 (1834) ex p.; Loudon, Arb. & Frut. Brit. 2:875, figs. 630, 631 (1838); M. Roemer, Syn. Mon. 3:145 (1847); Britton & Shafer, N. Am. Tr. 439, fig. 385 (1908); Wiegand in Rhodora 14: 138, pl. 95 (1912); Britton & Brown, Illustr. Fl. N. U.S. (ed. 2) 2:293, fig. 2332 (1913); Rehder in Bailey, Stand. Cyclop. Hort. 272 (1914); Hoffman in Proc. Boston Soc. Nat. Hist. 36:280 (1922); Wiegand & Eames, Fl. Cayuga Basin 247 (1926); Rehder, Man. Cult. Tr. & Shr. 389 (1927); Rosendahl & Butters, Tr. & Shr. Minnesota 214 (1928); Peattie, Fl. Indiana Dunes 219 (1930); Rydberg, Fl. Prairies & Plains 437 (1932); Small, Man. Se. Fl. 637 (1933); Marie-Victorin, Fl. Laurent. 316, fig. 91 (1935); Nielsen in Am. Midl. Nat. 22:168, pl. 3 (1939); Rehder, Man. Cult. Tr. & Shr. (ed. 2) 387 (1940).  
*Aronia latifolia* Riddell, Suppl. Cat. Ohio Pl. 24 (1836).  
*Amelanchier canadensis* var.  $\gamma$  *rotundifolia* Torrey & Gray, Fl. N. Am. 1:473 (1840), Fl. New York 1:225 (1843); Walpers, Rep. Bot. Syst. 2:55 (1843); Gray, Man. Bot. 130 (1848), (ed. 2) 126 (1856), (ed. 5) 162 (1868).  
*Amelanchier rotundifolia* sensu M. Roem. Syn. Mon. 3:146 (1847); Britton & Brown, Illustr. Fl. N. U.S. 2:238 fig. 1988 (1897); Small, Fl. Se. U.S. 532 (1903); Card in Bailey, Cyclop. Am. Hort. 57 (1904). Non (Lam.) Dum.-Courset 1811.  
*Amelanchier ovalis* var. *willdenowiana* M. Roem. l.c.  
*Amelanchier erecta* Blanchard in Torrey 7:101 (1907), ex p.  
*Amelanchier spicata* sensu Robinson & Fernald in Gray, New Man. Bot. (ed. 7) 460 (1908); Jones & Rand in Bull. Vermont Agr. Exp. Sta. 145:99, fig. 1, (1909). Non *Crataegus spicata* Lam.  
*Amelanchier sanguinea* f. *grandiflora* Wiegand in Rhodora 14:139 (1912).  
*Amelanchier sanguinea* var. *grandiflora* Rehder in Bailey, Stand. Cyclop. Hort. 1:272 (1914).  
*Amelanchier grandiflora* sensu Wiegand in Rhodora 22:149 (Oct. 29, 1920). Non Rehder 1920 (Sept. 6).  
*Amelanchier huronensis* Wiegand, op. cit., 150; Nielsen in Am. Midl. Nat. 22:170, pl. 4 (1939).

*Amelanchier amabilis* Wiegand in *Rhodora* 23:48 (1921); House in N.Y. State Mus. Bull. 254:412 (1924); Wiegand & Eames, Fl. Cayuga Basin 247 (1926); Rehder, Man. Cult. Tr. & Shr. 389 (1927), (ed. 2) 378 (1940).

Straggling or arching slender shrubs 1-3 m. tall, the stems solitary, or sometimes surculose and forming colonies; occasionally a small tree 4-6 m. tall; young twigs reddish brown or grayish; winter buds conical, reddish brown, dull, vernicose, or the scales ciliate, or sometimes pubescent on the back; leaves commonly oval, varying to suborbicular, conduplicate in the bud, unfolding before or with the flowers and usually about half-grown or nearly full-grown at anthesis, densely whitish or somewhat yellowish flocculent-tomentose beneath when young, tardily glabrous, or sometimes the tomentum partially deciduous by flowering time, some of the leaves sometimes retaining traces of tomentum at maturity, especially on the veins beneath and on the petioles, but usually the fully mature leaves nearly or quite glabrous on both surfaces; mature blades 2.5-7 cm. long, 2-5 cm. wide, the apex acutish or obtuse and more or less mucronate, the base rounded subcordate; principal lateral veins of average leaves 11-13 pairs, conspicuous, rather close together, straight or nearly so, parallel, the upper ones usually running straight to the margin and ending in the teeth, the uppermost short and strongly curved and ascending; short intermediate veins few or none; margins rather coarsely serrate-dentate nearly or quite to the base with broad sharp spreading teeth, these usually 4-6 per cm., and about 20-30 on each side of average leaves of the fruiting branches; petioles slender, 1-2 cm. long, glabrous, or remaining slightly pubescent; flowers many, in ascending, spreading, or drooping 4-10-flowered racemes 4-8 cm. long, the lower pedicels 6-18 mm. long; rachis and pedicels pubescent; petals 5, white, or sometimes pinkish, oblanceolate, obtuse, those of the fully opened flowers 11-22 mm. long, 4-6 mm. wide, more or less pilosulous on the base of the short claw; stamens about 20, the filaments glabrous; anthers 0.8-1.2 mm. long; hypanthium saucer-shaped, 4-8 mm. in diameter, glabrous or pubescent outside, usually more or less constricted on the very young fruit as a result of the neck of the hypanthium being produced into a rim above the rounded summit of the ovary; sepals triangular-lanceolate, acute, 3.5-4 mm. long, pubescent within, usually recurved from the middle after anthesis; styles 5, glabrous, 2-3 mm. long, usually united only near the base; top of the ovary densely tomentose; mature fruit globose or obovate-spheroidal, purplish-black, glaucous, glabrous, 6-8 mm. in diameter, sweet, juicy, edible; pedicels 1-4 cm. long; seeds brown, smooth, obliquely lanceoloid, somewhat flattened, about 5 mm. long and 2-3 mm. wide when well developed.

TYPE LOCALITY: "In Canada. . . ." Type in Michaux's herbarium, Museum d'Histoire Naturelle, Paris. Phototype in the Gray Herbarium.

RANGE: Woods and thickets, rocky bluffs, shores, hillsides, and ravines, on various substrata, including limestone, sandstone, conglomerate, gneiss, schist, and quartzite, from southern Quebec to Minnesota and northern Iowa, southern Michigan, New York, and western Massachusetts; also in the mountains of western North Carolina. Flowering from the beginning of May to the early part of June; fruits ripening in July and August. Common names: round-leaved juneberry; shore shadbush.



MAP 8.—Range of *Amelanchier sanguinea* and *A. fernaldii*.

QUEBEC: Isle Perrot, *Jack* 3928 (AA); Lake Massawippi, July 21, 1923, *Knowlton* (GH); Aylmer, *Rolland-Germain* 19258 (GH); Chateaugay, May 28, 1901, *Jack* (AA); Oka, *M.-Victorin* 1883 (AA), 18715 (GH); Bolton, July 25, 1926, *Knowlton* (GH); Thetford, *M.-Victorin* 11216 (AA).

MAINE: Winn, *Fernald & Long* 13780 (NE, AA); Orono, May 28, 1873, *Scribner* (NE); Veazie, June 23, 1905, *Knight* (UI); Milford, *Fernald* 13778, 13779 (GH, NE); Pembroke, *Fernald* 1880 (NE); Gilead, *Furbish* in 1897 (GH, NE); Masardis, Sept. 8, 1897, *Fernald* (NE, GH), 2311 (GH, NE); Houlton, *Fernald* in 1897 (GH, NE); Ashland, *Fernald* 2310 (GH); Fort Kent, *Woodward & Bissell* in 1914 (NE); Sangerville, *Fernald* in 1897 (NE); Dover, *Fernald* 388 (GH, NE, AA).

NEW HAMPSHIRE: Lebanon, *Fernald, Hunnewell, & Blanchard* in 1920 (NE); Haverhill, *Fernald* 15537 (GH, NE); Bath, *Pease* 19794 (NE); Durham, *Hodgdon* 2998 (NE).

VERMONT: Providence I., Lake Champlain, *Eggleston* 1178 (GH); Isle La Motte, *Cushman* 871 (NE); Swanton, May 22, 1912, *Knowlton* (NE); Mt. Willoughby, *Hodgdon* 2471 (NE); Canaan Falls, *Eggleston* 1121 (GH, UI, NE); Charlotte, May 28, 1922, *Knowlton* (NE); Burlington, *Pringle* in 1879 (AA);

Middlebury, *Brainerd* in 1901 (GH); Williamstown, June 8, 1917, *Knowlton* (NE); Wells, May 27, 1916, *Knowlton* (NE); W. Rutland, *Eggleston* 1127 (AA, NE), 1122 (GH); Hartland, May 8, 1921, *Knowlton* (NE), *Eggleston* 1971 (GH); North Hartland, *Drew, Hodgdon, & Taylor* 2472 (NE); Hartford, *Eaton & St. John* in 1920 (GH, NE); Cavendish, *Fernald* 449 (GH, NE); Bennington Co., *Steyermark* 7009 (MBG); Manchester, *Fernald, Harris, Drew, et al.* in 1932 (NE), *Cushman* 4330 (MBG); Bellows Falls, May 10, 1915, *Knowlton* (NE); Townsend, *Wheeler* in 1915 (NE); Westminster, *Blanchard* 4 (GH, AA).

MASSACHUSETTS: Sheffield, May 24, 1920, *Hoffmann* (NE); West Stockbridge, Aug. 7, 1920, *Hoffmann* (NE); Shelburne Falls, *Bean & Knowlton* 12070E (NE); Leverett, *Tower & Seymour* 3664 (NE).

NEW YORK: Canton, *Phelps* 568 (GH); Gouverneur, *Phelps* 1592 (GH); Plattsburg, *Hunnewell* 4681 (GH); Depauville, *Fernald, Wiegand, & Eames* 14302 (GH); LeRoy, *Wiegand* 13976 (GH); Romulus, *Eames* 4287, 4288 (GH); Forestport, *House* 11201 (GH); Mt. McGregor, *House* 16059 (GH); Orebed Mt., June 27, 1918, *Burnham* (GH); Lake George, *Kennedy* in 1885 (GH); Lake George Region, Aug. 10, 1916, *Burnham* (GH); Rochester, *Wiegand* 13979 (GH); Mendon, *Slavin* 205 (AA); Ledyard, *Wiegand* 6589, 6592 (GH); Glenville, *Svenson* in 1924 & 1931 (GH); Sand Lake, *Wiegand* 4281 (GH); Middleburg, *Svenson* 7849 (GH); Ithaca, *Wiegand* 2498 (GH, MBG), 2499, 2501 (GH), May 11, 1897 (GH, TYPE of *A. sanguinea* f. *grandiflora*); Caroline, June 10, 1882, *Dudley* (AA); Dryden, *Wiegand* 6582 (GH); Danby, *Wiegand* 2505 (GH); North Spencer, *Wiegand & Metcalf* 6583 (GH).

NEW JERSEY: Alpine, *Mackenzie* 5804 (Ph).

NORTH CAROLINA: Craggy Mt., near Biltmore, *Biltmore Herbarium* 5664c (GH, MBG, UI), 5664d (UI); Chimney Rock Mt., *Biltmore Herbarium* 5664e (MBG, UI, GH).

ONTARIO: Cloche Peninsula, *Fernald & Pease* 3364 (GH); Guelph, June 13, 1904, *Klugh* (GH); Port Franks, Lambton Co., May 26, 1904, *Dodge* (AA); Thessalon, *Pease & Bean* 26215 (GH); Gravenhurst, *Biltmore Herbarium* 5664 (GH, AA); Bear Island, *Krotkov* 5390 (GH); Plevna, Aug. 8, 1902, *Fowler* (GH); Nipigon, *Pease & Bean* 26502 (GH); Dalhousie Lake, *Dunbar* 12 (AA); Brockville, *Blanchard* 4 (GH); Ottawa, *Macoun* 20074 (GH).

MICHIGAN: West Bluff, Keweenaw Co., *Fernald & Pease* 3365, 3366, 3367 (GH); Copper Harbor, *Hermann* 7791 (MBG); Bête Grise, *Fernald & Pease* 3361 (GH); Gwinn, June 6, 1909, *Harrison* (GH); Mackinac I., July 4, 1912, *Hunnewell* (GH), June 2, 1900, *Schneck* (UI), *Sargent* in 1911 (AA); Cheboygan Co., *Gates* 9544 (UI), 13914 (AA); Douglas Lake, *Ehlers* 323 (GH); Sand Point, *Dodge* 74, 76 (GH, TYPE of *A. huronensis*); Sawyer, May 19, 1928, *Manning* (UI); N. Manitou I., *Wislizenus* 937.

WISCONSIN: Port Wing, *Fassett* 7313 (GH); Lake Owen, June 5, 1928, *Griscom* (GH); Rhinelander, *Palmer* 28711 (MBG); Dyckesville, *Palmer* 28747 (MBG); Ellison Bay, *Palmer* 28791 (MBG, AA); Jacksonport, *Kraus* 16 (GH); Milwaukee, May 21, 1906, *Hill* (UI); Ephraim, *Kraus* 22 (GH); Keshena, *Palmer* 27740 (MBG); Port Washington, *Palmer* 28861 (MBG); Cedarburg, *Palmer* 28905 (MBG).

MINNESOTA: Wilmar, *Palmer* 36815 (AA, MBG); Falls of Minnehaha, July 16, 1886, *L. H. Bailey* (GH); Duluth, June 28, 1915, *Stone* (Ph); Lake of the Woods, *MacMillan & Sheldon* 1747a (Minn.); Grand Portage, *Rosendahl* 6072 (Minn.); Itasca Park, *Nielsen* 1967, 2500 (Minn.); Red Wing, *Nielsen* 1349 (Minn.).

IOWA: Estherville, *Wolden* 1353 (GH); Bluffton, July 18, 1933, *Tolstead* (Minn.).

The first mention of the species under discussion was made by Michaux in 1803, who described a *Mespilus canadensis* var. *rotundifolia* as "arborescens: foliis suborbiculato-ovalibus, utrinque rotundatis . . . in Canada." The interpretation of Michaux's plant is rendered quite clear

by an examination of a photograph of the type specimen in the Michaux herbarium (Mus. Hist. Nat. Paris), which, "though not conclusive, seems more like the large-flowered, coarse-toothed species than any other; and this interpretation seems to have been that reached by other recent botanists who have studied the type. The Michaux variety was raised to specific rank and transferred to *Amelanchier* by Roemer in 1847. Unfortunately in 1814 Pursh described a *Pyrus sanguinea*. There has always been doubt as to the identity of this plant; and, so far as known, no specimen is in existence. Pursh cites as the only synonym the *M. canadensis*  $\gamma$  *rotundifolia* of Michaux, but he further says 'tenuissime serratis . . . A small tree . . . berries red . . .' which are not the characters of Michaux's plant. Moreover the locality is given as, 'In Canada and on the banks of the Columbia.' Since that time attempts have been made to apply Pursh's name, but in a most diverse manner (see Lindley in Bot. Register t. 1171, and Loudon, Arb. et Frut. p. 875). Evidently Pursh confused at least two plants, and evidently the only thing definite in connection with the Pursh name is the Michaux synonym, but that is definite, and the name need not be a source of confusion; therefore the writer is inclined to believe, with Dr. Britton, that Pursh's specific name should be retained for Michaux's plant. Even if Pursh's name is not used, the name *rotundifolia* can not be used as a specific name for our plant, as it is an earlier valid name<sup>1</sup> for the native European species." (Wiegand, in *Rhodora* 14:125. 1912).

The phototype (Plate XVII) of Michaux's plants depicts two fruiting specimens, almost exactly alike, mounted over three labels. On one label there is the statement "Lac Champlain," on the second, "hab. in Canada," and on the third label, "Lac Mistassin." Therefore, it is evident that Michaux's specimens came from the province of Quebec, or the northern part of what is now the state of New York, or adjacent Vermont. Clarification of the understanding of Michaux's type is contributed by a pencil tracing in the Gray Herbarium. This strengthens the conclusion of Wiegand and others that Michaux had a specimen of the taller, straggling shrub with coarsely toothed leaves and longer fruiting pedicels that we now call *A. sanguinea* (Pursh) DC.

Occasional specimens with larger flowers, and looser, often drooping racemes, have been named *A. grandiflora* Wieg., *A. huronensis* Wieg., and *A. amabilis* Wieg., or they have been treated as a variety or form of *A. sanguinea*. Since there are no evident supplementary characters of foliage or fruit, or even any differences of geographical distribution, these specimens are here considered to be well within the normal range of variation found in *A. sanguinea*.

<sup>1</sup>Not valid according to the current International Rules (1935) because *Crataegus rotundifolia* Lam. is an illegitimate substitute-name for *Mespilus Amelanchier* L. The valid name for this European species is therefore *Amelanchier ovalis* Medic.

11. AMELANCHIER GASPENSIS (Wieg.) Fern. & Weatherby  
(Plate XIX)

*Amelanchier sanguinea* sensu Lindley in Bot. Reg., pl. 1171 (1828). Non DeCandolle, 1825.

*Amelanchier sanguinea* var. *gaspensis* Wiegand in Rhodora 14:139 (1912).

*Amelanchier florida* sensu Wiegand in Rhodora 14:143, pl. 95 (1912); Rosendahl & Butters, Tr. & Shr. Minnesota 216 (1928). Non Lindley, 1833.

*Amelanchier gaspensis* (Wiegand) Fernald & Weatherby in Rhodora 33:235 (1931).

Low, much-branched shrubs 30-90 cm. tall, often forming dense thickets; bark grayish or brownish; winter buds conical, acute, glabrous or more or less pubescent; leaves commonly oval, varying to suborbicular, conduplicate in the bud, unfolding before the flowers and usually nearly or quite full-grown at anthesis, glabrous or quickly glabrate from the first; mature blades relatively thin, 3-6 cm. long, 1.5-4 cm. wide, the apex usually rounded or subtruncate, or somewhat acutish, the base cordate or subcordate, or sometimes rounded, quite glabrous on both surfaces, pale green beneath; primary lateral veins of average leaves 6-13 pairs, prominent, nearly equally distant, curved upward, the upper ones usually extending to the margin and ending in the teeth, the others anastomosing at their tips; margins dentate-serrate to below the middle (varying to subentire) with broad sharp ascending teeth, these usually 3-6 per cm., and about 5-20 on each side of average leaves of the fruiting branches; petioles slender, 1-2.5 (-3) cm. long, glabrous or quickly glabrate; flowers small, in ascending or erect, 5-15-flowered racemes 3-6 cm. long, the lower pedicels 1-2 cm. long; rachis and pedicels glabrous or barely pilose; petals 5, white, oblanceolate, glabrous throughout, 6-9 mm. long, 2-3.5 mm. wide; stamens 20, the filaments glabrous; anthers 0.6-0.9 mm. long; hypanthium saucer-shaped, 3-4 mm. in diameter, essentially glabrous outside, more or less constricted on the young fruit as a result of the neck of the hypanthium being produced into a rim above the rounded summit of the ovary; sepals lanceolate, acutish or acuminate, 1.5-3 mm. long, occasionally merely divaricate but usually recurved from the middle after anthesis, permanently glabrous on both sides, or with a small tuft of tomentum near the tip; styles 5, glabrous, about 2 mm. long, usually united to the middle; top of the ovary tomentose; mature fruit globose or subglobose, purplish black, glaucous, glabrous, 8-10 mm. in diameter when fully mature; lower pedicels 1-2 cm. long; seeds brown, smooth, obliquely lanceoloid, somewhat flattened, 4-5 mm. long, 2-3 mm. wide.

TYPE LOCALITY: Mouth of the Bonaventure River, Bonaventure Co., Gaspé Peninsula, Quebec, Canada. Type in the Gray Herbarium; isotype in the herbarium of the Arnold Arboretum.



RANGE: On cliffs, ledges, gravelly beaches, talus, or in alluvial woods, Gaspé Peninsula, and neighboring counties of Quebec; extending northward and westward to James Bay, and the region about Lake Superior. Flowering from July to the middle of August; fruits ripe in August and September.

QUEBEC: Grand River, *Fernald* in 1904, *Richards* in 1903 (GH); Percé Mt., *Collins, Fernald, & Pease* in 1904 (GH); Mt. St. Pierre, *M.-Victorin, et al.* 33203 (AA, GH), *Fernald, Weatherby, & Stebbins* 2451 (GH); Anse Pleureuse, *M.-Victorin, et al.* 33440 (GH); Coin-du-Banc, *M.-Victorin, et al.* 17434 (GH, AA); Rivière York, *M.-Victorin, et al.* 17431 (GH, AA); Mont Louis, *M.-Victorin* 28582 (AA, GH); Grande-Coupe, *M.-Victorin, et al.* 17435 (AA, GH); Cape Rosier, *Pease* 20216 (GH); Lac Pleureuse, *Fernald, Dodge, & Smith* 25840 (GH); Mt. Ste. Anne, *Williams, Collins, & Fernald* in 1905 (GH); Rivière St. Anne des Monts, *Fernald, et al.* 25839 (GH, AA), *Collins & Fernald* in 1905 (GH); mouth of Bonaventure River, *Williams & Fernald* in 1902 (TYPE, GH; AA); Maria, *M.-Victorin, et al.* 33298 (GH); Bonaventure River, *Collins, Fernald, & Pease* in 1904 (GH); Matapedia, *M.-Victorin* 28694 (GH); Sainte-Flavie, *Rousseau* 24537, 24554 (GH); Matane, *Forbes* in 1904 (GH); Milnikek, *Rousseau* 32418 (AA); Cap Enrage, *Rousseau* 26478, 26672 (GH), 26513 (AA); Bic, *Rousseau* 26259 (GH), 26241 (AA, GH), *Collins & Fernald* in 1904 (GH), *Fernald & Pease* 25137 (GH), *Louis-Marie, et al.* 34432 (GH); Montmagny, *Rousseau* 24561 (GH); Ile à Deux Têtes, *M.-Victorin* 24538, 24558 (GH, AA); L'Islet, *Rousseau* 24550 (GH); Charlton I., James Bay, *Potter* 484 (GH); 10 miles south of East Main, *Potter* 485 (GH).

ONTARIO: 50 miles north of Jackfish, *Jennings* 14024c (GH); Twin Islands, Temagami Region, *Anderson & Anderson* 26042 (GH); Batchawana Bay, *Pease & Ogden* 25152 (GH); Awrey, Sudbury District, *Fernald & Pease* 3369 (GH).

MICHIGAN: Keweenaw Co., May and July 1889, *Farwell* (GH); Alcona Co., *Bailey* 56 (GH); Carp Lake, Ontonagon Co., *Pease & Ogden* 24884 (GH); rocky shore of L. Superior, Marquette, Aug. 2, 1889, *Hill* (UI); Isle Royale, *Cooper* 122, 124, 125 (GH).

