

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE
HERBARIUM AND THE COLLECTIONS OF THE ARNOLD
ARBORETUM ¹

ALFRED REHDER

ROSACEAE (*continued*)**Sorbus L.**× **Sorbus arnoldiana**, hybr. nov. (= *S. Aucuparia* × *discolor*)

Arbor pyramidalis ramis suberectis vel erecto-patentibus; ramuli juniores fere glabri vel sparsissime villosi; gemmae fusco-purpureae, margine perularum dense et longe ciliato et apice barbato exceptis glabrae vel sparse longe pilosae. Folia 6–7-juga; foliola anguste oblonga, acuta, basi oblique late cuneata vel fere rotundata, 3–5 cm. longa et 0.8–1.4 cm. lata, basis quarta parte inferiore plerumque excepta argute serrata vel interdum ad medium, rarius ultra integra, supra glabra, laete viridia, subtus initio sparse, ad costam densius villosa, maturitate glabra vel secus costam sparse villosa, glaucescentia; petioli 1.5–2.5, rarius 3 cm. longi, ut rhachis purpurascens et initio sparse villosi, mox glabri; stipulae 5–8 mm. longae, digitato-incisae, pleraeque persistentes. Corymbi circiter 10 cm. diam., satis densi, rhachi et ramulis sparse villosis; flores 8–10 mm. diam.; petala ovalia vel late ovata, 3.5–4 mm. longa; stamina petalis subaequilongae; styli 3–4. Fructus subglobosi vel subpyriformes, 7–9 mm. diam., rosei; rhachis et ramuli inflorescentiae glabri et purpurascens.

Cultivated at the Arnold Arboretum (raised from seed of *S. discolor* Maxim. in 1907); specimens collected May 16 and September 26, 1918, *A. Rehder* (type).

This new hybrid was raised at the Arnold Arboretum in 1907 from seed collected from a tree of *S. discolor* Maxim. (*S. pekinensis* Koehne) received in 1902 from the nursery of C. Gebbers, Wiesenburg, Germany. It differs from *S. discolor* in the pubescence of the under side of the young leaflets, the smaller stipules, the shorter petioles, the denser villose inflorescence and in the pink fruits; from *S. Aucuparia* which is apparently the other parent it may be distinguished by the narrower leaflets, the larger, deeply incised and partly persistent stipules, the glabrous or glabrescent winter-buds and by the pink fruit. As it grows in the Arboretum it is a handsome pyramidal tree of vigorous growth now 6 or 7 m. tall and attractive in spring with its numerous dense clusters of white flowers, and in autumn remarkable for the light pink color of its fruits.

Aronia Pers.**Aronia arbutifolia** Ell. f. **leiocalyx**, forma nov.

A typo recedit calyce pedicelloque glabris vel fere glabris. — Folia obovata vel obovato-oblonga, subito acuminata, 4–6.5 cm. longa et 1.7–3.8

¹ Continued from vol. I, p. 263.

cm. lata; inflorescentia in parte inferiore satis plus minusve tomentosa, sursum glabrescens.

MASSACHUSETTS: Cedar Pond near Lynn, May 29 and October, 1886, *J. H. Sears* (type); same locality, October 16, 1890 and May 19, 1891, *C. E. Faxon*; Wyoma Lake, near Lynn, May 23, 1903, *A. Rehder*.

The glabrousness of the calyx and the upper part of the inflorescence suggests *A. melanocarpa*, but the leaves are pubescent beneath and the fruit is bright red and ripens in October. Specimens with similar pubescence I have seen from Maine, Virginia and South Carolina, but in the absence of fruits it is impossible to say if they belong here or to *A. floribunda*. This new variety is apparently not identical with *A. arbutifolia* b. *glabra* Elliott (Sketch Bot. i. 557 [1821]) which is described as having a glabrous calyx and the leaves a little hairy beneath while young, and glabrous at maturity, while in our form the leaves are tomentose beneath as in the type.¹

Aronia arbutifolia var. *pumila*, comb. nov. — *Mespilus pumila* Schmidt, Oester. Baumz. ii. 39, t. 88 (1794). — Krauss, Afbeeld. Boom. Heest. 2 pp., t. (Class XII, Ord. IV.) (1802). — *Pyrus depressa* Lindley in Trans. Hort. Soc. vii. 230 (1827). — *Aronia depressa* Spach, Hist. Vég. ii. 90 (1834). — *Pyrus arbutifolia* 4. *pumila* Loudon, Arb. Brit. ii. 926, fig. 647, 648 (1838). — *Sorbus depressa* Heynhold, Nomencl. Bot. 772 (1840). — Hedlund in Svensk. Vetensk.-Akad. Handl. xxxv. No. 1, 116 (Monog. Sorbus) (1901). — *Sorbus arbutifolia* var. *depressa* Schneider, Ill. Handb. Laubholzk. i. 698 (1906). — *Aronia arbutifolia* var. *depressa* Schneider in Fedde, Rep. Sp. Nov. iii. 150 (1906).

This is a dwarf form with creeping and rooting stems, small leaves and dark red fruits. I have little doubt that Lindley's *Pyrus depressa* is the same. Its dark purple fruits are described as downy, as are those of *Mespilus pumila*, which excludes *A. floribunda* with glabrous lustrous fruit. Specimens from Newfoundland agree in habit with the plant figured by Schmidt, but the color of the mature fruit of the Newfoundland plant is not known.

Aronia arbutifolia f. *macrophylla*, comb. nov. — *Pyrus arbutifolia* var. *macrophylla* Hooker in Comp. Bot. Mag. i. 25 [1835], nomen.

A typo recedit foliis majoribus usque ad 8 vel 9 cm. longis et interdum habitu arborescente.

LOUISIANA. Orleans Par'sh: New Orleans, 1833, *T. Drummond* (type, photograph seen); St. Tammany Parish: Covington, *T. Drummond* (photograph seen); Folsom, April 20, 1920, *R. S. Cocks* (Nos. 3332, 3333).

ARKANSAS. Hot Springs County: Malvern, June 23, 1915, *E. J. Palmer* (No. 8108).

TEXAS. San Augustine County: San Augustine, September 19, 1918, *E. J. Palmer* (No. 14460); Bland Lake, margin of sandy bog, April 2, 1918, *E. J. Palmer* (No. 13264).

¹ There was no specimen of this variety to be found in the Elliott herbarium preserved in the Charleston Museum, Charleston, S. C., but in the local herbarium I noticed a specimen from the Chicora woods, collected March 28, 1913, which answered Elliott's description and was stated to have "red berries."

This form differs from the type in the larger leaves which are up to 8 cm. long and 3.5 cm. wide in Drummond's specimen of which we received excellent photographs through the kindness of Dr. Prain; in Cock's No. 3333 they attain 9 cm. in length and 4 cm. in width. Palmer's Texas specimens came according to his notes from slender trees from 5 to 7 m. tall. The form with large leaves described as *A. arbutifolia* var. *Baenitziana* Schneider probably belongs to *A. floribunda*, as its fruit is fully ripe in August.

Sorbus arbutifolia var. *xanthocarpa* Hedlund (*Mespilus xanthocarpa* Loddiges¹) and *S. arbutifolia* var. *leucocarpa* Hedlund (*Pyrus arbutifolia* γ *alba* Willdenow) are unknown to me, and there is no reliable record in literature of forms with yellow or white fruit. Forms with large fruits have been named *A. arbutifolia* f. *macrocarpa* Zabel (in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 192 [1903], nomen).

Aronia floribunda Spach. Hist. Vég. II. 89 (1834). — *Pyrus floribunda* Lindley in Bot. Reg. XII. t. 1006 (1826); Trans. Hort. Soc. VII. 229 (1827?)² — ? *Pyrus melanocarpa* β *subpubescens* Lindley, l. c. (1827?). — *Sorbus floribunda* Heynhold, Nomencl. Bot. 773 (1840). — ? *Sorbus melanocarpa* β *subpubescens* Heynhold, l. c. (1840). — ? *Aronia nigra* b. *pubescens* Dippel, Handb. Laubholzk. III. 386 (1893), pro parte. — *Pyrus arbutifolia* var. *melanocarpa* f. *pubescens* Rand & Redfield, Fl. Mt. Desert, 98 (1894). — *Aronia atropurpurea* Britton, Man. 517 (1901). — Britton & Brown, Ill. Fl. ed. 2, II. 291, fig. 2327 (1913). — Nash in Addisonia III. 1, t. 81 (1918). — *Sorbus arbutifolia* var. *atropurpurea* Schneider, Ill. Handb. Laubholzk. I. 698 (1906). — *Aronia arbutifolia* var. *atropurpurea* Schneider in Fedde, Rep. Sp. Nov. III. 150 (1906). — *Pyrus arbutifolia* var. *atropurpurea* Robinson in Rhodora, x. 33 (1908). — *Adenorhachis atropurpurea* Nieuwland in Am. Midl. Nat. IV. 94 (1915). — *Pyrus atropurpurea* Bailey in Rhodora, XVIII. 154 (1916). — *Pyrus melanocarpa* var. *atropurpurea* Farwell in Rep. Mich. Acad. Sci. XIX. 258 (1917).