This species is related to *A. sanguinea* (Pursh) DC., and the cordilleran *A. alnifolia* Nutt. From the former it differs in its "glabrous or quickly glabrate foliage, its leaves more commonly rounded or subtruncate at summit, its fewer nerves with anastomosing tips, its erect racemes with glabrous or barely pilose rachis and pedicels, its shorter and glabrous or promptly glabrate sepals, and its shorter petals, and occupying a clearly circumscribed area northeast of the range of *A. sanguinea*, *A. gaspensis* seems to be quite as definite a species as any in the group." (*Fernald & Weatherby, l.c.*). From *A. alnifolia* it may be distinguished in the fruiting condition by its glabrous somewhat longer sepals, the "thinner leaves with at most pale green lower surfaces, the cordilleran series having the coriaceous leaves glaucous beneath," and its different habit of growth, and smaller fruits, as well as the wholly distinct geographical range. Although first described as a variety of *A. sanguinea*, it appears to be probably as

closely related to *A. alnifolia*. It seems best, therefore, to follow Fernald & Weatherby in treating the Gaspé plant as a distinct species.

*Amelanchier gaspensis* was apparently first illustrated (as *A. sanguinea*) in 1828 by Lindley in the Botanical Register, pl. 1171, on the basis of specimens grown in the gardens of the Royal Horticultural Society, but which came originally from near the southern end of James Bay, Ontario, "whence living plants were sent . . . by William Williams, Esq., Governor of Moose Factory, in 1824." From the beautiful colored plate and the accompanying description, it is evident that the plant described and illustrated is that which is now known as *Amelanchier gaspensis*. The description contains the following statements: "A handsome hardy shrub, resembling the Snowy Mespilus [i.e., probably *A. arborea*] in general appearance, but distinguished from that, and all other species of the genus, by its *young leaves being perfectly destitute of pubescence*." (Italics mine). *A. gaspensis* is the only known species of *Amelanchier* that grows in the region indicated and fits the description and illustration. The only discrepancies in the plate are that the leaves are shown as being slightly more pointed than is usual in *A. gaspensis*, and the flowers have glabrous ovaries, and only 3 or 4 styles. However, these peculiarities can be safely attributed to the merely impressionistic tendencies of the artist, because all the eastern American species have 5 styles, and in the description Lindley says that the calyces are "internally woolly," and the leaves are "obtuse at each end."

During the time since *A. gaspensis* was first recognized as a distinct entity by Wiegand in 1912, additional collections and field studies have made possible a considerable extension of the known geographical range of this species, which was at first thought to include only the Gaspé Peninsula of Quebec. The plant is now known to range westward to the region about Lake Superior. Collections of flowering specimens from Isle Royale, and others from northern Michigan, match almost exactly those from the type locality on the Gaspé Peninsula. They have the same kind of inflorescence, with the short pedicels, the glabrous and somewhat glaucous calyces, and the short petals. The obtuse leaves are fully grown and nearly or quite glabrous at flowering time, and their margins are toothed chiefly above the middle or toward the apex. In the light of subsequent discoveries it is now easily seen why Wiegand, and others, quite unable to match this material with any available specimens of the two related and somewhat similar species of the region, e.g., *A. spicata* and *A. sanguinea*, and apparently not suspecting that the plants belonged to *A. gaspensis*, arrived at the erroneous conclusion that their plants were identical with *A. florida* of the Pacific Slope of North America, whose natural geographical area is not closer than fifteen hundred miles to the westward.

## 12. AMELANCHIER ALNIFOLIA Nutt.

(Plate II)

- Aronia alnifolia* Nuttall, Gen. N. Am. Pl. 306 (1818).  
*Pyrus alnifolia* Sprengel, Syst. Veg. 2:509 (1825).  
*Amelanchier alnifolia* Nuttall in Journ. Acad. Nat. Sci. Philadelphia 7:22 (1834); M. Roem. Syn. Mon. 3:147 (1847); Decaisne in Nouv. Arch. Mus. Hist. Nat. Paris 10:135 (1874); Coulter, Man. Bot. Rocky Mt. Reg. 89 (1885); Watson in Garden & Forest 1:185, fig. 34 (1888); Watson & Coulter, in Gray, Man. (ed. 6) 167 (1889); Sargent, Silva N. Am. 4:131, pl. 196 (1892); Britton & Brown, Illustr. Fl. N. U.S. 2:239, fig. 1989 (1897); Koehne in Gartenflora 51:610, fig. 126 (1902); Card in Bailey, Cyclop. Am. Hort. 57, fig. 78 (1904); Sargent, Man. Tr. N. Am. 363, fig. 285 (1905); Rydberg, Fl. Colo. 191 (1906); Schneider, Illustr. Handb. Laubh. 1:738, figs. 411, 412 (1906); Britton & Shafer, N. Am. Tr. 440, fig. 387 (1908); Coulter & Nelson, New Man. Rocky Mt. Bot. 266 (1909); Apgar, Ornament. Shr. U.S. 182, fig. 278 (1910); Britton & Brown, Illustr. Fl. N. U.S. (ed. 2) 2:293, fig. 2333 (1913); Bean, Tr. & Shr. Brit. Isles 1:186 (1914); Rehder in Bailey, Stand. Cyclop. Hort. 272, fig. 187 (1914); Armstrong, Field Book W. Wild Fl. 217 (1915); Rydberg, Fl. Rocky Mts. 447 (1917); Standley in Contr. U.S. Nat. Herb. 22:366 (1921); Bailey, Man. Cult. Pl. 378 (1924); Tidestrom, in Contr. U.S. Nat. Herb. 25:283 (1925); Rehder, Man. Cult. Tr. & Shr. 389 (1927); Kirkwood, N. Rocky Mt. Tr. & Shr. 188, fig. 38 (1930); Rydberg, Fl. Prairies & Plains 437, fig. 290 (1932); Garrett, Spr. Fl. Wasatch Reg. (ed. 5) 106 (1936); Nielsen in Am. Midl. Nat. 22:164, 208, pl. 1. (1939); Preston, Rocky Mt. Tr. 175 (1940); Rehder, Man. Cult. Tr. & Shr. (ed. 2) 387 (1940).  
*Amelanchier ovalis* sensu Hooker, Fl. Bor. Am. 1:202 (1834); Loudon, Arb. & Frut. Brit. 2:876 (1838), ex p. Non D.C., 1825.  
*Amelanchier canadensis* var.  $\delta$  *alnifolia* Torrey & Gray, Fl. N. Am. 1:473 (1840); Walpers, Rep. Bot. Syst. 2:55 (1843); Porter & Coulter, Syn. Fl. Col. 38 (1874).  
*Amelanchier montana* Hort. ex Hand-list Trees Kew 1:217 (1894).  
*Amelanchier parvifolia* Hort. ex *ibid.*  
*Amelanchier lanulosa* Greene, MS.  
*Amelanchier cuneata* Piper in Bull. Torr. Club. 27:392 (1900), Contr. U.S. Nat. Herb. 11:346 (1906); Schneider, Illustr. Handb. Laubh. 1:739 (1906)  
*Amelanchier florida* sensu Piper, Contr. U.S. Nat. Herb. 11:346 (1906), ex p.; Piper & Beattie, Fl. Se. Wash. & Adj. Idaho 133 (1914); Henshaw, Wild Fl. N. Am. Mts. 154, pl. 30 (1914); Sargent, Man. Tr. N. Am. (ed. 2) 396, fig. 352 (1922); Raup in Contr. Arnold Arb. 6:174 (1934), Nat. Mus. Canada Bull. 74:142 (1935); Garrett, Spr. Fl. Wasatch Reg. (ed. 5) 106 (1936); St. John, Fl. Se. Wash. & Adj. Idaho 194 (1937); Graham, Ann. Carnegie Mus. 26:231 (1937). Non Lindley 1833.  
*Amelanchier utahensis* sensu Piper in Contr. U.S. Nat. Herb. 11:346 (1906). Non Koehne 1890.  
*Amelanchier alnifolia* var. *typica* Schneider, Illustr. Handb. Laubh. 1:739, figs. 411, 412 (1906); Nielsen in Am. Midl. Nat. 22:167 (1939).  
*Amelanchier alnifolia* var. *pumila* Schneider, Illustr. Handb. Laubh. 1:739 (1906), as to name only; Rehder in Bailey, Stand. Cyclop. Hort. 273 (1914).  
*Amelanchier macrocarpa* Lunell in Am. Midl. Nat. 3:143 (1913); Rydberg, Fl. Prairies & Plains 437 (1932).  
*Amelanchier leptodendron* Lunell in op. cit. 5:237 (1918).  
*Amelanchier carrii* Rydberg in Brittonia 1:89 (1931), Fl. Prairies & Plains 437 (1932).  
*Amelanchier humilis* sensu Raup in Journ. Arnold Arboretum 17:264 (1936). Non Wiegand 1912.  
*Amelanchier alnifolia* f. *alba* Nielsen in Am. Midl. Nat. 22:167 (1939).  
*Amelanchier alnifolia* var. *dakotensis* Nielsen in *ibid.*

Shrubs or small trees 2-4 m. tall, or in exposed situations sometimes dwarfed and prostrate; bark smooth, dark gray on the older branches, reddish brown on the branchlets; twigs of the season more or less silky-pubescent, soon becoming glabrous; winter-buds conical, villosulous, acute, dark brown, 3-6 mm. long; leaves of firm texture, oval or usually suborbicular or almost quadrangular, mostly flat, unfolded and more than half-grown at flowering time, tomentose beneath when young, soon becoming glabrous, usually by the time the flowers are fully expanded; upper surface dark green, smooth, quite glabrous, the lower surface pale or glaucous, glabrous throughout, or slightly pilosulous on the lower part of the midvein; blades 2-5 cm. long, 1.5-4 cm. wide, almost always obtuse, rounded, or truncate at the apex, rounded, truncate, or subcordate at the base, rarely somewhat tapering; lateral veins 8-13 pairs, conspicuous, parallel, curving and often forked and anastomosing near the margin, or running into the teeth, the intermediate veins none or inconspicuous; margins coarsely serrate or dentate to the middle, the lower half or third of the blade usually quite entire; sometimes the blade entire throughout or with 1 or 2 small teeth at apex; teeth usually coarse, rigid, ovate, acuminate, somewhat incurved, 1-3 mm. long on average leaves of the fruiting branches, 2-5 per cm., 2-20 on each side of average leaves; stipules linear, 6-18 mm. long, villous, soon deciduous; petioles 8-18 mm. long, pilose when young, soon becoming glabrous; flowers white, fragrant, conspicuous; racemes erect, 3-6 cm. long, 5-15-flowered, short and rather dense, the rachis and pedicels conspicuously lanate, the lower pedicels 5-15 mm. long; petals 5, white, oblanceolate, or oval, obtuse, 6-10 mm. long, 2-3 mm. wide, more or less ciliolate and with a small tuft of hairs on the base of the very short claw; stamens about 20, 1-2 mm. long, the filaments glabrous; anthers 0.6-0.9 mm. long; hypanthium shallowly campanulate, 3.5-4 mm. in diameter, the outside floccose at first but soon glabrous; sepals deltoid-lanceolate to lanceolate, 1.5-3 mm. long, more or less pilose within, becoming reflexed in age; styles 5, rarely 4, united below, 1.5-2.5 (-3) mm. long; summit of ovary persistently tomentose; fruit globose to obpyriform, 10-15 mm. in diameter, normally 10-loculed, and 10-seeded, purple or nearly black when ripe, glaucous, glabrous, edible, usually sweet and juicy, but the flavor rather insipid; fruiting pedicels glabrous, 5-15 mm. long; seeds asymmetrical, oval, flattened, brown, smooth, 4-5 mm. long, 3 mm. wide when fully developed.

TYPE LOCALITY: "In ravines and on the elevated margins of small streams from Fort Mandan [North Dakota] to the Northern Andes [Rocky Mountains]." Collected by Thomas Nuttall.

RANGE: Common along streams and on moist hillsides, in woods or thickets, or on open slopes in canyons and on mountainsides, from Yukon to Manitoba, southward to Nebraska, Colorado, and eastern Oregon; flowering from the middle of May to the middle of July, according to the altitude and latitude; fruit maturing in July and August. Common names: Western shadbush, saskatoon, serviceberry.

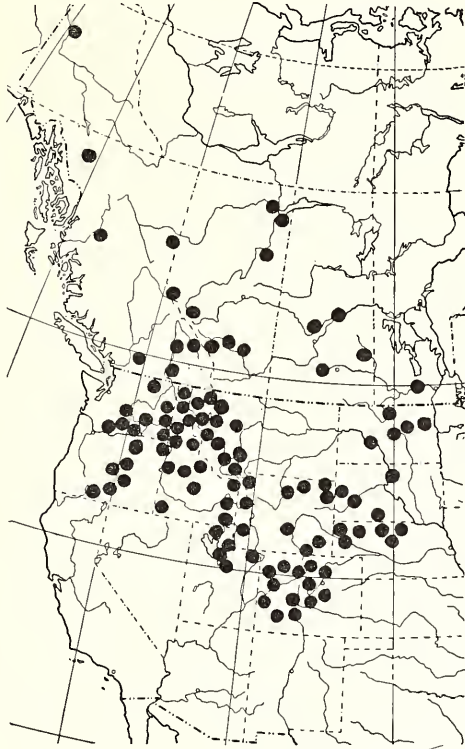
YUKON: Dawson, *Eastwood* 269 (AA), *Kusche* in 1916 (GH); Lewis River, *Gorman* 1026 (ND).

BRITISH COLUMBIA: Dawson Creek, *Raup & Abbe* 3500, 3502, 3530 (AA); Field, *Ulke* 535 (AA); Kelowna, *Murie* 1183 (MBG); Emerald Lake, *Pease* 22360 (G).

WASHINGTON: Klickitat Co., *Suksdorf* 10025, 10026 (AA, UI), 10129 (AA), 10154 (GH, AA), 10234, 10247 (AA), 11841, 11859 (UI); Pullman, *Piper* 1534 (AA), *Jack* 1213 (AA), *G. N. Jones* 1397 (GH, UI), 2057 (UI), *Beattie* 1819 (MBG); Yakima Co., *Cotton* 576, 571, 569, 365 (MBG); Spokane Co., *Suksdorf* 8597 (AA), 8609 (AA, UI), 8585 (UI), *Sandberg & Leiberg* 94 (MBG), *Palmer* 37835 (MBG), *Jack* 1453 (AA); Cle Elum, *Palmer* 37858 (AA); Easton, *G. N. Jones* 4681 (UI); Okanogan Co., *Thompson* 7073 (MBG); Kahlotus, *Rollins, Dillon, & Pickett* 868 (MBG), *Constance & McMurray* 1135 (MBG); Bishop, *Constance & Rollins* 1510 (GH).

OREGON: Strawberry Mts., *Applegate* 6219 (AA), *Ferris & Duthie* 784 (AA); Canyon City, *Brown* 78 (AA, MBG); Deschutes River, *E. Nelson* 807 (MBG); Tumalo Creek, *Whited* 571 (MBG); Lake Co., *Ferris & Duthie* 411 (AA); Baker, *M. E. Jones* 25397 (MBG); Blue Mts., *A. Nelson & Ruth Nelson* 783 (MBG).

ALBERTA: Wood Buffalo Park, *Raup* 2645, 2647, 2648, 2650, 2652, 2653, 2654, 2656 (GH); Fort Chipewyan, *Raup* 6065 (GH); Fort McMurray, *Raup* 7078, 7089 (GH); Lake Athabaska, *Raup & Abbe* 4466, 4515, 4519 (GH); Waterways, *Raup* 2649 (GH); Jasper Park, *Jack* 2540, 2629, 2778 (AA); Lake Louise, *Hunnell* 6169 (GH); Banff, Aug. 10, 1904, *Jack* (AA), *Brown* 23 (GH, MBG), 56 (GH); *Butters & Rosendahl* 1358 (GH), *Barber* 90 (GH); Rosedale, *Moodie* 1039 (GH); Calgary, *Moodie* 817 (GH, MBG), *Barber* 194 (GH).



MAP 9.—Range of *Amelanchier alnifolia*.

SASKATCHEWAN: Lake Athabaska, *Raup* 6670, 6588, 6931, 6084, 6933 (GH); Prince Albert, July 10, 1896, *Macoun* (GH); Moose Jaw, *Cowles* 38 (MBG, UI); Rosthern, *Munroe* in 1914 (AA); Ashcroft, *Cowles* 38a (MBG, UI); McKague, *Breitung* 523 (MBG); Saskatoon, July 14, 1913, *Sargent* (AA).

MANITOBA: Winnipeg, July 22, 1913, *Sargent* (AA); West Selkirk, *Macoun* 12627 (ND).

MONTANA: Seeley Lake, *Marsh* 507 (MBG); Bigfork, *Clemens* in 1908 (AA); Coram, *Jack* 1580 (AA); Madison River, *Scribner* in 1883 (AA); Wolf Creek, *Palmer* 36967 (AA, MBG); Great Falls, *Palmer* 36950 (MBG); Bozeman, *W. W. Jones* in 1901 (GH), *Blankinship* 135 (MBG); Gallatin Co., *Suksdorf* 52, 841 (AA); near Missoula, *MacDougal* 178 (GH), *Hitchcock* 2290 (MBG); near Bonita, *Muenschner* 11427, 11485 (MBG); Glacier Nat. Park, *Jack* 1497, 1498, 1511, 1537, 1592, 2007, 2293 (AA); St. Mary's Lake, *Hunnewell* 2445 (GH), *G. N. Jones* 5640 (UI).

IDAHO: Priest Lake, *Sargent* in 1896 (AA); near Moscow, *Jack* 1258 (AA), *G. N. Jones* in 1928 (UI); Hatwai Creek, *Sandberg*, *MacDougal*, & *Heller* 26 (GH, AA); Lewiston, *Heller* 3061 (MBG); Inkom, *Jack* 1155 (AA); Bovill, *Jack* 1359, 1374 (AA); Helmer, *Jack* 1361 (AA); Elk River, *Jack* 1336, 1379 (AA); Coeur d'Alene Mts., *Leiberg* 1203 (AA); Tamarack, *Clark* 166 (MBG); Montpelier, *Nelson & Macbride* 1052 (MBG); Salubria, *M. E. Jones* 6274 (MBG); Payette National Forest, *G. N. Jones* 5084 (GH); Salmon, *Payson & Payson* 1812 (MBG); Ashton, *Nelson* 10086 (MBG), *Cronquist & Davis* 2099 (MBG); Silver City, *Macbride* 926 (MBG); Deadwood Creek, *Nelson & Macbride* 1847 (MBG); Alturas Lake, *Cronquist* 3778 (MBG); Ketchum, *Nelson & Macbride* 1273 (MBG); Pocatello, *Jack* 1185, 1125, 1124a (AA), *Cronquist* 2298 (MBG), *Nelson & Macbride* 1405 (GH, MBG); Lava, *Nelson & Macbride* 1593 (MBG).

WYOMING: Yellowstone Nat. Park, *Jack* in 1904 (AA), *Sargent* in 1896 (AA), *Dewart* in 1889 (MBG, UI); Teton Mts., *Merrill & Wilcox* 1027a (GH); Moose, *Williams* 1106 (MBG); Upper Prairie Dog Creek, *Rollins* 550 (GH, MBG); Little Tongue River Canyon, *Williams & Williams* 3305 (GH, MBG); Cow Creek, *Nelson & Nelson* 798 (MBG); Laramie, *Jack* 1051 (AA); Dayton, *Jack* in 1900 (AA); Bighorn, *Jack* in 1900 (AA); Sundance Creek, *Nelson* 2129 (AA); Hulett, *Owmbey* 593 (MBG); Sherman, *Letterman* in 1884 (GH); Afton, *Payson & Armstrong* 3272 (MBG, GH, UI).

COLORADO: Ridgway, *Payson* 1075 (MBG); Silvercliff, *Horner* in 1898 (GH); San Juan Mts., *Wolf* 3075 (GH); Canyon City, *Nelson* 10530 (MBG); Tolland, *Palmer* 31358 (AA, MBG); Cedaredge, *Payson* 1069 (MBG); Pandora, *Baker* 750 (MBG); Estes Park, *Zobel* in 1935 (MBG); Shoshone, *Eggleston* 14967 (AA); Empire, *Engelmann* in 1874 (MBG); Sunset, *Andrews* in 1920 (AA); Boulder, *Cockerell* in 1906 (AA), *Hanson* C225 (MBG).

UTAH: Logan River, *Cronquist* 920 (MBG); Horse Creek, *Graham* 9262 (MBG); Mt. Timpanogos, *Garrett* 3686 (AA); Timpanogos Canyon, *Palmer* 38097 (MBG); Eagle Creek, *Harrison & Larsen* 7877 (MBG); Bromide Peak, *Harrison* 7473 (MBG); Thistle, *Eastwood* 7706 (AA); City Creek Canyon, *M. E. Jones* 1447 (AA); Providence Canyon, *Muenschner & Maguire* 2360 (MBG).

MANITOBA: Portage la Prairie, *Herriot* 72329 (GH).

NORTH DAKOTA: Devil's Lake, *Palmer* 36902 (AA), 36859 (MBG), *Lunell* in 1909 & 1910 (UI); Larimore, *Palmer* 36855 (AA, Ph); Butte, *Lunell* in 1907 and 1911 (AA, TYPE coll. of *A. macrocarpa*); Dunseith, *Lunell* in 1918 (TYPE coll. of *A. leptodendron*) (GH, MBG, UI); Stump Lake, *Stevens & Graves* 278 (GH); Pleasant Lake, *Lunell* in 1901 (GH); Leeds, *Lunell* in 1904 (UI).

SOUTH DAKOTA: Rosebud, *Williams*, s.n. (AA); Swan Creek, *Visher* 3308 (MBG); Timber Lake, *Shantz* 345 (UI); Deadwood, *Carr* 75 (TYPE coll. of *A. carrii*) (GH, MBG), *Palmer* 37197, 37343 (MBG, AA); Redfern, *Murdoch* 4035 (GH); Elk Canyon, *Rydberg* 680 (GH); Harney Peak, *Palmer* 37398 (MBG, AA); Piedmont, *Palmer* 37048 (MBG).

NEBRASKA: Chadron, *Pool & Folsom* in 1912 (MBG); Harrison, *Bates* 6074 (AA); Kirkwood, *Bates* 1357 (AA); Valentine, *Bates* 5928 (AA); Johnstown, *Bates* in 1898 (AA); Scottsbluff Co., Aug. 13, 1901, *H. P. Baker* (MBG).

The leaves of *Amelanchier alnifolia* are usually quite free from pubescence at maturity, and are dark green above and more or less glaucous beneath. The top of the ovary is densely tomentose, and the number of styles is uniformly five; the petals vary from 7-10 mm. in length. It is a small-flowered species, and therefore distinguished at once from the larger-flowered *A. cusickii*, which has an overlapping range, and from *A. florida*, which occupies a quite separate geographical area to the westward.