This species is intermediate in its characters between *A. arbutifolia* and *A. melanocarpa* Elliott, resembling in its pubescence the first species and in its fruit the second. Therefore *A. floribunda* has been considered by some botanists, first apparently by Koehne (Deutsch. Dendr. 254 [1893]), a hybrid between these two species, but its wide distribution from Newfoundland or Nova Scotia to Florida and west to Michigan and Indiana and its occurrence in regions where only one or neither of the parents grow, is not in favor of this theory, though possibly hybrid forms occasionally occur which it seems impossible to distinguish from this species.

¹ Upon *Mespilus xanthocarpa* Loddiges, the fruit of which was unknown to him, Lindley based his *Pyrus melanocarpa* β *subpubescens* which probably belongs to the following species.

² As the date of Lindley's publication usually the date of the title page, 1830, is cited, but the volume was published in parts and Lindley's article must have appeared between 1826 and 1828, as he does not cite it in 1826, while in 1828 he quotes it under plate 1154 of the Botanical Register.

Photinia Lindl.

Photina villosa DC. var. *coreana*, comb. nov. — *Pourthiaea coreana* Decaisne in Nouv. Arch. Mus. Paris, x. 148 (1874). — *Pirus mokpoensis* Léveillé in Fedde, Rep. Nov. Spec. x. 200 (1909). — *Pourthiaea villosa* var. *coreana* Nakai in Tokyo Bot. Mag. xxx. 25 (1916).

This variety differs from the type chiefly in the thinner, long-acuminate leaves and usually attenuate at the base, in the somewhat longer (3–6 mm. long) petioles and in the slenderer pedicels and branches of the inflorescence which is villous or sometimes only slightly so. It occurs in Korea and Japan.

Amelanchier Med.

× *Amelanchier grandiflora*, hybr. nov. (= *A. canadensis* × *laevis* Wiegand in herb.) — *A.?* *Botryapium lancifolia* Simon-Louis apud Zabel, Syst. Verz. Muenden, 19 (1878), nomen. — *A. canadensis grandiflora* Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 191 (1903), nomen. — *A. lancifolia* hort. gall. ex Zabel, l. c. (1903), pro synonym.

Arbor vel frutex ramis patentibus gracilibus; ramuli juniores initio floccoso-villosi, mox glabri, annotini purpureo-fusci. Folia ovata vel oblongo-ovata, breviter acuminata, basi subcordata, 4–10 cm. longa et 2.5–4 cm. lata, subaequaliter argute serrata, initio glauco-purpurea et supra laxa, subtus satis dense tomento sericeo-floccoso cito evanescente oblecta, maturitate glabra, supra opace viridia, subtus glauca, utrinsecus nervis 7–12 conspicuis; petioli 1.2–2 cm. longi, initio sericeo-villosi, mox glabri. Racemi plerique pendentes, flexuosi, 5–10 cm. longi, 8–10-flori, laxissime sericeo-villosi, purpurascens; pedicelli inferiores 1.5–2.2 cm. longi, apicem versus decipientes; calyx extus glaber vel fere glaber, purpurascens; sepala triangulari-vel ovato-lanceolata, acuminata, 4–5 mm. longa, sub anthesi initio erecti, mox reflexi; petala oblongo-oblancheolata, 1.3–1.6 cm. longa et 5–6 mm. lata; ovarium apice glabrum; hypanthium late campanulatum. Fructus atropurpurei, leviter glaucescentes, 7–8 mm. diam., succulenti, dulces, sepalis reflexis, pedicellis inferioribus 1.7–2.5 cm. longis.

Cultivated specimens: Bot. Gard. Muenden, April 23 and July 3, 1893, *A. Rehder* (type); Arnold Arboretum under No. 4406 (received from Muenden 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* (as *A. canadensis*).

The following spontaneous specimens in the herbaria of the Arnold Arboretum and of the New England Botanical Club and in the Gray Herbarium have been referred to this hybrid by Dr. K. M. Wiegand:

ONTARIO. Kingston, May 15, 1902, *J. Fowler*.

VERMONT. Windham County: Westminster, April 30, May 15, 1903, and (North) Westminster, Rod. Smith's pasture, May 3 and 10, 1903, *W. H. Blanchard* (distributed as *A. intermedia*). Rutland County: Noyes swamp, Pittsford, May 6, 1899, *W. W. Eggleston* (No. 1183); Rutland, July 7, 1899, *G. H. Ross* (Eggleston, No. 1118).

NEW HAMPSHIRE. Sullivan County: Summer's Falls, Plainfield, July 27, 1900, *W. W. Eggleston* (No. 1958).

CONNECTICUT. Hartford County: May 7 and June 16, 1901, May 8, June 13 and September 1, 1901, May 8 and June 9, 1901, *C. H. Bissell*; Glastonbury, May 14, 1913, *C. A. Weatherby* (No. 2863a); Tariffville, May 17, 1903, *E. J. Winslow & A. F. Hill*. New Haven County: banks of Mad River, May 1, 1913, *A. E. Blewitt* (No. 1800).

RHODE ISLAND. Providence County: Lime Rock, June 4, 1913, *C. F. Batchelder*; Lincoln, July 13, *M. L. Fernald*.

NEW YORK. Monroe County: Seneca Park, Rochester, May 4, 5, 18, June 21, July 6, 1905, *B. H. Slavin* (Nos. 1, 3, 8, 16). Chemung County: Latter Brook, May 13, 1898, *T. F. Lucy* (No. 5). Tompkins County: Fall Creek, Ithaca, 1885, *W. R. Dudley* (No. 54).

PENNSYLVANIA. Erie County: Presque Isle, May 8-9, 1906, *O. E. Jennings*. Lancaster County: mouth of Tucqan, April 29, 1893, *A. A. Heller & E. G. Halbach* (No. 1365).

VIRGINIA. Smyth County: Stalie's Knob, East Marion, May 18-19, 1892, *J. K. Small*; south fork of Holston River, east of Add Wolf, August 8, 1892, *J. K. Small*. Alexandria County: south of Alexandria, April 28, 1901, *G. S. Miller*.

NORTH CAROLINA. Rowan County: April 24, 1916, *T. G. Harbison* (No. 3).

GEORGIA. Richmond County: Augusta, May 22, April 6, 1900, *A. Cuthbert* (No. 2).

INDIANA. Warren County: two miles north of Attica, April 21, May 15, 1917, *C. C. Deam* (No. 22524). Ripley County: seven miles south-east of Versailles, June 18, 1915, *C. C. Deam* (No. 16116). Wells County: one mile below Vera Cruz, May 8, 1915, *Mrs. C. C. Deam* (No. 15582).

ILLINOIS. Jackson County: Grand Tower, May 3, 1902, *H. A. Gleason* (No. 2404); Tower Rock, May 7, 1902, *H. A. Gleason* (No. 2405).

MISSOURI. Marion County: Hannibal, August 28, 1911, *J. Davis* (Nos. 704, 713).

MICHIGAN: Marquette County: Turin, May 18, 1901, *B. Barlow*. Arenac County: Au Gres, June 21, 1912, *C. K. Dodge* (No. 4); Wayne County: Detroit, May 12, 1856 (*Herb. W. Boott*).

The specimens cited above are all intermediate in their characters between *A. canadensis* and *A. laevis* and there can be little doubt that they represent hybrid forms between these two species. The hybrid, as represented by the plants in the Arnold Arboretum differs from *A. canadensis* in the larger flowers, the longer and slenderer less pubescent racemes, in the purplish young leaves covered with a less dense, more floccose tomentum which soon disappears entirely; from *A. laevis* it differs in the tomentose young leaves, the slightly villose racemes with more numerous flowers on shorter pedicels and in the larger, more succulent fruit. Among the many *Amelanchier* 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 Muenden 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.

***Amelanchier grandiflora* f. *rubescens*, f. nov.**

A typo recedit floribus in alabastro intense purpureo-roseis, sub anthesi leviter roseo suffusus.

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* growing in Seneca Park, Rochester, and represented in our herbarium by specimen 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.

Malus L.