There has been a certain amount of ambiguity concerning the identity of *A. alnifolia* Nutt., caused largely, it is to be supposed, by the absence of Nuttall's original specimens, and on account of confusion with other species, particularly *A. florida* and *A. cusickii*. The original material of Nuttall was, according to his description, collected between Fort Mandan and the "Northern Andes." In his "Travels and Scientific Collections of Thomas Nuttall," Dr. F. W. Pennell (*Bartonia*, vol. 18, pp. 15, 16, 1936) comments as follows on this particular part of the Nuttall itinerary:

Fort Mandan, near the villages of the Mandan Indians, was not at the present town of Mandan, North Dakota, but was situated on the north side of the Missouri River in the present McLean County, and almost directly opposite the later Fort Clark. . . . All the way from the Platte River to Fort Mandan Nuttall has been telling of plants that occur on "to the Mountains" or "to the Northern Andes." These terms are evidently synonymous, and the mountains indicated lie farther up the Missouri River, but they can not be the actual Rocky Mountains for Nuttall cites no more tributary rivers above Knife River and he could not conceivably have crossed what is now Montana to the ranges known to Lewis and Clark. . . . I suppose that Nuttall must have ascended the Missouri through this rough country, until he came to where the plain that had seemed illimitable from the top of the river's bluffs at last found an end in real hills and mountains. It was no more than the northern extension of the Bad Lands and certainly could make but feeble claim to the imposing term "Northern Andes," but Nuttall evidently viewed it as an outlier of a great western mountain-system, continuous through both Americas. In reality, it did form an obvious limit to the ranges of the species he had been seeing.

It appears, therefore, that the type locality of *Amelanchier alnifolia* is probably not very far west of Fort Mandan in what is now western North Dakota.

In analyzing the probable identity of *A. alnifolia* Nutt. two facts stand out clearly. First, it is the only species known to occur in the area under consideration, and second, Nuttall's description, though brief and incomplete, gives some of its essential distinguishing characters: "Smooth; leaves roundish, the upper part toothed, pinnately nerved, under side somewhat glaucous; raceme simple, elongated; fruit black and sweet. HAB. In ravines and on the elevated margins of small streams from Fort

Mandan to the Northern Andes. OBS. A shrub 4 or 5 feet high; leaves roundish and retuse, somewhat attenuated at the base, toothed towards the summit; fruit dark purple, somewhat pruinose, very agreeable and saccharine, ripening about July and August." These statements leave no doubt as to the identity of the shrub described by Nuttall. The comment about the leaves being "attenuated at the base" is not incompatible with *A. alnifolia*, whose leaves, although usually rounded at the base, may vary on occasional specimens toward the condition mentioned by Nuttall. The suggestion has been offered that Nuttall might have had specimens of one of the eastern species, such as *A. spicata*, but this is highly improbable because that species is not known to occur so far westward.

The mature foliage of *A. alnifolia*, *A. florida*, *A. spicata*, and *A. sanguinea* often shows under certain environmental conditions a remarkable tendency toward parallel development, and therefore some herbarium specimens consisting of mature leaves only are sometimes rather difficult to separate by definite taxonomic characters. It was probably on account of this close similarity of foliage that Wiegand and others supposed the western *A. alnifolia* or *A. florida* to extend as far eastward as Minnesota and Michigan, and the eastern *A. humilis* Wieg. [*A. spicata* (Lam.) K. Koch] to occur northwestward in Canada to Mackenzie. However, flowering and fruiting specimens of these species are usually readily identified. In addition to its wholly separate westerly geographical range, *A. alnifolia* is characterized by the leaf-blades being mostly rounded or truncate at the apex, glabrous or nearly so, and almost all unfolded and more than half-grown at flowering time, coarsely toothed only above the middle, the lower half entire. There are also good taxonomic characters in the flowers.

Several names, purported to be of new species related to *A. alnifolia*, but based almost wholly on characters of the foliage, have been published from time to time. These include *A. macrocarpa* and *A. leptodendron* of Lunell, both of which appear to be based on specimens of *A. alnifolia* with unusual or abnormal foliage. In 1931 Rydberg described *A. carrii* from fruiting specimens collected in the Black Hills of South Dakota. It was said to be "related to *Amelanchier alnifolia* but differs in the short sepals and subentire leaves." A series of flowering specimens collected near the type locality in 1929 by Mr. E. J. Palmer (distributed as *A. humilis*) indicate *A. carrii* to be merely a phase of the widespread *A. alnifolia*. The name *A. carrii* is accordingly reduced to synonymy. Rydberg's statement that the leaves are "probably glabrous from the beginning" is not supported by observations made on flowering specimens.

Several specimens are known of what is supposed to be a natural bigeneric hybrid between *Amelanchier alnifolia* and a species of mountain-



ash, *Sorbus scopulina* Greene. When first discovered, this was thought to be a cross between *A. florida* and *S. sitchensis*. The *Sorbus*-parent was identified by the writer in 1939 as *S. scopulina*. It is now almost certain that the *Amelanchier*-parent is *A. alnifolia* rather than *A. florida*. If a binary name is used for this hybrid it is written  $\times$  *Amelasorbus jackii* Rehder in Journ. Arnold Arb. 6:154 (1925); G. N. Jones in *ibid.* 20:22 (1939). *Amelanchier alnifolia* Nutt.  $\times$  *Sorbus scopulina* Greene.

### 13. AMELANCHIER FLORIDA Lindl.

(Plate II)

- Amelanchier florida* Lindl., Bot. Reg. 19, pl. 1589 (1833); Spach, Hist. Nat. Veg. Phan. 2:86 (1834); M. Roem. Syn. Mon. 3:144 (1847); Decaisne in Nouv. Arch. Mus. Hist. Nat. Paris 10:136 (1874); Schneider, Illustr. Handb. Laubh. 1:739, fig. 412 (1906); Piper, Contr. U.S. Nat. Herb. 11:345 (1906); Britton & Shafer, N. Am. Trees 441, fig. 388 (1908), excl. syn.; Bean, Tr. & Shr. Brit. Isles 1:189 (1914); Piper & Beattie, Fl. Nw. Coast 200 (1915); Henry, Fl. S. Brit. Col. 183 (1915); Bean in Bot. Mag. 141, pl. 8611 (1915); Rehder, Man. Cult. Tr. & Shr. 388 (1927); Sudworth in U.S. Dept. Agric. Misc. Circular 92:134 (1927); Suksdorf in Werdenda 1:21 (1927); Benson, Contr. Dudley Herb. Stanford Univ. 2:102 (1930); G. N. Jones in Univ. Wash. Publ. Biol. 5:181 (1936); Nielsen in Madrono 4:17-21, pl. 6 (1937); G. N. Jones in Univ. Wash. Publ. Biol. 7:108 (1938); Nielsen in Am. Midl. Nat. 22:208 (1939); Applegate in Am. Midl. Nat. 22:277 (1939); Peck, Man. Higher Pl. Oregon 410 (1940); Rehder, Man. Cult. Tr. & Shr. (ed. 2) 387 (1940); Abrams, Illustr. Fl. Pac. States 2:471, fig. 2535 (1944).
- Amelanchier ovalis* var.  $\beta$  *semiintegrifolia* Hooker, Fl. Bor. Am. 1:202 (1834); Loudon, Arb. & Frut. Brit. 2:876 (1838).
- Amelanchier grandiflora* Douglas ex Hooker, op. cit., pro syn. *A. botryapium*.
- Amelanchier parvifolia* Hort. ex Loudon, Arb. & Frut. Brit. 2:877 (1838), (ed. 2) 1854.
- Amelanchier florida* var. *parvifolia* Loudon, l.c.
- Amelanchier alnifolia* sensu Sargent in Gard. & For. 5:409, fig. 69 (1892), Silva N. Am. 4:131, pl. 196 (1892), ex p.; Dippel, Handb. Laubh. 3:389, fig. 195 (1893), excl. syn.; Howell, Fl. Nw. Am. 165 (1898); Sudworth, For. Tr. Pac. Slope 345, fig. 162 (1908). Non Nutt. 1834.
- Amelanchier gormanii* Greene, Pittonia 4:129 (1900); Schneider, Illustr. Handb. Laubh. 1:739 (1906).
- Amelanchier oxyodon* Koehne in Gartenfl. 51:609, fig. 126b (1902).
- Amelanchier alnifolia* var. *florida* Schneider, Illustr. Handb. Laubh. 1:739, fig. 411 (1906), in Rep. Sp. Nov. Reg. Veg. 3:182 (1906); Rehder in Bailey, Stand. Cyclop. Hort. 272 (1914).
- Amelanchier canadensis* var. *semiintegrifolia* Farwell in Rep. Mich. Acad. Sci. 7:174 (1916).
- Amelanchier vestita* Suksdorf in Werdenda 1:20 (1927).
- Amelanchier ephemerotricha* Suksdorf, l.c.
- Amelanchier ephemerotricha* var. *silvicola* Suksdorf, l.c.
- Amelanchier florida* var. *typica* G. N. Jones, in Univ. Wash. Publ. Biol. 5:181 (1936).
- Amelanchier florida* f. *tomentosa* Sealy in Curtis' Bot. Mag. 160: pl. 9496, figs. a-e (1937); Rehder, Man. Cult. Tr. & Shr. (ed. 2) 387 (1940).

A slender shrub 1-5 m. tall or sometimes a small tree 10 or 12 m. tall and 15-20 cm. in diameter; branches erect; bark brownish, becoming gray, young twigs reddish brown, tomentose at first, soon glabrous; winter buds usually pubescent, purplish; leaves of thin texture at flowering time and fully expanded, oval to oblong or roundish, conduplicate in veneration, tomentulose when young, especially beneath; at maturity becoming glabrous and bright green above with the midvein impressed on the upper surface; lower surface pale green and glabrous or sparingly pubescent; blades 3-4 cm. long, 2-3 cm. wide, rounded or subtruncate at the apex, or occasionally varying to acutish, rounded or subcordate at the base; lateral veins 8-12 pairs, parallel, slightly curved upward, each vein often extending into a tooth; margins mostly entire below, coarsely toothed above the middle, or rarely below, with a few spreading deltoid teeth, the teeth 4-6 per cm., 5-20 on each margin on average leaves; blades rarely completely entire; stipules linear, villous, caducous; petioles slender, 1-2.5 cm. long, sparsely pubescent at first, soon becoming glabrous; flowers white, 2-3 cm. in diameter, fragrant; racemes erect, 4-8 cm. long, 5-15-flowered, the rachis and pedicels at first whitish pubescent but soon glabrous, the lower pedicels 8-14 mm. long; petals oblanceolate, obtuse, 12-15 mm. long (rarely shorter), 3-3.5 mm. wide, the apex obtuse, the base cuneate, more or less ciliolate on the base of the very short claw; stamens about 20, shorter than the calyx-lobes; anthers yellow, 0.5-0.7 mm. long; hypanthium campanulate, 4-5 mm. in diameter, tomentose when young, soon glabrous, slightly constricted on the young fruit; sepals deltoid-lanceolate, acute or acuminate, 2-2.5 mm. long, tomentulose at least inside at anthesis, reflexed and glabrous on the fruit; styles 5, stout, glabrous, 2-2.5 mm. long, united to the middle or above; summit of the ovary closely tomentose in anthesis, becoming nearly glabrous in fruit; fruit globose, 10-13 mm. in diameter, glabrous, glaucous, becoming purplish black at maturity, juicy, edible; lower pedicels 1-2 cm. long; seeds dark brown, glossy, about 5 mm. long and 2 mm. wide.

TYPE LOCALITY: "Northwest America," collected by David Douglas in 1825, probably along the lower Columbia River, near the present site of Vancouver, Washington.

RANGE: In open woods and on hillsides, usually near sea level, but occasionally ascending the mountains to an altitude of 5000 feet; southeastern Alaska to western Oregon and northwestern California, flowering from the beginning of March to the end of June, according to the latitude and altitude.

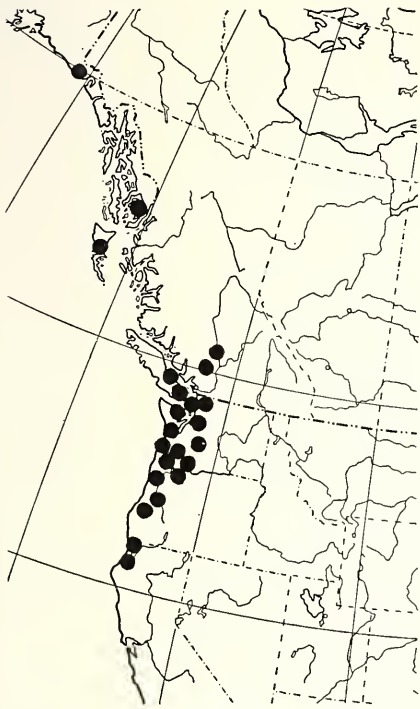
ALASKA: Wrangell, *Eastwood* 995 (AA, MBG); Chilkat Valley, *Walker* 1075 (GH, MBG); Old Kaasan Bay, *Cowles* 1419 (MBG, UI); along road from Hyder to Stewart, B.C., *Whited* 1197 (MBG); Yes Bay, *Gorman* 39 (ND).

BRITISH COLUMBIA: Glacier, *Brown* 283 (GH, MBG); McGillivray Creek, *Macoun* 93901 (AA); Mons, *Macoun* 93898 (GH); Skidegate, Queen Charlotte Islands, *Spreadborough* 93907 (GH); Lillooet, *Macoun* 93897 (AA), 93899 (GH); Alberni, May 25, 1917, *Carter* (GH); Jessie I., *Spreadborough* 93905 (AA); Cowichan Lake, *Spreadborough* 93906 (AA); Elk Lake, *Macoun* 93881 (AA); Nanaimo, *Macoun* 93895 (AA); Prospect Lake, *Macoun* 93883 (AA); Robertson River, *Spreadborough* 93904 (AA); Renfrew, *Rosendahl & Brand* 88 (GH, MBG); Sidney, *Sargent* in 1913 (AA), *Macoun* 93879, 93880 (GH), 93875, 93887, 93889 (AA); Victoria, *Macoun* 79796, *Eastwood* 9702, *Jack* 2865 (AA).

WASHINGTON: Chuckanut Bay, *Muenschner* 9635 (MBG); Browns Island, *Zeller* 844 (GH, MBG); Upper Valley of the Nesqually, *Allen* 214 (AA, GH, MBG); Clallam Co., *Elmer* 2512 (MBG); Seattle, *Piper* 84 (AA); Snoqualmie, May 2, 1937, *G. N. Jones* (GH); Yelm, Sept. 1, 1891, *Piper* (AA); Montesano, *Heller* 3958 (AA, GH, UI, MBG); Husum, *Suksdorf* 10033, 10201 (AA); Cape Horn, *Suksdorf* 10395, 10360, 10361 (AA); Bingen, *Suksdorf* 10154 (AA, UI, MBG), 10194, 10195, 10382, 10455 (AA), 10494, TYPE coll. of *A. ephemero-tricha* var. *silvicola* (GH, UI, AA), 11841, TYPE coll. of *A. vestita*, 11859, TYPE coll. of *A. ephemero-tricha* (GH), 11835, 11973 (GH, MBG, UI).

OREGON: Portland, Aug. 18, 1880, *Drake & Dickson* (GH); Waukena Falls, *Thompson* 2714 (MBG); Hood River, *Suksdorf* 2138, 2139, 2153 (AA); "Oregon, *Douglas*" (GH); Sauvies I., Apr. 1881, *J. Howell* (AA); Forest Grove, *Thompson* 616 (MBG); St. Helens, *T. Howell* 1132 (GH, MBG); Corvallis, *Steward* 230, *Epling* 5623 (MBG); Salem, *Nelson* 1071 (GH); Goshen, *Abrams* 8718 (MBG); Oakland, May 3, 1914, *Hunt* (AA); Sutherlin, *Muenschner* 15136 (MBG).

CALIFORNIA: Mendocino Co., *Bolander* 4674 (MBG).



MAP 10.—Range of *Amelanchier florida*.

The identity of *A. florida* is securely established by Lindley's detailed description and excellent colored plate. It is admittedly closely related to *A. alnifolia* Nutt., and at various times the two have been treated as different species, as one species and a variety, or have been merged as a single entity. Some botanists, including Dippel, Howell, and others, while maintaining two species, have interchanged the names, a procedure that has naturally increased the confusion in an already complicated subject, and adding still further obscurity to the understanding of these species is the existence of a third, *A. cusickii* Fern., discovered in 1899, which occupies

a smaller range within that of *A. alnifolia*. Reports of *A. florida* from the region east of the Cascade Mountains, and most of the specimens so named belong really to *A. cusickii*, a large-flowered species resembling *A. florida* in superficial appearance, but immediately distinguished by the usually glabrous ovary, and longer petals and sepals. *A. alnifolia* and *A. cusickii* often grow together, but there is no evidence of hybridization between them.

Although as now recognized by critical students of Amelanchier, *A. florida* and *A. alnifolia* are distinct species with good distinguishing floral characters and separate geographical ranges (the former confined to the Pacific slope west of the Cascade Mountains, and the latter a species of the Great Plains, and the Rocky Mountain area) leaf specimens of these species are sometimes virtually indistinguishable from each other, and on that account the foliage is of limited taxonomic value. Leaves of *A. alnifolia* tend to be more nearly suborbicular and of somewhat thicker texture, and often darker green, but these are by no means constant characters, especially on specimens collected later in the season, or from drier habitats. The best distinguishing morphological character is to be found in the flowers. Flowering specimens of *A. florida* are at once distinguished from those of *A. alnifolia* by the larger flowers with longer petals. The petals of *A. alnifolia* are usually 7-10 mm. long with only occasional larger-flowered specimens. *A. florida*, on the other hand, is a relatively large-flowered plant, the petals being usually 12-15 mm. long; however, occasional smaller-flowered specimens are found on stunted plants, or plants of dry habitats, so that the distinction is not an absolute one. The habit of these two species respectively is usually somewhat different, *A. florida* being generally taller and more slender, but the growth-form of each is extremely variable according to the habitat, and can therefore scarcely serve for basic taxonomic purposes. As previously noted, the geographical ranges of the two species are almost separate, and it is only in a very few localities, such as in the Gorge of the Columbia River, that the two are ever found growing near each other.

*Amelanchier gormanii* Greene was described from specimens collected by M. W. Gorman at Yes Bay, Alaska, in 1895, and was said to be characterized by the calyx, whose "limb is notably dilated under the insertion of the petals into a broad saucer-shaped rim; and the lanceolate segments, either erect or somewhat spreading, are longer than all the rest of the calyx, and are tomentulose within." However, this condition is by no means peculiar to specimens from Alaska, but is more or less characteristic of the partly ripened fruits of many specimens of both *A. florida* and *A. alnifolia*.

## 13a. AMELANCHIER FLORIDA var. HUMPTULIPENSIS

G. N. Jones

*Amelanchier alnifolia* var. *pumila* sensu Schneider, Illustr. Handb. Laubh. 1:739, fig. 412 (1906), as to specimen cited, non *A. pumila* Nutt. ex Torrey & Gray 1840.

*Amelanchier florida* var. *humptulipensis* G. N. Jones in Univ. Wash. Publ. Biol. 5:181 (1936).

Leaves and flowers smaller than those of *A. florida* var. *typica*; blades of the mature summer foliage of the fruiting branches mostly oval, acutish or obtuse at the base, acute or obtuse at the apex, 2-3 cm. long, 1-2 cm. wide, nearly entire, or shallowly serrate near the apex with small teeth; the racemes 2-4 (or sometimes only 1-2) cm. long, erect, 5-9-flowered, the pilose pedicels only 2-3 mm. long; petals 6-10 mm. long, 2 mm. wide, oblanceolate; stamens 12-15, the filaments glabrous, 1-2 mm. long; anthers 0.6-0.8 mm. long; hypanthium shallowly campanulate, sparsely pubescent outside at flowering time; sepals lanceolate, acuminate, soon recurved, 1.5-2 mm. long, glabrous within, or only sparsely pilosulous; styles 4, glabrous, unequal, 1.5 mm. long; top of the ovary tomentose, rarely nearly glabrous; fruit 5-7 mm. in diameter, 8-loculed and 8-seeded.

TYPE LOCALITY: Humptulips Prairie, Grays Harbor Co., Washington. Type: G. N. Jones 4565 (flower), 5819 (fruit) in the herbarium of the University of Washington, Seattle.

RANGE: Olympic Peninsula, Washington, and adjacent southern Vancouver Island, British Columbia.

BRITISH COLUMBIA: Mt. Benson, July 10, 1893, *Macoun* (GH), 208 (GH); near Victoria, May 15, 1893, *Macoun* (GH).

WASHINGTON: Humptulips, June 12, 1897, *Lamb* 1190 (AA, MBG); Humptulips River, *Murie* 1122 (MBG); Kamilche, *Benson* 1423 (MBG); Shelton, *Benson* 1420 (MBG).

This appears to be a local variety of *A. florida*, differing from the typical form of that species in its smaller size, usually more finely toothed leaves, shorter inflorescences, four styles, and its restricted geographical distribution. In 1906, C. V. Piper (Contr. U.S. Nat. Herb. 11:346) suggested that it might be a new species, but concluded that more and better specimens were needed. On account of the smaller flowers it might be treated as a near relative of *A. alnifolia* rather than of *A. florida*, but the general appearance, as well as its geographical range, suggest a closer connection with the latter, of which it might be dismissed as merely a stunted form, except for the fact that the flowers appear uniformly to possess only four styles instead of five, the almost invariable number for all other known species in this general cycle of affinity.

## 14. AMELANCHIER CUSICKII Fern.

(Plates III, XX)

*Amelanchier cusickii* Fernald in *Erythea* 7:121 (1899); Piper in *Contr. U.S. Nat. Herb.* 11:346 (1906); Schneider, *Illustr. Handb. Laubh.* 1:735, figs. 409, 410 (1906); Piper & Beattie, *Fl. Se. Wash. & Adj. Idaho* 133 (1914); Henry, *Fl. So. British Columbia* 183 (1915); Rydberg, *Fl. Rocky Mts.* 446 (1917); Kirkwood, *N. Rocky Mt. Tr. & Shr.* 190 (1930); St. John, *Fl. Se. Wash. & Adj. Idaho* 194 (1937); Peck, *Man. Higher Pl. Oregon* 410 (1940); Abrams, *Illustr. Fl. Pac. States* 2:471, fig. 2533 (1944).

Shrubs 1-3 m. tall, with numerous slender, virgate, flexible branches; bark on the young branches reddish, later becoming gray; twigs of the season reddish brown, often somewhat glossy, quite glabrous; winter buds reddish, nearly or quite glabrous, the inner scales more or less ciliate; leaves commonly oval, thin, glabrous from the first, even when young, becoming coriaceous in age, conduplicate in the bud, usually unfolded at anthesis; mature blades 2.5-5 cm. long, 2-3 cm. wide, the apex acutish and apiculate on some leaves, obtuse and rounded on others, the base rounded or subcordate, perfectly glabrous on both surfaces; lateral veins 7-10 pairs, curving upward and anastomosing near the margin; margins sharply serrate mostly above the middle, the upper teeth more prominent; teeth 3-6 per cm., 3-15 on each side on average leaves of the fruiting branches; stipules linear, deciduous, villous, about 1 cm. long; petioles slender, soon glabrous, 6-22 mm. long; flowers large, in 3-8-flowered racemes 2-5 cm. long, the lower pedicels 8-12 mm. long, glabrous; petals 5, white, glabrous, obovate or oblanceolate, obtuse, 16-25 mm. long, usually 5-7 mm. wide above the middle, the apex obtuse or acutish; stamens about 20, the filaments glabrous, 3-4 mm. long; anthers ellipsoid, 1-1.5 mm. long; hypanthium shallowly campanulate or saucer-shaped, glabrous within and outside, 4-5 mm. in diameter; sepals lanceolate, acuminate, or acute, 3.5-5 mm. long, pilose within at flowering time, usually recurved from the middle during or after anthesis, the margins very narrowly hyaline; styles 5 or 4, glabrous, 3-4 mm. long, united below the middle, or nearly free to the base; summit of the ovary glabrous or with a ring of tomentum around the base of the styles; mature fruit glabrous, globose, juicy and edible, reddish at first, becoming bluish black, about 1 cm. in diameter; fruiting pedicels 5-20 mm. long; seeds brown, smooth, asymmetrical, 4-5 mm. long.

TYPE LOCALITY: "On stony hillsides, Union County, Oregon." Type (*Cusick* 1858), in the Gray Herbarium of Harvard University; isotype in the herbarium of the Missouri Botanical Garden.

RANGE: Common on basaltic ledges along rivers, British Columbia, southward to eastern Washington, eastern Oregon, Idaho, western Montana, and northern Utah; flowering in March and April; fruit ripening in June.

BRITISH COLUMBIA: Kamloops, June 30, 1887, *Fowler* (MBG).

WASHINGTON: Fort Colville, *Lyll* in 1861 (GH); Camden, *Spiegelberg* 341 (GH); Kettle Falls, *Boner & Weldert* 172 (GH, MBG); Spokane, Sept. 1, 1899, *Piper* (GH), 2694 (AA), *Suksdorf* 8575 (AA, GH, MBG, UI), *Milburge* 258 (AA); Grand Coulee, *Rollins* 840 (MBG); Blewett Pass, *Benson* 1283 (MBG); Wenatchee R., Chelan Co., *G. N. Jones* 6573 (UI); Entiat, *Thompson* 6002 (GH, MBG); Priest Rapids, *G. N. Jones* 6349 (GH); Yakima, *G. N. Jones* 1387 (UI); near Ellensburg, *Eyerdam* 1377 (MBG), *Thompson* 11386 (GH, MBG); six miles s.w. of Pullman, Aug. 4, 1899, *Piper* (GH), *Elmer* 135 (MBG); Wawawai, *Piper* 3812 (GH), *G. N. Jones* 1398 (UI); Almota, *Constance, et al.* 1037 (GH, MBG); Bishop, *Constance & Rollins* 1512 (GH); Hooper, *Constance & Rollins* 1499 (MBG); Waitsburg, *Horner* B183 (GH); Palouse Falls, *G. N. Jones* 2832 (Ph).

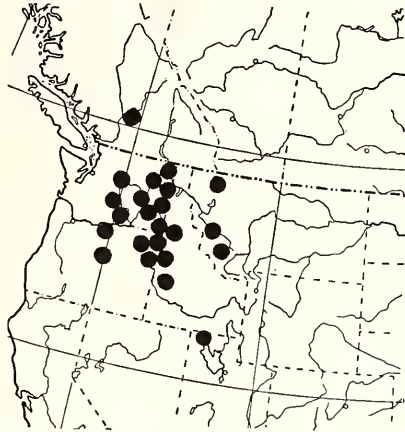
OREGON: The Dalles, *Lunell* 50 (GH), Apr. 19, 1903, *Lunell* (UI); Canyon Creek, Grant Co., *Henderson* 5147 (GH, MBG); eastern Oregon, *Cusick* 1858 (TYPE, GH, isotype, MBG); Wallowa Mts., *G. N. Jones* 7088, 7101, 7134, 7147 (UI); Jim Creek, Wallowa Co., *Constance* 999 (MBG); Crooked River, *Whited* 363 (GH, MBG).

IDAHO: Spalding, *Meyer* 1428 (MBG); Snake River Canyon, Idaho Co., *Constance, Clements, & Machlis* 1008, *Packard* 371, *Meyer* 854 (MBG); Dry Buck, Boise Co., *Macbride* 852 (GH, MBG); Kootenai Co., July 1890, *Leiberg* (GH).

MONTANA: Near Butte, *Moore* in 1893 (MBG); Mt. Sentinel, *Kirkwood* 28, 29, 30 (AA), *Barkley & Osburnson* 2313 (AA, MBG, UI); near Missoula, *Kirkwood* 1182 (GH, MBG), *Hughes* 1185 (GH, MBG), *E. C. Faust* in 1915 (UI); near Bonner, *Geil* 4 (MBG, UI).

UTAH: Cache Co., Logan Canyon, *Maguire* 3501 (GH); Blacksmith Canyon, *Maguire* 3507 (GH); Sardine Canyon, *Maguire* 2363 (GH).

This distinctive species was named in compliment to the pioneer Oregon botanist, William Conklin Cusick (1842-1922). It is the largest-flowered species of *Amelanchier*, and thus in the flowering stage is at once distinguishable from all others. It blooms from ten to fifteen days earlier than *A. alnifolia*. Fruiting specimens are frequently less easily recognized, but the long sepals will usually serve to separate it from *A. alnifolia*, the common species occurring within its range.



MAP 11.—Range of *Amelanchier cusickii*.

15. AMELANCHIER BASALTICOLA Piper  
(Plate III)

*Amelanchier alnifolia* sensu Holzinger in Contr. U.S. Nat. Herb. 3:224 (1895).  
Non Nuttall, 1834.

*Amelanchier basalticola* Piper, Fl. Palouse Reg. 100 (1901); Piper in Contr. U.S. Nat. Herb. 11:346 (1906); Piper & Beattie, Fl. Se. Wash. Adj. Ida. 133 (1914); Rydberg, Fl. Rocky Mts. 446 (1917); St. John, Fl. Se. Wash. & Adj. Ida. 194 (1937).

Shrubs 1-3 m. tall; bark gray; twigs of the season glabrous, brown, smooth; winter buds small, glabrous; leaves conduplicate in veneration, appearing before the flowers, flat and unfolded at flowering time, pale green, glabrous, and glaucous from the first, firm in texture; blades sub-orbicular, 1.5-3 cm. long, 1.5-2 cm. wide, rounded or truncate at apex and base, the apex sometimes acute and mucronate; lateral veins 10-13 pairs, curved upward, anastomosing near the margin; margins serrate above the middle or less commonly from near the base, the teeth small, sharp, somewhat curved, 4-6 per cm., mostly 5-15 on each side on average leaves of the flowering branches; some of the blades sometimes nearly or quite entire; stipules linear-subulate, small, glabrous, fugacious; petioles slender, glabrous, 7-18 mm. long, usually shorter than the blade; flowers appearing after the leaves have unfolded, about 3 cm. in diameter; racemes terminal, 2-4 cm. long, 4-8-flowered; pedicels nearly or quite glabrous, and somewhat glaucous, 4-8 mm. long; petals 5, white, glabrous, oblanceolate, 12-16 mm. long, 3-4 mm. wide above the middle, the apex acute, obtuse, entire or erose; stamens about 20, the filaments glabrous, 2-3 mm. long; anthers 0.8 mm. long; hypanthium campanulate, glabrous and somewhat glaucous, 3 mm. in diameter, sepals linear-lanceolate, attenuate-acuminate, 3.5-4 mm. long, pilosulous within, becoming reflexed after anthesis, somewhat glaucous, slightly longer than the tube; styles 5, free to below the middle or almost to the base, 2-2.5 mm. long, summit of the ovary glabrous or nearly so; mature fruit globose, dark purple, juicy, glabrous, 9-12 mm. in diameter; fruiting pedicels glabrous, about 1 cm. long; well developed seeds chestnut brown, smooth, glabrous, 5-6 mm. long, 3-3.5 mm. wide, asymmetrical, flattened-ellipsoid, bluntly pointed at each end.

TYPE LOCALITY: Bluffs of Snake River, Whitman County, Washington, opposite Clarkston.

RANGE: Southeastern Washington, adjacent Idaho, and Oregon. Flowering in April and May; fruit ripe in June and July.

WASHINGTON: Bluffs above Wawawai, *Piper* 3823 (MBG, AA, GH).

IDAHO: Near Lewiston, Apr. 15, 1896, *Heller* (UI), 2988 (MBG, Ph); Upper Ferry, Clearwater River, near Lewiston, *Sandberg*, *MacDougal*, & *Heller* 53 (MBG, AA, GH, UI); Nez Perces Co., May 1892, *Sandberg* (UI, MBG); near Riggins, *G. N. Jones* 972 (UI).

OREGON: Mitchell, *Ferris & Duthie* 656 (AA); Wallowa River, *G. N. Jones* 7137 (UI); Deep Creek, Snake R. Canyon, Wallowa Co., *Constance*, *Rollins*, & *Dillon* 1568 (GH); Snake R. Canyon above Rogersburg, *Meyer* 226 (MBG).



*Amelanchier basalticola* Piper is a species of local distribution inhabiting the basaltic cliffs and ledges of the river canyons of southeastern Washington, and adjacent Idaho and Oregon. It is very conspicuous in the spring when in bloom, marking the ledges on which it grows. It belongs to the *alnifolia-florida-cusickii* cycle of affinity, being probably most closely related to *A. cusickii*, from which it differs in its shorter and narrower petals, somewhat longer sepals, and the smaller, roundish, pale green leaves. It is distinguished from *A. alnifolia* by the longer petals, longer and narrower sepals, as well as the usually smaller leaves.

## 16. AMELANCHIER PUMILA Nutt.

(Plates III and IX)

*Amelanchier canadensis* var.  $\epsilon$  *pumila* Nuttall ex Torrey & Gray, Fl. N. Am. 1:474 (1840); Walpers, Rep. Bot. Syst. 2:55 (1843); Dietrich, Syn. 3:158 (1843).

*Amelanchier pumila* Nuttall ex Torrey & Gray apud M. Roemer, Syn. Mon. 3:145 (1847); Rydberg, Fl. Rocky Mts. 446 (1917); Tidestrom in Contr. U.S. Nat. Herb. 25:283 (1925); Graham in Ann. Carnegie Mus. 26:232 (1937).

*Amelanchier glabra* Greene, Fl. Franciscana 52 (1891); Schneider, Illustr. Handb. Laubh. 1:735 (1906); Coulter & Nelson, New Man. Rocky Mt. Bot. 266 (1909); Smiley in Univ. Calif. Publ. Bot. 9:230 (1921); Tidestrom in Contr. U.S. Nat. Herb. 25:283 (1925); Abrams, Illustr. Fl. Pac. States 2:471, fig. 2532 (1944), excl. syn.

*Amelanchier polycarpa* Greene, Pittonia 4:127 (1900); Schneider, Illustr. Handb. Laubh. 1:735, fig. 409 (1906); Rydberg, Fl. Colorado 191 (1906); Wooton & Standley in Contr. U.S. Nat. Herb. 19:323 (1915); Rydberg, Fl. Rocky Mts. 446 (1917); Tidestrom in Contr. U.S. Nat. Herb. 25:283 (1925); Tidestrom & Kittell, Fl. Ariz. & New Mexico 251 (1941); Kearney & Peebles in U.S. Dept. Agric. Misc. Publ. 423:393 (1942).

*Amelanchier alnifolia pumila* A. Nelson in Coulter & Nelson, New Man. Rocky Mt. Bot. 266 (1909).

Shrubs 1-3 m. tall, the whole plant perfectly glabrous; bark reddish brown, becoming gray; twigs and winter buds glabrous; leaves oval, perfectly glabrous throughout from the beginning, thickish, somewhat coriaceous at maturity, pale and somewhat glaucescent, at least on the lower surface, deeper green above; conduplicate in vernation, unfolding before or with the flowers and nearly full grown at anthesis; mature blades suborbicular to oval, 1-5 cm. long, 1-2 cm. wide, the apex obtuse or truncate, often somewhat mucronate, the base rounded, subcordate, or truncate, rarely somewhat cuneate; lateral veins 7-9 pairs, curving upward and often extending into the teeth, or anastomosing near the margin; margins coarsely serrate to the middle, the lower third of the blade entire, the teeth 1-2 mm. long, 3-5 per cm., 6-10 on each side of average blades of the flowering and fruiting branches; some small-leaved specimens with the blades nearly entire, or with only a few small teeth near the apex; stipules linear, glabrous, fugacious; petioles rather slender, mostly shorter than the blade, glabrous; flowers in erect or ascending

4-8-flowered racemes 2-4 cm. long, the lower pedicels about 6-12 mm. long; hypanthium and pedicels completely glabrous, more or less glaucous; petals 5, white, glabrous, oval, 8-12 mm. long, 3-4 mm. wide, obtuse at the apex or sometimes acute, widest at or above the middle; stamens 12-15, the filaments glabrous, 1-2 mm. long; anthers 0.8 mm. long; hypanthium campanulate, 3-4 mm. in diameter, completely glabrous, somewhat constricted on the young fruit; sepals triangular-lanceolate to linear-lanceolate, acuminate, completely glabrous on both sides, 3 mm. long (rarely longer), soon recurved; styles 5 (or 4), united at the base, glabrous, 1-2 mm. long; top of the ovary completely glabrous; mature fruits depressed-globose, dark purple, glaucous, juicy, 8-9 mm. in diameter; pedicels 6-12 mm. long; seeds brown, asymmetrical, 4-5 mm. long.

TYPE LOCALITY: "Near the sources of the Platte in the Rocky Mountains." Collected by Thomas Nuttall. Type in the herbarium of the Academy of Natural Sciences of Philadelphia.

RANGE: On mountain sides and plains, altitude 7,000-10,000 feet, southwestern Montana and Idaho, to southern Oregon, Wyoming, Utah, Colorado, and northeastern California, apparently not common, or at least only locally abundant.

MONTANA: Spanish Basin, Madison Range, *Flodman* 545 (MBG); Helena, May 1893, *Starz* (MBG).

IDAHO: Alturas Lake, *Cronquist* 2596 (MBG); Twin Falls, *Nelson & Macbride* 1368 (MBG, GH); Corral, *Macbride & Payson* 2880 (GH, MBG).

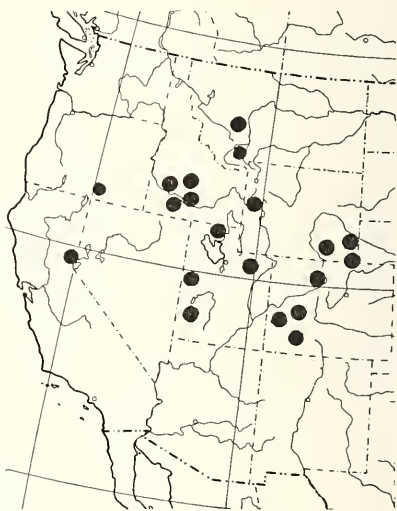
OREGON: Cougar Peak, Lake Co., *Eggleston* 7066 (GH).

WYOMING: Jackson Hole, June 9, 1934, *Nelson & Nelson* (MBG); Medicine Bow Mts., *Rollins* 889 (MBG); Laramie Hills, *Nelson* 1931 (GH, MBG); near Leckie, *Merrill & Wilcox* 548 (GH); *Sherman*, July 29, 1884, *Letterman* (MBG).

COLORADO: "R. Mts." [Rocky Mountains], *Nuttall* (TYPE in herb. Acad. Nat. Sci. Phila.); Gunnison Canyon, *Payson* 1051 (MBG); Cerro Summit, *Baker* 49 (MBG); Piedra, July 10, 1899, *Baker* 379 (AA, GH, MBG; ND, TYPE of *A. polycarpa*); Eldora to Arapahoe Peak, *Daniels* 909 (MBG); without definite locality, *Vasey* in 1868 (GH).

UTAH: Logan Canyon, *Mulford* 192 (MBG, UI); Milford, *Hill* 169 (UI); near Moon Lake, *Harrison & Larsen* 7685 (MBG); Oak City, *Harris* C28699 (MBG).

CALIFORNIA: Deer Park, Lake Tahoe region, *Eastwood* 372 (GH, AA); Donner Lake, *J. Torrey* 126 (GH, Paratype of *A. glabra*), *Heller* 7176 (GH, AA, MBG).



MAP 12.—Range of *Amelanchier pumila*.

*Amelanchier pumila* Nutt., included in their Flora of North America by Torrey & Gray in 1840, was based on specimens collected by Nuttall "Near the sources of the Platte in the Rocky Mountains." It can usually be distinguished from all other species by the fact that the whole plant is completely glabrous, even on the youngest parts. It is evidently closely related to *A. cusickii* and *A. basalticola*, from which it differs principally in its glabrous condition, and in the smaller flowers with shorter petals, styles, and anthers.

## 17. AMELANCHIER PALLIDA Greene

(Plates III and XXI)

*Amelanchier alnifolia* sensu Brewer & Watson, Bot. Calif. 1:190 (1880); Greene, Man. Bot. Bay Reg. 110 (1894); Jepson, Fl. W. Middle Calif. 288 (1901), (ed. 2) 213 (1911); H. M. & C. C. Hall, Yosemite Fl. 125 (1912); Jepson, Man. Fl. Pl. Calif. 509, fig. 508 (1925), Fl. Pl. Calif. 2:234 (1936); McMinn, Illustr. Man. Calif. Shr. 216, fig. 239 (1939). Non Nuttall, 1834.

*Amelanchier pallida* Greene, Fl. Franciscana 53 (1891); Coville in Contr. U.S. Nat. Herb. 4:97 (1893); Howell, Fl. Nw. Am. 165 (1898); Schneider, Illustr. Handb. Laubh. 1:742, figs. 416, 417 (1906); Davidson & Moxley, Fl. S. Calif. 206 (1923); Tidestrom in Contr. U.S. Nat. Herb. 25:284 (1925); Benson in Contr. Dudley Herb. Stanford Univ. 2:103 (1930); Graham in Ann. Carnegie Mus. 26:232 (1937); Peck, Man. Higher Pl. Oregon 410 (1940); Abrams, Illustr. Fl. Pac. States 2:472, fig. 2538 (1944).

*Amelanchier subintegra* Greene in Pittonia 5:109 (1903); Schneider, Illustr. Handb. Laubh. 1:742, figs. 416, 417 (1906).

*Amelanchier gracilis* Heller in Muhlenbergia 2:59 (1905); Schneider, Illustr. Handb. Laubh. 1:735 (1906); Benson in Contr. Dudley Herb. Stanford Univ. 2:103 (1930); Abrams, Illustr. Fl. Pac. States 2:471, fig. 2536 (1944).

*Amelanchier siskiyouensis* Schneider, Illustr. Handb. Laubh. 1:735, figs. 409, 410 (1906), in Fedde, Rep. Sp. Nov. 3:181 (1906); Smiley in Univ. Calif. Publ. Bot. 9:230 (1921).

*Amelanchier recurvata* Abrams in Bull. Torr. Club 37:151, fig. 1 (1910); Davidson & Moxley, Fl. S. Calif. 206 (1923).

*Amelanchier alnifolia* var. *pallida* Jepson, Man. Fl. Pl. Calif. 509 (1925), Fl. Calif. 2:234 (1936); Munz, Man. S. Calif. Bot. 229 (1935).

*Amelanchier alnifolia* var. *cuyamacensis* Munz in Bull. S. Calif. Acad. Sci. 31:65 (1932), Man. S. Calif. Bot. 229 (1935).

*Amelanchier alnifolia* var. *siskiyouensis* Jepson, Fl. Calif. 2:234 (1936).

*Amelanchier alnifolia* var. *subintegra* Jepson, *ibid.*

*Amelanchier florida* sensu Wynd in Am. Midl. Nat. 17:921 (1936); Applegate in *ibid.* 20:277 (1939). Non Lindley 1833.

Shrubs 1-3 (-8) m. tall, with erect or ascending or divaricate branches, these often numerous and rigid, especially in dry habitats, or rarely spreading or more or less drooping; bark of the twigs and branches usually reddish brown, or gray, glabrous; winter buds pubescent; leaves oval or elliptical to suborbicular or broadly obovate, rather thick or coriaceous, indistinctly reticulate, pale dull green on both surfaces, the lower surface usually paler than the upper, or sometimes the upper surface dark green, finely tomentulose or puberulent on both surfaces,

occasionally varying to nearly or quite glabrous; blades at maturity 2-4 cm. long, 1.5-2.5 cm. wide, the apex usually narrow and acutish or rounded and retuse, rarely truncate, often apiculate or cuspidate, the base rounded; lateral veins 7-9 pairs, obscure; margins variable, entire or with a few small teeth toward the apex, or sometimes toothed to below the middle, both conditions often found on the same specimen; stipules linear, villous, 1-1.5 cm. long, fugacious; petioles 6-12 mm. long, usually more or less pubescent; flowers in short and somewhat corymbose racemes 2-4 cm. long and 4-6-flowered, on short lateral leafy spurs of the season; pedicels rather stout, 3-5 mm. long, pubescent at anthesis; petals 5, white, oval or obovate, 8-11 mm. long, 3-4.5 mm. wide, sparsely pilose at the base within; stamens about 15, the filaments glabrous, 2 mm. long; anthers 0.8-1 mm. long; hypanthium shallowly campanulate, 3-4 mm. in diameter, more or less tomentose on the outside at anthesis, or nearly glabrous, more or less constricted on the very young fruit; sepals lanceolate, acuminate 2-3 mm. long, villosulous on both sides, usually recurved from the middle after anthesis; styles 4 or 3 (rarely 5), glabrous, about 2 mm. long, free nearly to the base; summit of the ovary usually tomentose, sometimes only sparsely pilose or nearly glabrous; mature fruit subglobose, purplish black, juicy when mature, 4-6 mm. in diameter, the upper part of the hypanthium constricted on the young fruit; fruiting pedicels 3-9 mm. long.

TYPE LOCALITY: Near Yreka, Siskiyou County, California, collected May 12, 1876, by E. L. Greene, no. 779.

RANGE: On dry gravelly ridges and slopes, on moraines, in rocky woods and thickets, or along streams, from sea level to 8500 feet altitude, southern Oregon to southern California, chiefly in the Sierra Nevada and Coast Ranges; also in northwestern Nevada. Flowering from the middle of April to the end of June, according to the altitude; fruits ripening in July and August. Common name: California serviceberry.

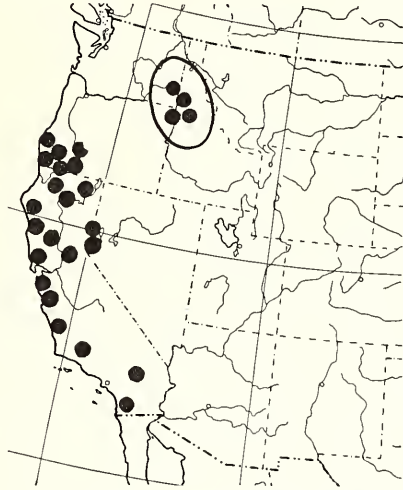
OREGON: Reston, *Peck* 3530 (GH); near Klamath Falls, *Wiggins* 4631 (GH); Crater Lake National Park, *Stanford* 1758 (MBG), *G. N. Jones* 7690 (UI); opposite Ashland, *T. Howell* in 1889 (MBG); near Ashland, *Peck* 9242 (GH, MBG); near Waldo, Aug. 24, 1904, *Rehder & Jack* (AA), *Henderson* 5824 (MBG); Wilderville, Aug. 24, 1904, *Jack* (AA); between Rogue R. and Union Creek, *Heller* 12962 (GH, Ph, UI); O'Brien, *G. N. Jones* 7755 (UI); Agness, *Nelson* 1475 (GH); Harbor, *Peck* 8731 (MBG, GH); Port Orford, *Peck* 8512 (GH, MBG).

CALIFORNIA: Shelley Creek, *Eastwood* 12076 (AA); French Hill, *Eastwood* 72 (AA); near Mt. Eddy, *Heller* 13396 (MBG); Siskiyou Co., *Pringle* in 1882 (GH, AA, MBG); near Shasta Springs, *Heller* 7970 (GH, AA, MBG, TYPE coll. of *A. gracilis*); Mt. Shasta, *Brown* 557 (MBG); Cantara, *Eastwood* 11931 (AA); McCloud, *Eastwood* 1081 (GH, AA); Weed, *Smith* 284 (GH, AA); Yreka, *Heller* 8003 (GH, AA, MBG), *Greene* 779 (GH, MBG, TYPE coll.); near Alturas, *C. L. Hitchcock* 6701 (MBG); Parker Creek, *Ferris & Duthie* 77 (AA); Hoopa Indian Reservation, *Chandler* 1282 (AA, GH, MBG); Little Van Duzen R., *Eastwood & Howell* 4800 (AA); Goose Valley, *Eastwood* 785 (AA, GH); Bennett Spring, Tehama Co., *Heller* 13004 (GH, AA, MBG, UI); Fredonyer Pass, *Heller* 15144

(UI); Plumas Co., *Eggleston* 6235, 7596 (GH); Mt. Sanhedrin, *Heller* 5961 (GH, MBG), *Bacigalupi* 1549 (GH, AA); Lakeport, *Baker* 2964 (GH, AA, MBG, TYPE coll. of *A. subintegra*); near Stirling, *Heller* 13156 (GH, MBG, UI); Chico Meadows, *Heller* 11963 (GH, AA, UI); near Donner Lake, *Heller* 7038 (GH, AA, MBG); Truckee, *Sonne* 88 (MBG); Emigrant Gap, *Heller* 12729 (GH, UI); Fallen Leaf Lake, *Abrams* 4809, 4817 (GH), *Smiley* 214, 215 (GH); Sebastopol, *Pammel & Davy* 77 (MBG), *Heller* 5794 (GH, MBG); Cazadero, *Heller* 6617 (AA, GH, MBG); Napa, *Smyth* in 1899 (GH); Silver Lake, *Hansen* 230 (GH, MBG, TYPE coll. of *A. siskiyouensis*); San Mateo Co., *Abrams* 5577 (AA); Pescadero, *Elmer* 4659 (MBG); Santa Clara Co., *Heller* 7419 (GH, AA, MBG), *Heller* 8531 (GH, UI); Yosemite Nat. Park, *Smiley* 899 (GH), *Abrams* 4577 (GH), 4675 (AA, GH); Mt. Bullion, *Congdon* 31 (GH); Ranch Jolon, *Brewer* 576 (GH, MBG); General Grant Park, *Culbertson* 4647 (GH, MBG); Tehachapi Mts., *Abrams & McGregor* 490 (GH, AA); Topatopa Mts., *Abrams & McGregor* 107 (AA, GH, TYPE coll. of *A. recurvata*); Cuyamaca Lake, *Munz* 8099 (GH, TYPE coll. of *A. alnifolia* var. *cuyamacensis*), *Munz & Johnston* 12638 (AA, MBG), *Spencer* 865 (GH), *Abrams* 3912 (GH, MBG).

NEVADA: Verdi, June 1, 1893, *Sonne* (MBG), *Heller* 10875 (AA, GH, UI, MBG); Kings Canyon, Ormsby Co., *Baker* 952 (GH, AA, MBG), 1219 (GH, AA).

It has been customary to refer nearly all the Californian *Amelanchier*s to *A. alnifolia* Nutt., but that species does not occur in California, or indeed on the Pacific slope. The common and characteristic species of California and southern Oregon is *A. pallida* Greene. It differs from *A. alnifolia* in its usually smaller, narrower leaves, which are mostly finely and inconspicuously permanently pubescent or puberulent, at least beneath, the indument scarcely noticeable to the naked eye. In fact, the original description does not mention this character. Only rarely are the leaves quite glabrous on both surfaces at maturity. The blades are variable in shape, texture, and degree of serration, varying apparently with the habitat and the age of the branch, those on vigorous young shoots often showing a tendency toward being sub-orbicular and coarsely toothed. Specimens from moist habitats have darker green and more serrate leaves, while in drier habitats the leaves are nearly entire, paler green, more pubescent, and subcoriaceous in texture. These fluctuations give the specimens a somewhat different



MAP 13.—Range of *Amelanchier pallida*.  
In oval, *Amelanchier basalticola*.

appearance, but they seem to be well within the normal range of variation of the species. *A. pallida* differs also from *A. alnifolia* in the fewer-flowered often somewhat corymbiform racemes, usually 15 stamens, the styles 4 or 3 (rarely 5) free nearly to the base, and in the usually smaller fruits.

The forms with darker green, less puberulent, and more serrate leaves that have been described as *A. gracilis* Heller, and *A. siskiyouensis* Schneider, present at first glance a rather distinctive appearance, and these characters are often more prevalent on plants from higher altitudes, but there is a complete intergradation to the form with pallid, nearly entire leaves, and thus it is scarcely feasible to attempt to maintain more than one species. However, special field work might yield data for possibly varietal separation.

Regarding the Californian serviceberries as varieties of *A. alnifolia* Nutt., Dr. W. L. Jepson (Fl. Calif. 2:234, 1936) noted:

[They are] continuously though not highly variable as to pubescence and leaf shape. Pubescence of the leaves or lack of it, and pubescence of the sepals are not definitely associated with any other character. The leaf-blades are broad, elliptic, or suborbicular and serrate at apex or a little below the apex on the sides. Plants otherwise alike may have puberulent or glabrous leaves. . . . In the Coast Ranges and southward to Southern California, the leaf-blades tend to have a few small teeth at apex or are even sometimes entire, though rarely, the teeth may be large or the serrations extend half way to the base. . . . In the Sierra and North Coast Ranges occurs a form (var. *siskiyouensis* Jepson) with oblong or elliptic leaf-blades serrate usually to the middle or nearly to the obtuse base; they are thin at flowering time, weakly puberulent or rarely thinly arachnoid below. . . . On the desert slopes of the Sierra Nevada and the high mountains of Southern California or in ranges bordering the deserts a shrub is found (var. *pallida* Jepson) with elliptic leaves pale or glaucous or whitish pubescent beneath: . . . All these phases, as above indicated, are freely supplemented by intergrades representing many indefinite fractional variations.

*Amelanchier alnifolia* var. *cuyamacensis* Munz, from Cuyamaca Lake, San Diego Co., and *A. recurvata* Abrams, belong obviously to the same species, and match exactly the typical, or oligodontous, form of *A. pallida* Greene.

## 18. AMELANCHIER UTAHENSIS Koehne

(Plate III)

*Amelanchier utahensis* Koehne, Gattung. Pomac. in Wissen. Beil. Progr. Falk.-Real. Berlin 95:25, pl. 2 (1890); Schneider, Illustr. Handb. Laubh. 1:741, figs. 415, 416 (1906); Rydberg, Fl. Rocky Mts. 447 (1917); Tidestrom in Contr. U.S. Nat. Herb. 25:283 (1925); Graham in Ann. Carnegie Mus. 26:233 (1937); Peck, Man. Higher Pl. Oregon 410 (1940); Tidestrom & Kittell, Fl. Ariz. & New Mex. 251 (1941); Kearney & Peebles in U.S. Dept. Agric. Misc. Publ. 423:393 (1942); Abrams, Illustr. Fl. Pac. States, 2:471, fig. 2537 (1944).

*Amelanchier alnifolia* sensu Coville in Contr. U.S. Nat. Herb. 4:97 (1893), ex p.; Parish in Pl. World 20:217 (1917); I. M. Johnston in *ibid.* 22:105 (1919). Non Nuttall, 1834.

- Amelanchier pallida* var. *arguta* Greene in *Erythea* 1:221 (1893).
- Amelanchier alnifolia* var. *utahensis* M. E. Jones in *Proc. Calif. Acad. Sci.* 5:679 (1895).
- Amelanchier prunifolia* Greene in *Pittonia* 4:21 (1899); Schneider, *Illustr. Handb. Laubh.* 1:740, figs. 413, 414 (1906); Rydberg, *Fl. Col.* 191 (1906); Coulter & Nelson, *New Man. Rocky Mt. Bot.* 266 (1909); Rydberg, *Fl. Rocky Mts.* 447 (1917); E. H. Graham in *Ann. Carnegie Mus.* 26:232 (1937); Rehder, *Man. Cult. Tr. & Shr.* 390 (1927), (ed. 2) 389 (1940).
- Amelanchier venulosa* Greene, in *Pittonia* 4:21 (1899); Schneider, *Illustr. Handb. Laubh.* 1:741, fig. 416 (1906); Davidson & Moxley, *Fl. S. Calif.* 206 (1923).
- Amelanchier bakeri* Greene in *Pittonia* 4:128 (1900); Schneider, *Illustr. Handb. Laubh.* 1:742, fig. 416 (1906); Rydberg, *Fl. Colorado* 191 (1906); Coulter & Nelson, *New Man. Rocky Mt. Bot.* 266 (1909); Wooton & Standley in *Contr. U.S. Nat. Herb.* 19:323 (1915); Rydberg, *Fl. Rocky Mts.* 447 (1917); Garrett, *Spr. Fl. Wasatch Reg.* (ed. 5) 106 (1936); Kearney & Peebles in *U.S. Dept. Agric. Misc. Publ.* 423:393 (1942).
- Amelanchier rubescens* Greene in *Pittonia* 4:128 (1900); Schneider, *Illustr. Handb. Laubh.* 1:740, figs. 413, 414 (1906); Rydberg, *Fl. Colorado* 191 (1906); Bean Tr. & Shr. *Brit. Isles* 1:190 (1914); Wooton & Standley in *Contr. U.S. Nat. Herb.* 19:322 (1915); Tidestrom in *ibid.* 25:284 (1925); Tidestrom & Kittell, *Fl. Ariz. & N. Mex.* 251 (1941).
- Amelanchier crenata* Greene in *Pittonia* 4:127 (1900); Schneider, *Illustr. Handb. Laubh.* 1:742, figs. 415, 416 (1906); Wooton & Standley in *Contr. U.S. Nat. Herb.* 19:323 (1915); Rydberg, *Fl. Rocky Mts.* 447 (1917).
- Amelanchier rubescens* var. *cinerea* Goodding in *Bot. Gaz.* 37:55 (1904).
- Amelanchier elliptica* A. Nelson in *Bot. Gaz.* 40:66 (1905); Rydberg, *Fl. Colorado* 191 (1906); Schneider, *Illustr. Handb. Laubh.* 1:739 (1906); Coulter & Nelson, *New Man. Rocky Mt. Bot.* 266 (1909).
- Amelanchier oreophila* A. Nelson in *Bot. Gaz.* 40:65 (1905); Schneider, *Illustr. Handb. Laubh.* 1:740, fig. 414 (1906); Rydberg, *Fl. Colorado* 191 (1906); Coulter & Nelson, *New Man. Rocky Mt. Bot.* 266 (1909); Wooton & Standley in *Contr. U.S. Nat. Herb.* 19:323 (1915); Rydberg, *Fl. Rocky Mts.* 447 (1917); Tidestrom in *Contr. U.S. Nat. Herb.* 25:283 (1925); Kirkwood, *N. Rocky Mt. Tr. & Shr.* 189 (1930); Garrett, *Spr. Fl. Wasatch Reg.* (ed. 5) 106 (1936); Tidestrom & Kittell, *Fl. Ariz. & New Mex.* 251 (1941); Kearney & Peebles in *U.S. Dept. Agric. Misc. Publ.* 423:394 (1942).
- Amelanchier mormonica* Schneider, *Illustr. Handb. Laubh.* 1:740, fig. 414, n-o (1906), in *Fedde, Rep. Sp. Nov.* 3:182 (1906); Wooton & Standley, *Contr. U.S. Nat. Herb.* 19:323 (1915); Rydberg, *Fl. Rocky Mts.* 447 (1917); Garrett, *Spr. Fl. Wasatch Reg.* (ed. 5) 106 (1936); Kearney & Peebles in *U.S. Dept. Agric. Misc. Publ.* 423:394 (1942).
- Amelanchier alnifolia* var. *elliptica* Schneider, *Illustr. Handb. Laubh.* 1:739 (1906).
- Amelanchier jonesiana* Schneider in *Fedde, Rep. Sp. Nov.* 3:182 (1906); Rydberg, *Fl. Rocky Mts.* 447 (1917).
- Amelanchier goldmanii* Wooton & Standley in *Contr. U.S. Nat. Herb.* 16:131 (1912).
- Amelanchier australis* Standley in *Proc. Biol. Soc. Wash.* 26:116 (1913).
- Amelanchier covillei* Standley in *Proc. Biol. Soc. Wash.* 27:198 (1914); Wooton & Standley in *Contr. U.S. Nat. Herb.* 19:323 (1915); Tidestrom in *ibid.* 25:283 (1925); Abrams, *Illustr. Fl. Pac. States*, 2:471, fig. 2534 (1944).
- Amelanchier purpusi* Koehne in *Engler, Bot. Jahrb.* 52:278 (1915); Rehder, *Man. Cult. Tr. & Shr.* 391 (1927), (ed. 2) 389 (1940).
- Amelanchier plurinervis* Koehne in *Bot. Jahrb.* 52:278 (1915); Rehder, *Man. Cult. Tr. & Shr.* 391 (1927), (ed. 2) 389 (1940).
- Amelanchier nitens* Tidestrom in *Proc. Biol. Soc. Wash.* 36:182 (1923), in *Contr. U.S. Nat. Herb.* 25:283 (1925).

- Amelanchier alnifolia* var. *covillei* Jepson, Man. Fl. Pl. Calif. 510 (1925), Fl. Calif. 2:234 (1936); Munz, Man. So. Calif. Bot. 229 (1935).  
*Amelanchier alnifolia* var. *venulosa* Jepson, Man. Fl. Pl. Calif. 510 (1925), Fl. Calif. 2:234 (1936); Munz, Man. So. Calif. Bot. 229 (1935).  
*Amelanchier alnifolia* var. *nitens* Munz in Bull. So. Calif. Acad. Sci. 31:65 (1932).  
*Amelanchier utahensis* subsp. *covillei* Clokey in Madrõno 8:57 (1945).  
*Amelanchier utahensis* subsp. *oreophila* Clokey in ibid. 58.

Shrubs or small trees 0.5-5 m. tall, much-branched, bushy, often growing in clumps; twigs rigid, the bark ashy gray, those of the season persistently copiously white-sericeous or lanate, rarely nearly or quite glabrous, the 2- or 3-year-old twigs also often pubescent; winter buds usually copiously pubescent, or on occasional specimens glabrous; leaves usually small, commonly suborbicular to oval, ovate, or obovate, grayish green, or pale and glaucescent, finely tomentulose or cinereous on both surfaces even at maturity, with soft, curled trichomes, varying to completely glabrous, subcoriaceous at maturity, conduplicate in the bud, unfolding before or with the flowers and more than half-grown at flowering time; mature blades 0.5-3 cm. long, 0.5-2 cm. wide, the apex rounded or truncate, or even emarginate, or often acute and mucronate, the base rounded or truncate, or sometimes cuneate; lateral veins 11-13 pairs; margins coarsely and often sharply dentate to the middle or below varying to subentire, or crenately few-toothed toward the apex; the teeth mostly 3-5 per cm., 3-10 on each side of average leaves of the flowering and fruiting branches; stipules linear, pubescent; petioles slender, 5-18 mm. long, flowers small, sometimes reddish in the bud, in erect or ascending, 3-6-flowered racemes 2-3 cm. long, sometimes subcorymbose as the result of the elongation of the lower pedicels; rachis and pedicels lanate (rarely glabrous), the pubescence usually persistent on the fruiting specimens; petals 5, white, linear-oblongate or cuneate, 6-7 (-9) mm. long, 1.5-2.5 mm. wide; stamens 10-15 (-18), shorter than or equalling the styles, the filaments glabrous, 1-2 mm. long; anthers 0.7-0.9 mm. long; hypanthium shallowly campanulate or funnelform, 3-4 mm. in diameter, tomentulose, varying to completely glabrous, not at all constricted on the young fruit; sepals linear or linear-lanceolate, acuminate, thickish, tomentulose on both sides (or occasionally glabrous), 3 mm. long, soon recurved from the middle and often becoming somewhat elongated after anthesis, or remaining erect or spreading on the fruit; styles 4 or 3, or only 2 (rarely 5), glabrous, united near the base, 2.5-3 mm. long; summit of the ovary more or less tomentulose (rarely quite glabrous), tapering into the style-base; mature fruits few, 6-10 mm. in diameter, 3-6-loculed, usually puberulent when young, purplish black and juicy at maturity, or often remaining dry, insipid, pale brown and leathery, and drying on the bush without ripening; pedicels 2-3 cm. long, usually pubescent; seeds 4-6 in each



pome, brown, microscopically punctulate, flattened-ellipsoid, obtuse at each end, about 5-6 mm. long and 3 mm. wide when mature and fully developed.

TYPE LOCALITY: "Utah, Belleview [Pintura, Washington Co.], alt. 3000 ped., leg. Marcus E. Jones n. 1716 . . . Vidi in herbario regio Berolinensi." Isotype in the herbarium of the New York Botanical Garden.

RANGE: Dry rocky slopes and canyons, banks of creeks, mountain sides, foothills, and deserts, from the Sonoran to the Transition zones, 4000 to 8000 feet altitude, New Mexico to southern Montana, westward to eastern Oregon and Lower California. Flowering from the beginning of April to the end of May; fruit ripening from July to September, according to the altitude.

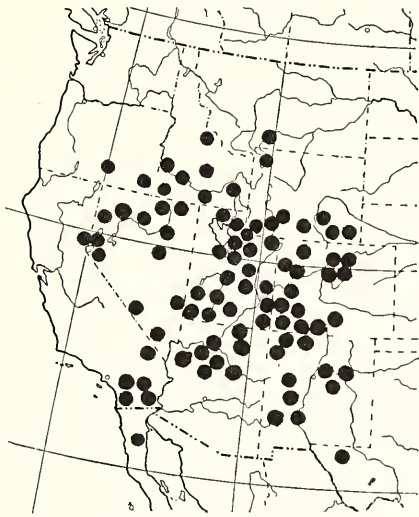
OREGON: Vale, Malheur Co., *Leiberg* 2193 (GH); Lake Abert, *Eggleston* 7116 (GH).

IDAHO: Salmon, *Payson & Payson* 1812 (GH); Big Willow, *Macbride* 127 (GH, MBG); King Hill, *Nelson & Macbride* 1110 (GH, MBG); Corral, *Macbride & Payson* 2880a, 2880b (GH, MBG); Soldier Mts., *Macbride & Payson* 2904 (GH, MBG); House Creek, *Nelson & Macbride* 1798 (GH, UI, MBG); Twin Falls, *Nelson & Macbride* 1327, 1347 (GH, MBG); McCammon, *Muenschler & Maguire* 2362 (MBG); Lava, *Nelson & Macbride* 1593 (GH); Montpelier, *Macbride* 13, 24, 209 (GH, UI, MBG).

MONTANA: Wilsall, *Suksdorf* 269 (AA).

WYOMING: Chimney Rock, *Greenman & Greenman* 6031, 6048 (MBG); Telephone Canyon, *Porter* 1059 (MBG); Elk Mt., *Goodding* 555 (AA, GH, MBG); Rawlings, *Payson & Payson* 2540 (GH, MBG); Point of Rocks, *Merrill & Wilcox* 458 (GH); Granger, *Hanna* 955 (MBG); Rock Springs, *Hanna* 715 (MBG); Centennial, *Nelson* 9317 (GH), *Jack* 1075, 1089 (AA); Cumberland, *Nelson* 9010 (MBG); near Lyman, *Rollins* 198 (MBG); Mountainview, *Nelson* 11344 (GH); Bear River, *Pammel & Blackwood* 4063 (AA, GH, MBG); Rock River, *Nelson* 9333 (GH, MBG); Bates Hole, *Payson* 4779 (MBG), *Solheim* 434 (UI).

COLORADO: Willow Creek, *Goodding* 1683 (GH, MBG); Camp Creek, *Goodding* 1456 (GH, MBG, ISOTYPE of *A. oreophila*); Rangeley, *Graham* 9074 (GH); Buford, *Hermann* 5688 (GH, MBG); Breckenridge, *Mackenzie* 240 (MBG); Bear Creek, June 13, 1918, *Churchill* (GH, MBG); Golden-Central City, *Duthie & Clokey* 3795 (GH, MBG, UI); White Rocks, May 12, 1918, *Andrews* (AA); near Boulder, *Hanson* C226 (MBG); Mesa Grande, May 1892, *Purpus* (AA); Paonia, *Eggleston* 14572, 14959 (AA), 14574 (GH); Cedaredge, *Payson* 1066 (MBG); Cerro Summit, *Baker* 47, 55, 163 (GH, MBG); near Cimarron, *Baker* 139, 210,



MAP 14.—Range of *Amelanchier utahensis*.

(GH, MBG); Cedar Creek, *Baker* 438, 439 (GH, MBG); Gunnison Mesa, *Eastwood* 5095 (AA); Naturita, *Payson & Payson* 3883 (GH, MBG), *Payson* 248 (GH, MBG), *Payson* 982 (MBG); Nucla, *Payson & Payson* 4225 (GH, MBG); Sheep Creek Canyon, *Payson & Payson* 3884 (GH, MBG); Bedrock, *Payson & Payson* 4228 (GH, MBG); Paradox, *Walker* 210 (GH, MBG); near Ridgway, *Payson* 1077 (MBG), 2307 (GH, MBG); Norwood Hill, *Walker* 416 (GH, MBG); Pagosa Springs, *McKelvey* 4721 (AA); La Veta Pass, *Hooker & Gray* in 1877 (GH); Los Pinos (Bayfield), *Baker* 376 (GH, MBG; ND, TYPE of *A. bakeri*); Durango, *Eastwood* 5273 (AA); Bob Creek, *Baker, Earle, & Tracy* 197 (GH, MBG); Mesa Verde Nat. Park, *Munz* 13046 (AA); Mancos, *Baker, Earle, & Tracy* 665 (Minn.; ND, TYPE of *A. prunifolia*).

UTAH: Peterson, *Pammel & Blackwood* 3876 (GH, MBG), 3887 (AA, GH); Goodman Ranch, Bear River Valley, *Hermann* 5813 (MBG); Big Cottonwood Canyon, *Rydberg & Carlton* 6662 (GH); Springville, May 17, 1913, *Hill* (MBG); Red Butte, May 6, 1909, *Clemens* (GH, AA); Salt Lake City, *Palmer* 38037 (AA, MBG); Farmington Canyon, *Pammel & Blackwood* 3623 (GH, AA); Soldier Summit, *Eastwood* 7262, 7263 (AA); Duchesne Co., *Graham* 9407 (GH), 8061, 9284, 9363 (MBG); Green River, *Graham* 9202 (GH), 9196 (MBG); Diamond Mt., *Graham* 8074 (MBG); Ashley Creek, *Graham* 6289 (MBG); near Watson, *Graham* 9006 (MBG); Dry Fork, *Graham* 8810 (MBG); near Vernal, *Graham* 8749 (MBG); Dinosaur Quarry, *Graham* 7639 (MBG); near Helper, *McKelvey* 4267 (AA); Cottonwood Canyon, *Graham* 9519 (MBG); Filmore Forest, *Eggleston* 14164 (GH); Sevier Desert, *Harris* C20491 (GH); Cottonwood Creek, *Cutler* 2372 (MBG); Stansbury Mts., *Harris* C20112 (MBG); Stansbury Island, *Garrett* 5356 (AA); Green Lakes, *Hermann* 4836 (GH, MBG); Uinta Mts., *Williams* 577 (GH, MBG); Milford, *Goodding* 1036 (AA, GH, MBG, ISOTYPES of *A. elliptica*); La Sal Mts., *Purpus* 6523 (MBG), *Maguire & Redd* 1907 (GH); Cooper Canyon, *Cutler* 2297 (MBG); Natural Bridges Nat. Mon., *Maguire & Redd* 1905 (GH); Elk Ridge, *Maguire & Redd* 1911 (MBG); Colorado, *Cutler* 2651 (MBG); Abajo Mts., *Rydberg & Garrett* 9274 (GH); Post Canyon, *Graham* 9896 (GH); Modena, *Goodding* 1008 (AA, GH, MBG); Cedar City, *Tidestrom* 9429 (GH); 50 miles s.w. of San Raphael, *Harrison* 7439 (MBG); Zion Nat. Park, *Allen* in 1934, *Fisk* in 1930 (MBG); Virgin, *Maguire* 4840 (GH, MBG); Rockville, *M. E. Jones* 5224 (MBG); near St. George, *Tidestrom* 9359 (GH), *Goodding* 780 (MBG, TYPE coll. of *A. rubescens* var. *cinerea*); near Glendale, *M. E. Jones* 25393 (MBG), *Nelson & Nelson* 2890 (GH); Bellevue, April 21, 1880, *M. E. Jones* 1716 (NY, TYPE coll. of *A. utahensis*).

NEVADA: Hunter Creek, *Kennedy* 1866 (GH, AA); Peavine Mt., *Heller* 9718 (GH); near Alum Creek, *Heller* 9739 (AA); Fish Lake, *Heller* 9995 (AA, GH, MBG), 10004 (AA, GH); W. Humboldt Mts., *Heller* 10630 (GH, MBG); Battle Mts., June 1868, *Watson* 353 (GH); near Cave Creek, *Mason* 4725 (GH), *Heller* 9510 (MBG); Jarbidge, *Nelson & Macbride* 1939 (GH), 1935 (GH, MBG, UI), 2120, 2121 (GH, MBG), *Eggleston* 14105 (GH); near Deeth, *Heller* 10576 (GH, MBG, AA), 10567 (GH), 9108 (AA, MBG), *Eastwood & Howell* 310 (AA), *Maguire* 5772 (GH); Lamoille Creek, *Heller* 9310 (MBG); Oasis, *Palmer* 38025 (AA, MBG); E. Humboldt Mts., Aug. 1868, *Watson* 353 (GH); near Ely, *Tidestrom* 11050 (AA); Carson City, June 2, 1897, *M. E. Jones* (MBG); Kings Canyon, *Baker* 946 (AA, GH, MBG); Glenbrook, *Baker* 1002 (AA, GH, MBG); White Mts., *Duran* 752 (GH, MBG); near Panaca, *Tidestrom* 9460 (AA); Kyle Canyon, Charleston Mts., *Tidestrom* 9600 (GH), *Clokey* 7141, 7142 (GH), 7541, 7542 (GH, MBG, UI); Wilson's Ranch, Charleston Mts., Clark Co., *Clokey* 7970 (GH), 8236, 8237 (GH, UI), TOPOTYPES of *A. nitens*; Wells, July, 1893, *E. L. Greene* (ND, TYPE of *A. pallida* var. *arguta*).

CALIFORNIA: Portola, *Eastwood* 7017 (AA); Providence Mts., *Munz, et al.* 4147 (GH); Panamint Mts., *Munz* 14820 (MBG); Argus Peak, *Purpus* 5376 (GH, MBG); Old Dad Mts., *M. E. Jones* 25392 (MBG); Wrightwood, *Newsom* in 1932 (GH, MBG); Cushenberry Springs, Bear Valley, San Bernardino Mts., *Parish*

453, 3383 (MBG), 1290 (GH, TYPE coll. of *A. venulosa*), 10882 (GH, MBG); Bear Valley, *Abrams* 2884 (GH, MBG); Deep Creek, *Abrams* 2041 (AA); Sugarloaf Peak, *Fosberg* 8605 (GH); San Antonia Peak, *M. E. Jones* 29011 (MBG), *Parish* 11969 (GH, MBG); Laguna Mts., *Eastwood* 9212 (AA).

ARIZONA: Peach Springs, *Wilson* in 1893 (GH); Grand Canyon, *Rehder* 115, 116 (AA), *Eastwood* 5886, 5948 (AA), *Nelson & Nelson* 2024 (MBG); *McKelvey* 4395 (AA), *Eastwood* 6047, 6086 (AA, GH); between House Rock and Jacob Lake, *Nelson & Nelson* 2877 (GH, MBG); 7 miles northwest of Jacobs Lake, *Peebles & Parker* 14670 (GH); 18 miles north of Inscription House Trading Post, *Peebles* 13920 (GH); Mormon Lake, *Smith* 12005, *MacDougal* 102 (GH, TYPE coll. of *A. mormonica*); Kendrick Peak, June 22, 1911, *Lowell* (AA); near Flagstaff, *McKelvey* 1314 (AA), *Lowell* in 1915 (MBG), *Hanson* 626 (MBG); *Williams, Nelson* 10245 (MBG); between *Williams* and Ash Fork, *McKelvey* 915 (AA); Mt. Agassiz, May 1916, *Pearson* (AA); between Tunitcha and Luka-Chukai Mts., *Goodman & Payson* 2797, 2846 (MBG); Navajo Indian Reservation, *Voorhies* 82 (GH, AA, MBG); Matazal Mts., *McKelvey* 1034, 1138 (AA), *Collom* 488 (MBG); Verde R., between *Payson* and Pine, *McKelvey* (AA); Devils Canyon, between Miami and Superior, *Nelson & Nelson* 1888 (MBG); Camp Grant, *E. Palmer* 94 (MBG).

NEW MEXICO: Above Toadlena, *McKelvey* 4626, 4630 (AA); Aztec, *Baker* 377 (GH, AA, MBG, TYPE coll. of *A. crenata*), *Baker* 380, 381 (GH, MBG; ND, TYPE of *A. rubescens*); Chama, *Wolf* 2988 (GH); Lake Burford, *Wetmore* 470 (AA); Tierra Amarilla, *Eggleston* 6575 (GH, MBG); near Gallup, *McKelvey* 2316, *Eastwood* 5609 (AA); Pecos River, 8 miles east of Glorieta, *Heller* 3679 (AA, GH, MBG); Winsor Creek, *Standley* 4125 (GH, MBG); Mogollon Mts., Aug. 8, 1900, *Wooton* (MBG); Kingston, *Metcalfe* 961 (GH, MBG); near Silver City, *Greene* in 1880 (MBG), *Metcalfe* 620 (GH, MBG).

TEXAS: Ridge above McKittrick Canyon, Guadalupe Mts., *Moore & Steyermark* 3482 (GH, MBG).

MEXICO: San Pedro Martín, Baja California, May 26, 1893, *Wiggins & Demaree* 4948 (FM, UC), *T. S. Brandegee* (UC).

This common Amelanchier, occurring throughout the mountainous and desert regions of western United States, is an extremely variable species, for which the oldest name is *A. utahensis* Koehne, applied in 1890 to specimens collected near the geographical center of its range, in southwestern Utah. Its variability is indicated by the fact that during the half-century that has elapsed since this species was first recognized, it has been described and redescribed under approximately two dozen different names. In its typical form, it is a twiggy shrub with rather small, permanently pubescent, conspicuously toothed leaves that are subcoriaceous at maturity. The branchlets may be pubescent for two or three years. Shade forms have larger, thinner leaves, and tend to approach *A. alnifolia* in general appearance, but such specimens can usually be distinguished by the fewer styles and stamens, and the narrower, often somewhat elongated sepals. One of the vernacular names used for this species is "red service-berry," because in some localities the flower buds are pink. It is sometimes abundant locally, and is said to be palatable as a browse plant in the spring.

An Amelanchier inhabiting the arid slopes and plains of parts of southern California, including shrubs with rather prominently veiny

leaves, was described by E. L. Greene in 1899 as *A. venulosa*. However, it lacks morphological characters to distinguish it from *A. utahensis*. Greene recognized the fact that it is different from *A. pallida* in its more venulose leaves, but was apparently unaware that it had been published as *A. utahensis* nine years earlier. The specimens described as *A. rubescens* Greene, collected "In arroyos and among hills about Aztec, New Mexico, 24 April 1899, C. F. Baker" (nos. 380, 381), are also clearly conspecific with *A. utahensis*. Likewise, *A. crenata* Greene, also from Aztec, New Mexico, and said by its author to be "altogether peculiar in the crenate character of its leaf indentation" is merely a phase of the widespread and variable *A. utahensis*. The plants described as *A. rubescens* var. *cinerea* by L. N. Goodding in 1904 from near the type locality of *A. utahensis*, represent merely a pubescent extreme of that species. *A. plurinervis* Koehne was described from plants cultivated in Berlin, but collected by C. A. Purpus in western United States. Specimens distributed from Arb. Spaeth., now in the herbarium of the Arnold Arboretum, belong quite evidently to *A. utahensis*.

In 1905, Professor Aven Nelson, concluding that "either *A. alnifolia* was unusually variable or that some segregation ought to be made," described the common western xerophytic shrub with puberulent leaves, fewer styles and stamens, and smaller fruits, as *A. oreophila*, apparently without knowing that this species had been described as *A. utahensis*, from southwestern Utah fifteen years earlier by E. Koehne. Nelson's comments in Bot. Gaz. 40:66 (1895) are as follows:

After many years' observation in the field and the study of a large series of specimens, I am satisfied that two valid species exist and can be readily distinguished. Nuttall's *A. alnifolia* is the widely distributed glabrous shrub of the creek banks, moist canyons, and snow slopes. . . . The leaves are larger, coarsely serrate, often suborbicular or with a tendency to truncateness at base and apex. . . . The fruits become much larger, are purple, with bloom, juicy and well flavored, and are used extensively for sauces and pies, maturing during July or August, according to the altitude. *A. oreophila* [*A. utahensis*] is a smaller shrub, scraggy-branched, usually in dense clumps, and occurring in the driest situations (open stony slopes, ridges, and hilltops). It is never wholly glabrous, and the fruit is of little if any value. . . . Much of the material distributed from the Rocky Mountains belongs to this species.

In 1923, Dr. Ivar Tidestrom described, as *A. nitens*, a glabrous shrub with glossy foliage and yellow fruits occurring in the Charleston Mountains of southwestern Nevada. In its extreme glabrous form, this is a plant of distinctive appearance, but it intergrades completely with the typically pubescent forms of the widespread *A. utahensis*, and it is therefore not practicable to attempt to accord it nomenclatural recognition. Even on topotypes collected in 1938 and 1939 by Mr. I. W. Clokey (e.g., Clokey 8236, 8237, UI) some specimens are almost perfectly glabrous,

while others are distinctly pubescent on the blades, petioles, pedicels and sepals. This glabrous or semi-glabrous form has no particular geographical distribution, but occurs sporadically in various intergrades, in several parts of the range of *A. utahensis*. Dr. Rogers McVaugh<sup>1</sup> reports his field observations of these plants as follows:

In desert and semi-desert areas from Clark Co., Nevada, throughout the Grand Canyon region, there is an abundance of a glabrous or nearly glabrous form with small lustrous leaves, which seems to be otherwise identical with Form C [i.e., *A. utahensis*]. This is the plant described as *A. nitens* Tidestrom, which was said by its author to have yellow fruit ("pomis maturis aureis"). In July 1941 I was able to visit Wilson's Ranch, the type locality of this species, and to collect mature fruits. As in many similar localities in the southern Great Basin, most of the fruits had dried at maturity, leaving the seeds to rattle within. On a few bushes, however, I was able to find an occasional berry [pome] which was still soft and slightly fleshy; all these were pale, nearly white, with a purplish-red cheek; they were in fact identical with the fruits of *A. utahensis* from other parts of its range.

There seems to be no evidence that yellow or orange fruits, usually ascribed to certain western American species, ever actually occur, except perhaps as a result of the attacks of fungous diseases. In drier habitats, it commonly happens that the fruits are small, dry and leathery. Frequently they never ripen, or when they do ripen they remain on the bush and retain a pale brown leathery appearance. Several rust fungi, particularly *Gymnosporangium*, parasitize various species of Amelanchier. It may be that fruits heavily infected with this fungus, which gives them a yellowish appearance, have been the cause of the widespread misconception regarding the color of the fruit of some western species. The fruits of all species of Amelanchier are normally bluish black at maturity.

<sup>1</sup>McVaugh, Rogers, Contributions Toward a Flora of Nevada, No. 22, pp. 95-96, June 15, 1942. Issued (mimeographed) by The Division of Plant Exploration and Introduction, Bureau of Plant Industry, U.S. Department of Agriculture, Washington, D.C.

#### IV. LIST OF NUMBERED EXSICCATAE

- Abbe, E. C.—1136, 1151 (1).  
 Abrams, LeRoy—2041, 2884 (18); 3912, 4577, 4675, 4809, 4817, 5577 (17); 8718 (13).  
 Abrams, LeRoy, & McGregor, E. A.—107, 490 (17).  
 Adams, J.—339 (7).  
 Adams, J., & Wherry, E. T.—4662 (6).  
 Aiton, G. B.—1004 (9).  
 Allard, H. A.—220, 2516, 2584, 2819, 4342, 4498 (6); 4353 (5); 1229 (7).  
 Allen, O. D.—214 (13).  
 Anderson, E., & Anderson, D. M.—26042 (11).  
 Applegate, E. I.—6219 (12).  
 Arsène, L.—310 (5); 311 (1).  
 Arthur, J. C., Bailey, L. H., & Holway, E. W. D.—B407 (1).  
 Bacigalupi, R.—1549 (17).  
 Bailey, L. H.—56 (11).  
 Baker, C. F.—47, 55, 139, 163, 210, 376, 377, 380, 381, 438, 439, 946, 1002 (18); 49, 379 (16); 750 (12); 952, 1219, 2964 (17).  
 Baker, C. F., Earle, F. S., & Tracy, S. M.—197, 665 (18).  
 Balsler, G.—775 (9).  
 Barber, M. A.—90, 194 (12).  
 Barkley, F. A., & Osburnson, L.—2313 (14).  
 Bartlett, H. H.—846 (9).  
 Bartram, E. B.—3220 (8).  
 Batchelder, C. F.—3 (5).  
 Bates, J. M.—5992 (6); 1357, 5928, 6074 (12).  
 Bean, R. C., & Fernald, M. L.—17013, 17014 (9).  
 Bean, R. C., & Knowlton, C. H.—12070e (10).  
 Bean, R. C., White, D., & Linder, D. H.—21459 (1).  
 Beattie, R. K.—1819 (12).  
 Benner, W. M.—4883 (6); 6708 (4); 2393, 9567 (5); 2703 (8); 2926, 7533 (9).  
 Benson, L.—1283 (14); 1420, 1423 (13a).  
 Bergman, H. F.—1376 (9).  
 Bicknell, E. P.—4835 (5); 4815, 4816, 4840, 4847, 4849, 4850, 4851, 4857, 4858, 4862a, 4868, 4879 (7).  
 Biltmore Herbarium—5664, 5664c, 5664d, 5664e (10); 6706 (9).  
 Bishop, H.—370, 371, 373 (1).  
 Bissell, C. H., & Graves, C. B.—21457 (7).  
 Bissell, C. H., Pease, A. S., Long, B., & Linder, D. H.—21440 (7).  
 Blake, S. F.—2496, 5677 (9); 9324, 9362 (7); 10557 (6).  
 Blake, S. F., & Fernald, M. L.—3645 (9).  
 Blanchard, W. H.—3, 4 (9); 4 (10); 5 (1).  
 Blankinship, J. W.—135 (12).  
 Blewitt, A. E.—1508, 1801 (7); 1511, 1792, 1794, 1795, 1796, 2035, 2037 (9); 1512, 1797, 1798 (5); 1802, 1804, 1805, 2036, 2038, 2039, 3501, 3650 (6).  
 Bolander, H.—4674 (13).  
 Boner, L., & Weldert, V.—172 (14).  
 Bowman, P. W.—26, 237, 402 (1).  
 Breckenridge, W. J., & Nielsen, E. L.—3161 (4).  
 Breckenridge, W. J., Nielsen, E. L., & Moore, J. W.—3229 (4).  
 Breitung, A. J.—523 (12).  
 Brewer, W. H.—576 (17).  
 Brown, H. E.—78 (12); 557 (17).  
 Brown, S.—23, 56 (12); 216 (9); 283 (13).  
 Burnham, S. H.—11 (7); 12 (5); 21 (3); 1162 (6).  
 Bush, B. F.—30, 85, 85a, 85b, 85c, 1602, 1602a, 3509, 10380, 15250 (6).  
 Butters, F. K.—1342 (4).  
 Butters, F. K., & Rosendahl, C. O.—1358 (12).  
 Byhouwer, J. T. P., & Kobuski, C. E.—50 (7).  
 Carr, W. P.—75 (12).  
 Chamberlain, E. B.—34, 52, 533 (5); 62, 228 (9).  
 Chandler, H. P.—1282 (17).  
 Chase, Agnes—197, 1047 (5); 702, 709, 990, 1048, 1745 (9); 2035, 2053 (6).  
 Chase, V. H.—1795 (6).  
 Cheney, L. S.—4447 (4).  
 Child, H. W., Knowlton, C. H., Bird, F. W., & Bean, R. C.—16377 (5).  
 Clark, J. A.—166 (12).  
 Clokey, I. W.—7141, 7142, 7541, 7542, 7970, 8236, 8237 (18).  
 Collom, R. E.—488 (18).  
 Congdon, J. W.—31 (17).  
 Constance, L.—999 (14).  
 Constance, L., Clements, H. F., & Machlis, L.—1008 (14).

- Constance, L., Machlis, L., Rogers, B., & Rollins, R. C.—1037 (14).  
 Constance, L., & McMurray, R. L.—1135 (12).  
 Constance, L., & Rollins, R. C.—1510 (12); 1499, 1512 (14).  
 Constance, L., Rollins, R. C., & Dillon, L. A.—1568 (15).  
 Cooper, W. S.—46 (1); 122, 124, 125 (11).  
 Cotton, J. S.—365, 569, 571, 576 (12).  
 Cowles, H. C.—38, 38a (12); 1419 (13).  
 Cronquist, A.—920, 2298, 3778 (12); 2596 (16).  
 Cronquist, A., & Davis, R. J.—2099 (12).  
 Culbertson—4647 (17).  
 Cushman, J. A.—871, 4330 (10).  
 Cushman, J. A., & Sanford, S. N. F.—1217 (3).  
 Cusick, W. C.—1858 (14).  
 Cuthbert, A.—1 (7).  
 Cutler, H. C.—2297, 2372, 2651 (18).  
 Daniels, F.—909 (16).  
 Davis, J.—49, 113, 704, 1259, 1462, 2011, 2227, 4646 (6).  
 Day, M. A.—57, 75 (7); 379 (3).  
 Deam, C. C.—12868, 16116, 33798 (5); 22524, 23005 (6); 23107, 33770, 38194, 38195, 38196, 38251, 39083 (9).  
 Demaree, D.—11245, 11260, 18743 (6).  
 Dodge, C. K.—20, 57, 71, 73 (8); 74, 76 (10).  
 Drew, W. B., Hodgdon, A. R., & Taylor, F.—2472 (10).  
 Drouet, F.—1421 (6).  
 Dudley, W. R.—56 (7).  
 Dunbar, J.—10 (9); 12 (10).  
 Duncan, W. H.—3282 (5).  
 Duran, V.—752 (18).  
 Duthie, R., & Clokey, I. W.—3795 (18).  
 Eames, A. J., & Dean, E.—4293 (6).  
 Eames, A. J., & MacDaniels, L. H.—4285 (9).  
 Eames, E. H.—1 (5); 4287, 4288 (9); 8287 (6).  
 Earle, F. S., & Baker, C. F.—1610 (6a).  
 Eastwood, A.—72, 785, 1081, 11931, 12076 (17); 269, 7706 (12); 372 (16); 995, 9702 (13); 5095, 5273, 5609, 5886, 5948, 6047, 6086, 7017, 7262, 7263, 9212 (18).  
 Eastwood, A., & Howell, J. T.—310 (18); 4800 (17).  
 Eggleston, W. W.—185, 1176, 1179, 1180 (9); 1118, 1173, 1174, 1175 (3); 1121, 1122, 1127, 1178, 1971 (10); 1182, Eggleston, W. W. (*continued*)  
 1183, 1957, 1959 (6); 1960, 1962, 1964, 2369 (1); 6235, 7596 (17); 7066 (16); 6575, 7116, 14105, 14164, 14572, 14574, 14959 (18); 14967 (12).  
 Ehlers, J. H.—323 (10); 1183 (9).  
 Elmer, A. D. E.—135 (14); 2512 (13); 4659 (17).  
 Epling, C.—5623 (13).  
 Evers, R. A.—52 (6).  
 Eyerdam, W.—1377 (14).  
 Eyles, D.—6894 (6).  
 Farwell, O. A.—52d (1).  
 Fassett, N. C.—446, 2826, 13745 (5); 2818, 2819, 2820, 2821, 2822, 2823, 13775 (9); 2825, 3051, 7128 (4); 7313 (10).  
 Fassett, N. C., & Schmidt, J. F. W.—15708 (9).  
 Fassett, N. C., Steyermark, J. A., & Tryon, R. M.—18359 (9).  
 Fernald, G. B.—43 (9).  
 Fernald, M. L.—37, 2312, 11719 (3); 105, 1881, 1888, 2644, 9620, 9626, 13760, 13773, 13774, 13775, 15197, 15204, 16867 (9); 257, 2314 (1); 9624 (5); 388, 449, 1880, 2310, 2311, 13778, 13779, 15537 (10); 1885, 13767 (6); 15191, 15198, 15199, 18546 (7).  
 Fernald, M. L., Bartram, E. B., & Long, B.—23930, 23931 (9); 23937 (7); 23943, 23944, 24761 (5).  
 Fernald, M. L., Bartram, E. B., Long, B., & Fassett, N. C.—23929 (9).  
 Fernald, M. L., Bartram, E. B., Long, B., & St. John, H.—7553, 7582, 7591 (9); 7581 (3); 7586, 7587, 7589 (2).  
 Fernald, M. L., & Bean, R. C.—14132 (9); 14160 (7).  
 Fernald, M. L., & Bissell, C. H.—21433 (9).  
 Fernald, M. L., Bissell, C. H., Graves, C. B., Long, B., & Linder, D. H.—21441, 21442 (5).  
 Fernald, M. L., Bissell, C. H., Pease, A. S., Long, B., & Linder, D. H.—21432 (9).  
 Fernald, M. L., & Collins, J. F.—233, 614, 1100 (1).  
 Fernald, M. L., Dodge, C. W., & Smith, L. B.—25840 (11).  
 Fernald, M. L., & Griscom, L.—4425 (6).  
 Fernald, M. L., Griscom, L., & Long, B.—4650 (6).  
 Fernald, M. L., Griscom, L., Mackenzie, K. K., & Smith, L. B.—25839 (11).

- Fernald, M. L., & Hunnewell, F. W.—15192 (5); 15200 (7).
- Fernald, M. L., & Jackson, H. B.—10107 (1).
- Fernald, M. L., & Long, B.—3959, 7063, 7064, 7065, 7067, 7069, 7450, 8291, 9621, 11698, 11844, 11845, 13039, 13040, 13041 (6); 7068, 7070, 7071, 7869, 9625, 9949, 11343, 12096, 13772, 16869, 18542, 18543, 23946 (7); 7072, 7073, 7074, 7448, 7449, 7870, 9947, 11846, 11847, 13042, 13043, 13950 (8); 9623, 13763, 21451 (5); 13762, 13766, 13777, 13781, 14178, 18548, 18549, 18551, 23932, 23933, 23934 (9); 13764, 13768, 13769, 21450 (3); 13780 (10); 13782 (1).
- Fernald, M. L., Long, B., & Dunbar, B. H.—26759 (9).
- Fernald, M. L., Long, B., & Fogg, J. M.—290, 1791 (5); 292, 1789 (1); 1792 (2).
- Fernald, M. L., Long, B., & Linder, D. H.—21439 (9); 21456 (7).
- Fernald, M. L., Long, B., & St. John, H.—7584, 7593, 7594, 7595 (9); 7590, 7592 (2); 7596, 7597 (1).
- Fernald, M. L., Long, B., & Smart, R. F.—5790 (8).
- Fernald, M. L., & Pease, A. S.—3359, 25134 (9); 3360, 25133 (1); 3361, 3364, 3365, 3366, 3367 (10); 3369, 25137 (11); 16825 (3); 25135 (5).
- Fernald, M. L., Pease, A. S., & Long, B.—11700 (7); 21435, 21436, 21437 (9).
- Fernald, M. L., & St. John, H.—7578 (3); 7585, 11080 (9); 10840, 10841, 10842, 11083 (2); 11082 (5); 11085 (7).
- Fernald, M. L., & Smiley, F. J.—11720 (1).
- Fernald, M. L., & Svenson, H. K.—914 (9).
- Fernald, M. L., Weatherby, C. A., & Stebbins, G. L.—2451 (11).
- Fernald, M. L., & White, D.—21438 (9).
- Fernald, M. L., & Wiegand, K. M.—3554, 5535, 5574, 5574a, 5576, 5578, 5597, 5600, 5602, 5736, 5737, 5738, 5739, 5742, 5743, 5744, 5745, 5746, 5748, 5749, 5750, 5751, 5752, 5754, 5755, 5756, (1); 5542, 5545, 5547, 5552, 5567, 5568, 5569, 5570, 5578a, 5580, 5599, 5755 (5); 3553, 5557, 5565, 5558, 5559, 5561, 5562, 5563, 5605, 5608, 5623, 5627, 5630, 5633, 5635 (9).
- Fernald, M. L., Wiegand, K. M., & Eames, A. J.—14302 (10).
- Ferris, R. S., & Duthie, R.—77 (17); 411, 784 (12); 656 (15).
- Fischbach, C. M.—228 (6).
- Flodman, J. H.—545 (16).
- Floyd, F. G.—801, 803, 980, 1008 (9); 845 (5).
- Fogg, J. M.—1863, 4049, 16324 (9).
- Fosberg, F. R.—8605 (18).
- Friesner, R. C.—9541 (6).
- Garrett, A. O.—3686 (12); 5356 (18).
- Gates, F. C., & Gates, M. T.—9544, 13914 (10).
- Geil, D.—4 (14).
- Gilbert, F. A.—398 (7).
- Gilbert, F. A., Rehder, A., & Smith, L. B.—833 (7).
- Gleason, H. A.—708 (5); 1695, 2404 (6).
- Godfrey, R. K., & White, R. N.—7027 (9).
- Godfrey, R. K., White, R. N., & Shelbourne, V.—7038 (7).
- Goodale, A. S., & Markert, W. C.—76864 (9).
- Gooding, L. N.—555, 780, 1008, 1036, 1456, 1683 (18).
- Goodman, G. J., & Payson, L. B.—2797, 2846 (18).
- Gorman, M. W.—39 (13); 1026 (12).
- Graham, E. H.—6289, 7659, 8061, 8074, 8749, 8810, 9006, 9074, 9196, 9202, 9284, 9363, 9407, 9519, 9896 (18); 9262 (12).
- Grant, M. L.—2862 (4).
- Greene, E. L.—779 (17).
- Greenman, J. M.—936, 1058 (1); 3024 (9).
- Greenman, J. M., & Greenman, M. T.—6031, 6048 (18).
- Greenman, J. M., Lansing, O. E., & Dixon, R. A.—81 (6).
- Grimes, E. J.—2560 (6).
- Griscom, L.—21578 (6).
- Hanna, L.—715, 955 (18).
- Hansen, G.—230 (17).
- Hanson, H. C.—C225 (12); C226, 626 (18).
- Harbison, G. J.—1, 9, 30, 194, 813, 846, 7236, 7240 (9); 2, 510, 913 (5); 4, 6, 11, 15, 30, 40, 1415, 7095 (6); 8 (7).
- Harger, E. B.—3, 10 (5).
- Harper, R. M.—819 (7); 1806 (6); 3322 (6a).
- Harris, J. A.—C20112, C20491 (18); C28699 (16).



- Harris, S. K.—423 (7).  
 Harris, S. K., & Pease, A. S.—26551 (3).  
 Harrison, B. F.—7439 (18); 7473 (12).  
 Harrison, B. F., & Larsen, E.—7685 (16); 7877 (12).  
 Hay, G.—63 (1).  
 Hayden, A.—10489 (9).  
 Heller, A. A.—2988 (15); 3679, 9108, 9310, 9510, 9718, 9739, 9995, 10004, 10567, 10576, 10630 (18); 3061, 3679, 9739 (12); 3958 (13); 5794, 5961, 6617, 7038, 7419, 7970, 8003, 8531, 10875, 11963, 12729, 12962, 13004, 13156, 13396, 15144 (17); 7176 (16).  
 Henderson, L. F.—5147 (14); 5824, 13004 (17).  
 Hermann, F. J.—4836, 5688, 5813 (18); 6471, 7259, 10191 (5); 6486, 6497 (9); 4016, 9625 (6); 7791 (10); 10048 (7).  
 Herriot, W.—72329 (12).  
 Hill, A. F.—169 (16); 1614 (3); 1700 (9).  
 Hill, E. J.—231895 (9); 321889 (5); 411912 (6).  
 Hitchcock, C. L.—2290 (12); 6701 (17).  
 Hodgdon, A. R.—195, 2244, 2245 (5); 2471, 2998 (10); 2600, 2845, 3192 (9); 2597, 2773 (7).  
 Hodgdon, A. R., & Dunn, S.—2772 (5).  
 Horner, R. M.—B183 (14).  
 Horsey, R. E.—323 (6).  
 Hotchkiss, N.—2290 (1).  
 House, H. D.—7264, 9468, 10227 (1); 7265, 8943, 10175, 17246 (9); 7787, 11870 (6); 7961 (5); 10189 (3); 11201, 16059 (10).  
 Howe, C. D., & Lang, W. F.—265, 297 (5); 1081, 1203 (1).  
 Howell, T.—1132 (13).  
 Hubbard, F. T., & Torrey, G. S.—T352 (9).  
 Hubricht, L.—B2011 (6).  
 Hughes, J. A.—1185 (14).  
 Hunnewell, F. W.—4029, 4128, 6889 (6); 4129, 5885 (5); 4681 (10); 5895 (9); 6031 (7); 2445, 6169 (12).  
 Hunnewell, F. W., & Wiegand, K. M.—2137, 2139, 2140, 2143 (7).  
 Hunt, K. W.—2969 (8).  
 Hunt, K. W., & Martin, F.—1408, 2526 (8).  
 Hyland, F.—699, 753 (7).  
 Jack, J. G.—628, 680, 3187, 3188, 3648, 3671 (5); 684, 3108, 3583, 3639, 3948 (7); 1075, 1089 (18); 1051, 1124a, 1125, 1155, 1185, 1213, 1258, 1336, Jack, J. G. (*continued*)  
 1359, 1361, 1374, 1379, 1453, 1497, 1498, 1511, 1537, 1580, 1592, 2007, 2293, 2540, 2629, 2778 (12); 2865 (13); 3106, 3344 (1); 3209, 3357, 3479, 3514, 3762, 3872, 3946 (9); 3928 (10).  
 Jenney, C. F., Churchill, J. R., & Hill, A. F.—3264 (6).  
 Jennings, O. E.—1581 (7); 14015 (1); 14024c (11); 14521 (9).  
 Jones, G. N.—972, 7137 (15); 1397, 2057, 4681, 5084, 5640 (12); 4565, 5819 (13a); 1387, 1398, 2832, 6349, 6573, 7088, 7101, 7134, 7147 (14); 7690, 7755 (17); 11992, 12089, 13143, 13340, 15618, 15840 (6); 17143 (9).  
 Jones, G. N., & Jones, F. F.—13716, 13750, 13781, 15323 (5); 16170 (1).  
 Jones, M. E.—1716, 5224, 29011, 25392, 25393 (18); 1447, 6274, 25397 (12).  
 Kennedy, G. G.—17, 257 (1); 1866 (18); 2360, 3260 (7).  
 Kimball, R. H.—102 (1).  
 Kirkwood, J. E.—28, 29, 30, 1182 (14).  
 Koehler, H. J.—1 (9); 2 (5).  
 Kraus, E. J.—16, 22 (10).  
 Krotkov, P. V.—5384, 5390 (10); 7517 (9).  
 Lakela, O.—2873 (9).  
 Lamb, F. H.—1190 (13a).  
 Leiberg, J. B.—1203 (12); 2193 (18).  
 Letterman, C. W.—2, 3 (6).  
 Long, B.—6633, 8476, 12515, 12867, 14522, 16257, 18378, 21447, 21448, 30691, 32022, 32349, 33631, 41781, 48444, 50001, 52074, 54418, 57028 (5); 3107, 6586, 9610, 11605, 11883, 11943, 13516, 14514, 14519, 32089, 32282, 37298, 37719, 46255, 46808, 50133, 51868, 52160, 52340, 53736, 58228 (6); 26820, 31233, 32689, 33309, 33330, 33615, 34224, 54350, 57005, 57021, 58240 (7); 5915, 16451, 18759, 21005, 21590, 30300, 30603, 30773, 32883, 33071, 35296, 45720, 48268, 48766, 52012, 54322, 54368, 54423, 58269 (8); 12504, 12556, 20586, 25839, 30640, 32642, 37315, 48649, 51076, 51838, 52017, 52022, 52088, 52094, 56467 (9).  
 Long, B., & Pennell, F. W.—7364, 7374 (8).  
 Long, B., & St. John, H.—2479 (6).  
 Long, C. A. E.—320, 335, 852 (9).  
 Loomis, J. A.—856 (9).  
 Louis-Marie, Fr.—116 (9); 145 (5).  
 Lucy, T. F.—818b (9).  
 Lunell, J.—50 (14).

- Macbride, J. F.—13, 24, 127, 209 (17); 852 (14); 926 (12).
- Macbride, J. F., & Payson, E. B.—2880 (16); 2880a, 2880b, 2904 (18).
- MacDougal, D. T.—102 (18); 178 (12).
- Mackenzie, K. K.—240 (18); 3080, 4201 (9).
- Mackenzie, K. K., & Griscom, L.—5804 (10); 10327 (1); 11102 (5).
- MacMillan, C., & Sheldon, E. P.—1747a (10).
- Macoun, J.—208 (13a); 12627 (12); 79796, 93380, 93875, 93879, 93880, 93881, 93883, 93887, 93889, 93895, 93897, 93898, 93899, 93901 (13); 19043 (5); 66927 (3); 20074 (10); 34296 (6); 34298, 34301, 66924, 80733, 85506 (9).
- Macoun, J. M., & Malte, M. O.—88016 (5).
- Maguire, B.—2363, 3501, 3507 (12); 4840, 5772 (18).
- Maguire, B., & Redd, J. D.—1905, 1907, 1911 (18).
- Manning, W. E., & Seymour, F. C.—3687 (9).
- Marie-Victorin, Fr.—11222, 15586, 24546, 24547 (6); 1883, 11216, 18715 (10); 2087, 8237, 9504, 11221, 11223, 15585, 24545, 24548 (9); 4318 (2); 4319, 9503, 11219 (5); 11214, 15589 (1); 24538, 24558, 28582, 28694 (11).
- Marie-Victorin, Fr., Brunel, J. B., Rolland-Germain, Fr., & Rousseau, Z.—17433, 17436 (1); 17431, 17434, 17435 (11).
- Marie-Victorin, Fr., & Rolland-Germain, Fr.—9507, 18710, 18711, 27898, 27900 (2); 18707, 18708, 18709, 27899, 27901 (1); 33110, 33130 (9).
- Marie-Victorin, Fr., Rolland-Germain, Fr., & Jacques, E.—33203, 33298, 33440 (11); 33216, 33436, 33439 (2); 33467, 33486 (1).
- Marsh, V. L.—507 (12).
- Mason, H. L.—4725 (18).
- Mattioli, A. & E.—7, 13, 20 (4).
- Mattoon, E. A.—13 (6).
- McFarland, F. T.—18 (5).
- McKelvey, S. D.—915, 1034, 1138, 1314, 2316, 4267, 4395, 4626, 4630, 4721 (18).
- Menzel, R. W.—403 (7).
- Merrill, E. D., & Wilcox, E. N.—458 (18); 548 (16); 1027a (12).
- Merrill, G. M.—1965 (6).
- Metcalfe, O. B.—620, 961 (18).
- Meyer, F. G.—226 (15); 854, 1428 (14).
- Milburge, Sister M.—258 (14).
- Moffatt, W. S.—190 (6); 1610 (9).
- Moldenke, H. N.—9502 (5); 10580 (7).
- Moodie, M. E.—817, 1039 (12).
- Moore, A. H.—4189 (3).
- Moore, J. A., & Steyermark, J. A.—3482 (18).
- Moore, J. W., & Nielsen, E. L.—3653 (4).
- Morton, J. A.—2691 (1).
- Moyle, J. B.—216 (9).
- Moyle, J. B., & Nielsen, E. L.—1944 (4).
- Muenschner, W. C.—50 (7); 9635, 15136 (13); 11427, 11485 (12).
- Muenschner, W. C., & Clausen, R. T.—4020 (1).
- Muenschner, W. C., & Maguire, B.—2319, 2320 (3); 2322 (9); 2360 (12); 2362 (18).
- Muenschner, W. C., & Spalteholz, R.—16175 (7).
- Muenschner, W. C., Wilson, C. L., & Foster, A. S.—15609 (9).
- Mulford, A. I.—192 (16).
- Munz, P. A.—8099 (17); 13046, 14820 (18).
- Munz, P. A., & Johnston, I. M.—12638 (17).
- Munz, P. A., Johnston, I. M., & Harwood, R. D.—4147 (18).
- Murdoch, J.—4035 (12).
- Murdoch, J., & Torrey, G. S.—T391 (9).
- Murie, O. E.—1122 (13a); 1183 (12).
- Myers, J. C.—415 (6).
- Nelson, A.—1931 (16); 2129, 10086, 10530 (12); 9010, 9317, 9333, 10245, 11344 (18).
- Nelson, A., & Macbride, J. F.—1052, 1273, 1405, 1593, 1847 (12); 1110, 1327, 1347, 1593, 1798, 1935, 1939, 2120, 2121 (18); 1368 (16).
- Nelson, A., & Nelson, R.—783, 798 (12); 1888, 2024, 2877, 2890 (18).
- Nelson, E.—807 (12).
- Nelson, J. C.—1071 (13); 1475 (17).
- Newins, H. S.—8141 (5).
- Nichols, G. E.—168, 557 (5).
- Nielsen, E. L.—1055, 1060, 1063, 1064, 1066, 1069, 1082, 1091, 1301, 1376, 1379, 1804, 1820, 1931, 2485, 2521, 2547, 2669, 2961, 3113, 3124, 3127, 3129, 3131, 3133, 3136, 3137, 3138, 3170 (4); 1868, 1872 (5); 1630 (6); 1349, 1967, 2500 (10).
- Ownbey, M.—593 (12).

- Packard, J.—371 (14).  
 Palmer, E.—94 (18).  
 Palmer, E. J.—1602, 5616, 14684, 20761, 20764, 24470, 25860, 26350, 29915, 29927, 33207, 34917, 35564, 35890, 39015, 39994, 41069, 42440 (6); 20185, 35412 (7); 2322, 3539, 38948 (6a); 27740, 28711, 28747, 28791, 28861, 28905, 36815 (10); 27779, 27795, 27796, 30009, 36296, 39808, 39833, 40470, 40471, 42391 (9); 31358, 36855, 36859, 36902, 36950, 36967, 37048, 37197, 37343, 37398, 37835, 37858, 38097 (12); 38025, 38037 (18).  
 Palmer, W.—1340 (1).  
 Pammel, L. H.—14, 52 (9).  
 Pammel, L. H., & Blackwood, R. E.—3623, 3876, 3887, 4063 (18).  
 Pammel, L. H., & Davy, J. B.—77 (17).  
 Parish, S. B.—453, 1290, 10882, 11969 (18).  
 Payson, E. B.—248, 982, 1066, 1077, 2307, 4779 (18); 1069, 1075 (12); 1051 (16).  
 Payson, E. B., & Armstrong, G. M.—3272 (12).  
 Payson, E. B., & Payson, L.—1812, 2540, 3883, 3884, 4225, 4228 (18); 1812 (12).  
 Pease, A. S.—678 (6); 670, 10995, 14374, 16044, 26527 (3); 683, 16554, 16990, 17890, 18048, 19680, 23232, 24246, 25775, 25912, 25979, 26323, 26541 (9); 20216 (11); 4090, 10216, 10312, 11205, 11969, 13482, 14372, 16662, 16683, 19561, 25275 (1); 16010, 17476, 18044 (5); 19794 (10); 22360 (12); 24229, 26992 (7).  
 Pease, A. S., & Bean, R. C.—26215, 26502 (10).  
 Pease, A. S., & Long, B.—21434, 21452 (9); 21453 (7).  
 Pease, A. S., & Ogden, E. C.—24884, 25152 (11).  
 Peck, M. E.—3530, 8512, 8731, 9242 (17).  
 Peebles, R. H.—13920 (18).  
 Peebles, R. H., & Parker, H. W.—14670 (18).  
 Pennell, F. W.—82, 24805 (5); 2708, 12027 (9).  
 Pennell, F. W., & Long, B.—7559 (5).  
 Perry, L. M., & Roscoe, M. V.—243 (2); 244 (1).  
 Phelps, O. P.—567, 1591 (5); 568, 1592 (10); 1581, 1582 (6); 1583, 1584, 1585, 1586 (9); 1588, 1589 (1).  
 Piper, C. V.—84 (13); 1534 (12); 2694, 3812 (14); 3823 (15).  
 Piper, R. H.—76881 (9).  
 Plantae Exsiccatae Grayanae—662 (7); 663, 664 (5); 842 (9); 959 (1).  
 Porter, C. L.—1059 (18).  
 Potter, D.—484, 485 (11); 486, 487 (1).  
 Pretz, H. W.—2363a, 3246, 5919, 9090 (5); 8296, 9260 (8); 10767, 11248, 11762, 12754 (9).  
 Purpus, C. A.—5376, 6523 (18).  
 Rand, E. L., & Robinson, B. L.—616 (1); 618 (9).  
 Randolph, L. F., & Randolph, F.—121 (5); 1200 (6).  
 Raup, H. M.—2645, 2647, 2648, 2649, 2650, 2652, 2653, 2654, 2656, 6065, 6084, 6588, 6670, 6931, 6933, 7078, 7089 (12); 7410, 7727 (6); 8094 (9).  
 Raup, H. M., & Abbe, E. C.—3500, 3502, 3530, 4466, 4515, 4519 (12).  
 Rehder, A.—955 (7); 115, 116 (18).  
 Ridgway, R.—2534 (6).  
 Robinson, B. L.—782 (1).  
 Roland, A. E.—2047, 41469 (9).  
 Rolland, F.—57, 58, 59 (6); 7214 (3); 13033, 13035 (9).  
 Rolland-Germain, Fr.—19258 (10).  
 Rollins, R. C.—198 (18); 550 (12); 840 (14); 889 (16).  
 Rollins, R. C., Dillon, L. A., & Pickett, F. L.—868 (12).  
 Rosendahl, C. O.—439, 4935, 4937, 5198 (4); 4980, 4983 (9); 6072 (10).  
 Rosendahl, C. O., & Brand, C. J.—88 (13).  
 Rosendahl, C. O., & Butters, F. K.—2578, 3892 (4).  
 Rosendahl, C. O., & Nielsen, E. L.—1852 (5).  
 Rossbach, G. B.—1102, 1136 (6).  
 Rousseau, J.—24557, 24552 (3); 24537, 24550, 24554, 24561, 26241, 26259, 26478, 26513, 26672, 32418 (11); 26228, 26771 (1); 24549, 24559, 24562, 24567 (5).  
 Rousseau, J., & Fortier, L.—31441 (1).  
 Ruth, A.—317 (6).  
 Rydberg, P. A.—680 (12); 9052 (6).  
 Rydberg, P. A., & Carlton, E. C.—6662 (18).  
 Rydberg, P. A., & Garrett, O. A.—9274 (18).  
 St. John, H.—11887 (9); 1903, 90526, 90527, 90528, 90529 (1); 1909 (2).  
 St. John, H., & Long, B.—1009, 8059 (6); 1063 (7).

- St. John, H., & Nichols, G. E.—2332 (1).  
 Sandberg, J. H.—3 (9).  
 Sandberg, J. H., & Leiberg, J. B.—94 (12).  
 Sandberg, J. H., MacDougal, D. T., & Heller, A. A.—26 (12); 53 (15).  
 Sandborger, J. D.—20 (1).  
 Sanford, J. N.—379 (6).  
 Sanford, S. N. F.—626 (9); 1066, 1193, 10215 (5).  
 Sargent, H. E.—21 (7); 24 (6).  
 Schacklette, H. T.—261 (6).  
 Seymour, F. C.—571, 1222, 3493 (7); 1223, 1224, 3501 (5); 1708, 1709, 3512, 4641 (9).  
 Shantz, H. L.—345 (12).  
 Sharp, A. J., & Svenson, H. K.—7278 (6).  
 Slavin, B. H.—203 (9); 205 (10).  
 Smiley, F. J.—214, 215, 899 (17).  
 Smith, E. G.—12005 (18).  
 Smith, L. B., & Hodgdon, A. R.—3872 (6).  
 Smith, L. E.—284 (17).  
 Solheim, W. G.—434 (18).  
 Sonne, C. F.—88 (17).  
 Spencer, M. F.—865 (17).  
 Spiegelberg, C. H.—341 (14).  
 Spreadborough, W.—93904, 93905, 93906, 93907 (13).  
 Standley, P. C.—4125 (18).  
 Stanford, E. E.—1758 (17).  
 Stecker, A.—19 (1).  
 Stevens, G. W.—2427 (6).  
 Stevens, O. A., & Graves, H.—278 (11).  
 Steward, A. N.—230 (13).  
 Steyermark, J. A.—7009 (10); 18635 (9).  
 Stone, W.—65, 6484 (7); 11932 (5); 12684 (9).  
 Stoudt, H. N., & Hermann, F. J.—2779, 2784 (6).  
 Suksdorf, W. N.—52, 841, 8585, 8597, 8609, 10025, 10026, 10129, 10154, 10234, 10247, 11841, 11859 (12); 269 (18); 8575 (14); 2138, 2139, 2153, 10033, 10154, 10194, 10195, 10201, 10360, 10361, 10382, 10395, 10455, 10494, 11835, 11841, 11859, 11973 (13).  
 Svenson, H. K.—346, 7779 (6); 7849 (10); 8012 (9).  
 Tanger, Louise F. A.—3025 (6); 3036, 3044, 3045 (5); 3043, 3065 (9); 3351 (8).  
 Thompson, J. W.—6002, 11386 (14); 7073 (12); 616, 2714 (13).  
 Thone, F.—172 (6).  
 Tidestrom, I.—9359, 9429, 9460, 9600, 11050 (18); 11882 (6); 11947 (7).  
 Topping, D. L.—223 (5).  
 Torrey, J.—126 (16).  
 Tower, A. O., & Seymour, F. C.—3664 (10); 3668, 3671 (9); 3674 (6).  
 Ulke, T.—S35 (12).  
 Visher, S. S.—3308 (12).  
 Voorhies, C. T.—82 (18).  
 Wahl, H. A.—29, 298 (5); 34 (6); 33, 47, 73 (9).  
 Walker, E. P.—210, 416 (18); 1075 (13).  
 Watson, S.—353 (18).  
 Weatherby, C. A.—2018, D2103, 3616, 4070, 4070a, 4070b, 4255, 5370 (9); D2157 (6); 2861, 5280 (5); 4916, 7029 (7).  
 Weatherby, C. A., Smith, L. B., Rollins, R. C., & Muñoz, C., Pl. Exsicc. Gray.—959 (1).  
 Webb, R. J.—84 (6); 1180 (5).  
 Werner, W. C.—54 (9); 55 (6).  
 Wetmore, A.—470 (18).  
 Wherry, E. T., & Adams, J. W.—2768 (9); 2775 (7).  
 Whited, K.—363 (14); 571 (12); 1197 (13).  
 Wiegand, K. M.—991, 2131, 2132, 2539, 2541, 15627 (7); 2133, 4290, 6587, 6593, 6594, 6603 (9); 2498, 2499, 2501, 2505, 4281, 6582, 6589, 6592, 13976, 13979 (10); 2136, 2572 (5).  
 Wiegand, K. M., & Eames, A. J.—2515, 2517, 2518 (7).  
 Wiegand, K. M., & Manning, W. E.—1328, 1330, 1331 (7).  
 Wiegand, K. M., & Metcalf, F. P.—6583 (10).  
 Wiggins, I. L.—4631 (17).  
 Wiggins, I. L., & Demaree, D.—4948 (18).  
 Wilkens, H.—471, 5128, 5168 (9); 5129, 6666 (5); 1097 (6).  
 Williams, L. O.—577 (18); 1106 (12).  
 Williams, L. O., & Williams, R.—3305 (12).  
 Wislizenus, F.—937 (10).  
 Wolden, B. O.—1043, 1047, 1074, 1075, 1078 (9); 1353 (10).  
 Wolf, C. B.—2988 (18); 3075 (12).  
 Woodward, R. W., & Bean, R. C.—17116 (7).  
 Woodward, R. W., & Fernald, M. L.—15202 (9).  
 Zech, O. F.—152, 161, 168, 195 (4).  
 Zeller, S. M., & Zeller, E. B.—844 (13).

PLATES

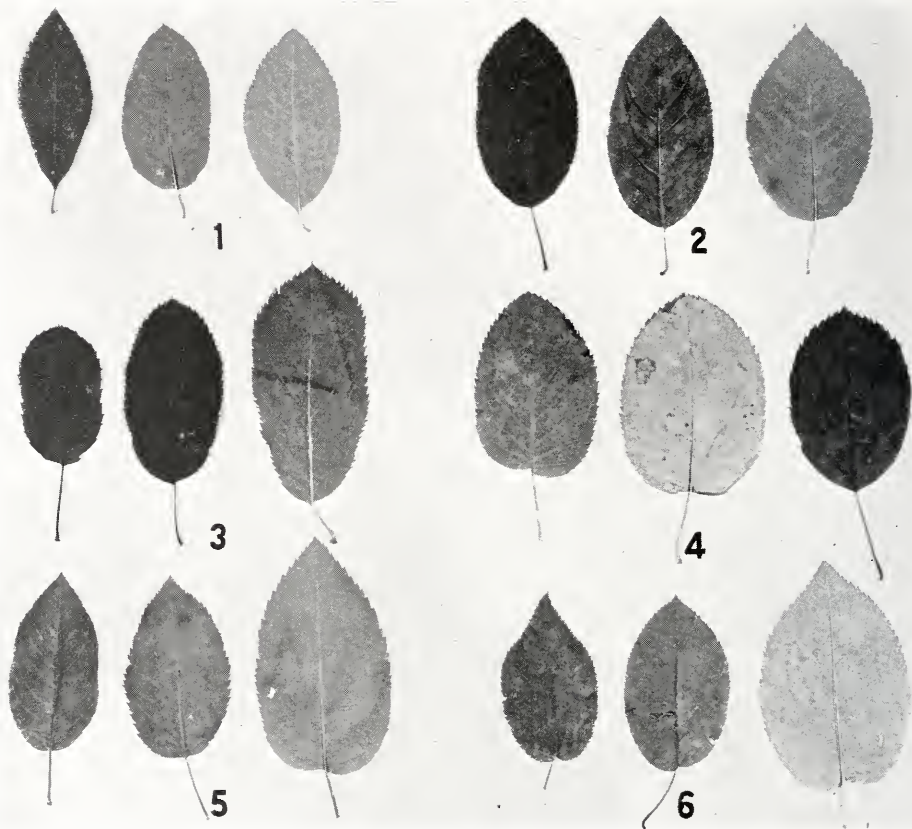


PLATE I

Leaves of species of *Amelanchier* from herbarium specimens.

FIG. 1.—*Amelanchier bartramiana* (Tausch)  
M. Roem.

FIG. 2.—*Amelanchier neglecta* Egglest.

FIG. 3.—*Amelanchier fernaldii* Wieg.

FIG. 4.—*Amelanchier interior* Nielsen.

FIG. 5.—*Amelanchier laevis* Wieg.

FIG. 6.—*Amelanchier arborea* (Michx.f.)  
Fernald.

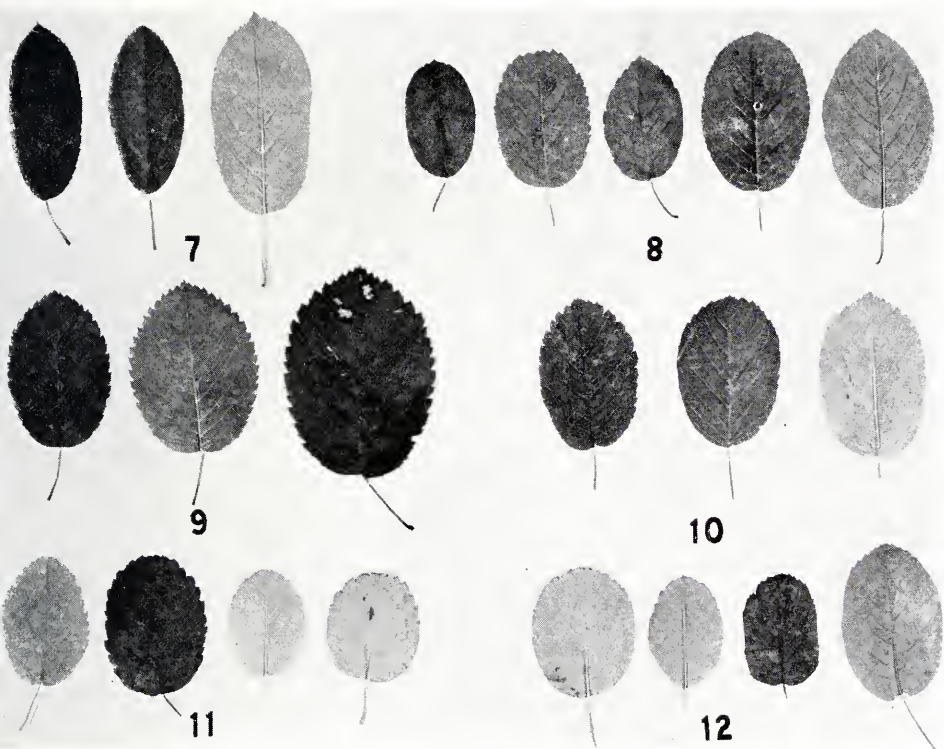


PLATE II

Leaves of species of *Amelanchier* from herbarium specimens.

FIG. 7.—*Amelanchier canadensis* (L.) Medic.

FIG. 8.—*Amelanchier spicata* (Lam.) K.Koch.

FIG. 9.—*Amelanchier sanguinea* (Pursh) DC.

FIG. 10.—*Amelanchier gaspensis* (Wieg.)  
Fernald & Weatherby.

FIG. 11.—*Amelanchier alnifolia* Nutt.

FIG. 12.—*Amelanchier florida* Lindl.

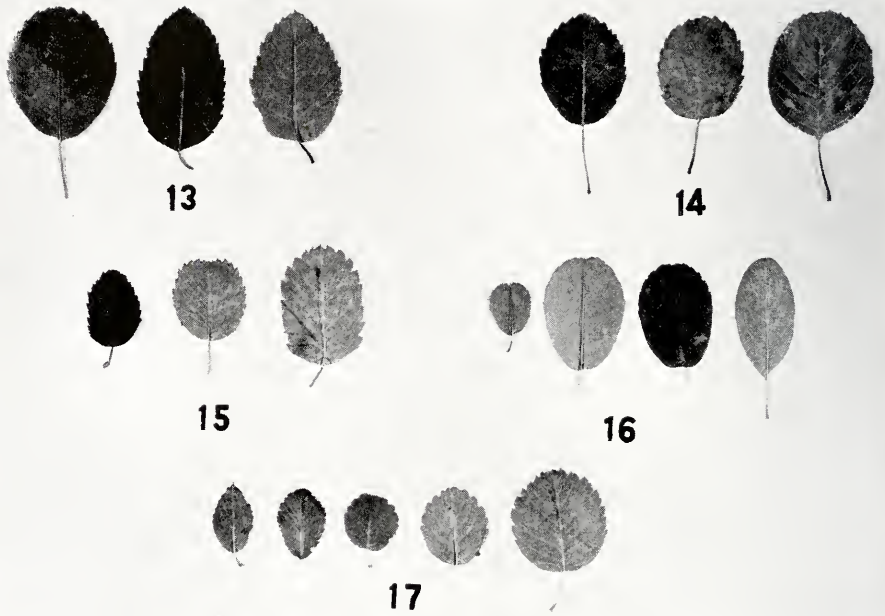


PLATE III

Leaves of species of *Amelanchier* from herbarium specimens.

FIG. 13.—*Amelanchier cusickii* Fernald.  
 FIG. 14.—*Amelanchier basalticola* Piper.  
 FIG. 15.—*Amelanchier pumila* Nutt.

FIG. 16.—*Amelanchier pallida* Greene.  
 FIG. 17.—*Amelanchier utahensis* Koehne.





PLATE IV

Type of *Amelanchier fernaldii* Wieg. in the Gray Herbarium; from Fernald, Long & St. John 7592, Grindstone Island, Magdalen Islands, Quebec, Canada.



PLATE V

Type of *Amelanchier neglecta* Egglest. in the Gray Herbarium; from  
Rutland, Vermont, May 12 and June 21, 1899, W. W. Eggleston.



Type specimen of  
*Amelanchier laevis* Wieg. 2  
 K. M. WIEGAND

FLORA OF EASTERN MASSACHUSETTS  
 For Herbarium of Wellesley College

2136  
*Amelanchier laevis* Wiegand  
 sampled at a natural bridge  
 in Westford  
 K. M. Wiegand 76 May 4, 1911 Wellesley  
 76 31-24 1911

PLATE VI

Type of *Amelanchier laevis* Wieg. in the Gray Herbarium; from Wellesley, Massachusetts, K. M. Wiegand 2136.



Type  
*A. interior*  
 flourens

Amelanchier interior Nielsen  
 MAY 1915

HERBARIUM OF THE UNIVERSITY OF MINNESOTA  
 MINNEAPOLIS, MINN. 55455  
 Type  
 2961  
 fl. white, calyx 4-5 mm, petals 10-12 mm, sepals 10-12 mm, fruit 10-12 mm, seeds 10-12 mm, 2-3 mm diam. 2-3 mm diam.  
 27th & Franklin

PLATE VII

Type of *Amelanchier interior* Nielsen in the Herbarium of the University of Minnesota; from Minneapolis, Minnesota, E. L. Nielsen 2961.



Fig. 1

Fig. 2

PLATE VIII

FIG. 1.—Phototype from Herb. Mus. Paris of F. A. Michaux's *Mespilus canadensis* var.  $\beta$  cordata, the basis of *Amelanchier arborea* (Michx.f.) Fernald.

FIG. 2.—Phototype from Herb. Mus. Paris of Michaux's *Mespilus canadensis* var.  $\alpha$  obovatis, the basis of *Amelanchier obovatis* (Michx.) Ashe.



Fig. 1



Fig. 2

PLATE IX

FIG. 1.—Phototype of *Mespilus canadensis* L. (*Amelanchier canadensis* (L.) Medic.), from the Linnean Herbarium, London. Reproduced from *Rhodora*, vol. 43, pl. 672, fig. 1.  
 FIG. 2.—Type of *Amelanchier pumila* Nutt., from the specimen in the herbarium of the Academy of Natural Sciences, Philadelphia.



PLATE X

Photograph of *Amelanchier intermedia* Spach in the Gray Herbarium.

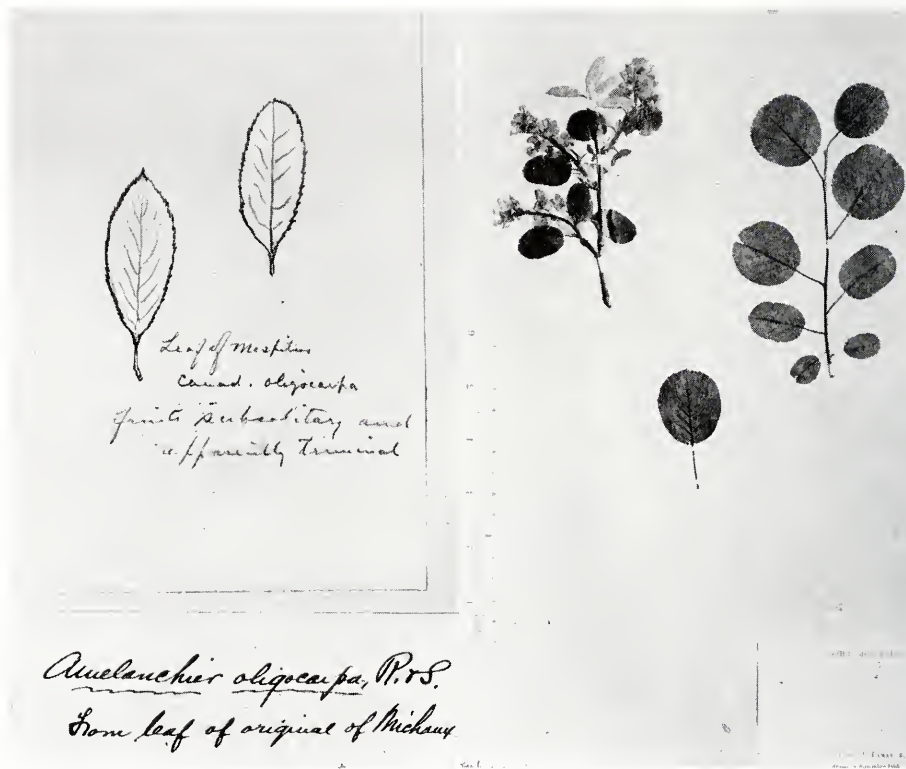


Fig. 1

Fig. 2

PLATE XI

FIG. 1.—Photograph of a tracing of leaves of *Mespilus canadensis* var.  $\delta$  *oligocarpa* Michx., from Herb. Mus. Paris. This is *Amelanchier bartramiana* (Tausch) M. Roem.

FIG. 2.—Phototype of *Crataegus spicata* Lam. in Herb. Mus. Paris, the basis of *Amelanchier spicata* (Lam.) K. Koch.





Type specimen of  
*Amelanchier stolonifera* Wieg.  
 1844. K. M. WILSON

FLORA OF EASTERN MASSACHUSETTS  
 24 Herbarium of Wellesley College  
 No. 213

Amelanchier stolonifera Wieg.  
 No. 213. (Type specimen)  
 Collected by K. M. Wilson  
 at Wellesley, Mass., June 18, 1892.  
 K. M. Wilson

PLATE XII  
 Type of *Amelanchier stolonifera* Wieg. (Gray Herbarium).



PLATE XIII

Photograph of the second sheet of *Amelanchier stolonifera* Wieg.  
 (Gray Herbarium).



PLATE XIV

Photograph of the third sheet of *Amelanchier stolonifera* Wieg.  
(Gray Herbarium).



PLATE XV  
 Type of *Amelanchier humilis* Wieg. in the Gray Herbarium.



PLATE XVI

Photograph of an isotype of *Amelanchier austromontana* Ashe  
in the Gray Herbarium.

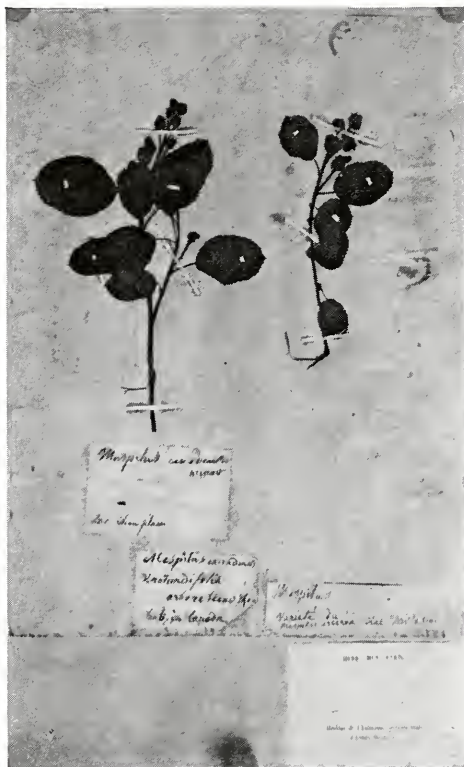


Fig. 1

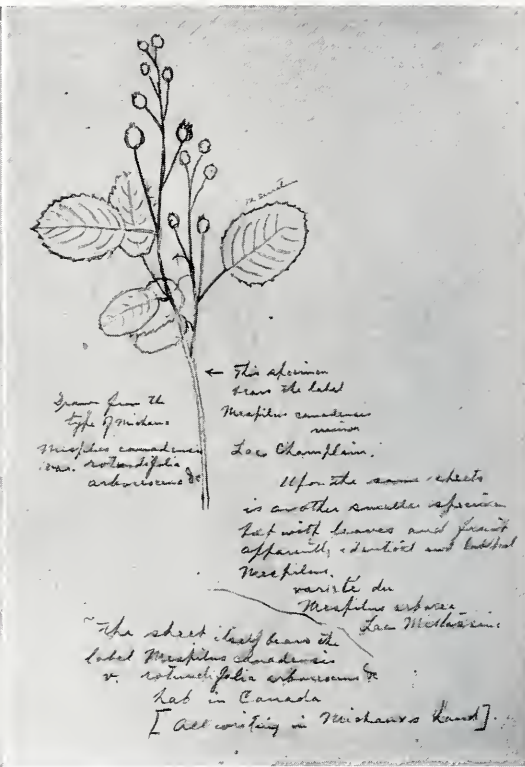


Fig. 2

PLATE XVII

FIG. 1.—Phototype of Michaux's *Mespilus canadensis* var.  $\gamma$  *rotundifolia* in Herb. Mus. Paris.  
 FIG. 2.—A tracing of part of specimen shown in Fig. 1, from the original in the Gray Herbarium.



UNIVERSITY OF ILLINOIS  
*A. sanguinea* (Pursh) DC.  
C. N. JONES 1942

The Academy of Natural Sciences of Philadelphia

No. *Amelanchier*  
Locality *St. Louis, Mo.*

Collector *C. N. Jones*

Date *June 28*

PLATE XVIII

Photograph of a specimen of *Amelanchier sanguinea* (Pursh) DC. from Minnesota.



PLATE XIX

Type of *Amelanchier gaspensis* (Wieg.) Fernald & Weatherby  
in the Gray Herbarium.





EASTERN OREGON PLANTS  
 Coll. W. F. Fernald  
 1935  
 Fernald vs  
 Amelanchier cusickii  
 Clifton or Stimpson's. Fruit  
 so much like that of  
 black. May 3 - June 10

PLATE XX

Type of *Amelanchier cusickii* Fernald in the Gray Herbarium.



UNIVERSITY OF ILLINOIS

*Amelanchier pallida* Greene

G. N. JONES 1942

FLORA OF N. CALIFORNIA.

No. 779

*Amelanchier pallida* Greene  
U.C.B.

COLL. E. L. GREENE. May 13,

1876.

### PLATE XXI

Photograph of an isotype of *Amelanchier pallida* Greene in the Gray Herbarium.



PLATE XXII

A flowering specimen of *Amelanchier obovata* (Michx.) Ashe in the herbarium of the Academy of Natural Sciences of Philadelphia, collected in Virginia by Fernald & Long, no. 7073.



A DEPT. OF THE SOUTH VIRGINIA  
 PLANT GARDEN  
 No. 9947 *Amelanchier obovata* (Michx.) Ashe  
 Shalem, 1-3 feet high  
 Aerial view and other as large as natural, sheet of Peterburg,  
 at head of Fox Run  
 M. F. Fernald and F. S. Long  
 May 17, 1915

PLATE XXIII

A fruiting specimen of *Amelanchier obovata* (Michx.) Ashe in the herbarium of the Academy of Natural Sciences of Philadelphia, collected in Virginia by Fernald & Long, no. 9947.

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