In the following conspectus of the genus *Malus* thirty-two species are recognized, including *Eriolobus* which had been considered by some botanists a distinct genus. These thirty-two species fall easily into several distinct and apparently natural groups which call for a systematic arrangement under sections and subsections to bring out their relationship. The first division of the genus into sections was proposed in 1893 by Koehne, who divided it into the sections *Calycomeles* and *Gymnomeles* according to the behavior of the calyx whether persistent or deciduous. Ten years later Zabel considering the veneration of the leaves the most important character proposed the section *Eumalus* with involute and never lobed leaves and the section *Sorbomalus* with conduplicate and more or less lobed leaves. In 1906 Schneider added two new sections, *Eriolobus* corresponding to the genus of that name, and *Docyniopsis* containing *M. Tschonoskii* which I had referred in 1903 to the genus *Eriolobus* chiefly on account of the presence of copious grit-cells in the fruit; this character, however, I do not now consider important enough for generic distinction and I am following Schneider in referring *Eriolobus* to *Malus*.

SECT. I. EUMALUS Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 185 (1903), nomen. — Schneider, Ill. Handb. Laubholzk. I. 714 (1906). — Leaves involute in bud, never lobed; fruit without grit-cells.

Subsect. 1. PUMILAE, subsect. nov. — *M.* sect. *Calycomeles* Koehne, Deutsch. Dendr. 257 (1893), pro parte. — Calyx persistent: styles 5; fruit about 2 cm. thick or larger.

1. *M. pumila* Mill. — 2. *M. sylvestris* Mill. — 3. *M. prunifolia* Borkh. — 4. *M. spectabilis* Borkh. — The species of this subsection are closely related. — Europe, western to eastern Asia.

Subsect. 2. BACCATAE, subsect. nov. — *M.* sect. *Gymnomeles* Koehne, Deutsch. Dendr. 257 (1893), pro parte. — Calyx deciduous: styles 3–5: fruit small, not exceeding 1.5 cm.

5. *M. sikkimensis* Koehne. — 6. *M. baccata* Borkh. — 7. *M. theifera* Rehd. — 8. *M. Halliana* Koehne. — The species of this subsection are closely related except *M. sikkimensis* which seems to have some relation to *M. Prattii* and *M. yunnanensis*. — Eastern Asia, Himalayas.

SECT. II. SORBOMALUS Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 721 (1906), nomen. — Schneider, Ill. Handb. Laubholzk.

I. 721 (1906). — *M. sect. Gymnomeles* Koehne, Deutsch. Dendr. 257 (1893), pro parte. — Leaves conduplicate in bud, usually more or less lobed: calyx deciduous or sometimes persistent: styles 3–5: locules of ovary not extending with their apex to the base of style and core of fruit not protracted into a free pointed apex; fruit without or with few grit-cells.

Subsect. 3. SIEBOLDIANAE, subsect. nov. — Calyx caducous, leaving a large shallow scar: styles 3–5, villous at base: leaves of flowering branchlets not lobed; those of shoots partly 3–5-lobed, rarely not lobed: fruit subglobose, without grit-cells, small.

9. *M. floribunda* Sieb. — 10. *M. zumi* Rehd. — 11. *M. Sieboldii* Rehd. — 12. *M. Sargentii* Rehd. — The species of this group are all closely related. — Japan and Korea.

Subsect. 4. KANSUENSES, subsect. nov. — Calyx usually tardily deciduous, leaving a small deeply impressed scar, sometimes partly or wholly persistent: styles 3–5, glabrous: all leaves more or less lobed except in *M. fusca*: fruit ellipsoidal, without or with few grit-cells.

13. *M. fusca* Schneid. — 14. *M. transitoria* Schneid. — 15. *M. kansuensis* Schneid.¹ — 16. *M. Komarovii* Rehd. — 17. *M. honanensis* Rehd. — The first two species of this group form a transition to the preceding subsection on account of the absence of grit-cells in the fruit and of dots on the fruit and the first also in its only partly three-lobed leaves. The following two species have their fruits dotted and with a few grit-cells; of the last species which forms by the shape of its leaves a transition to the subsect. Yunnanenses the fruit is not yet known. — Western North America, eastern Asia.

Subsect. 5. FLORENTINAE, subsect. nov. — Calyx deciduous: leaving a small deeply impressed scar: styles 5, villous at base: all leaves lobed with several lobes on each side: fruit broadly ellipsoidal, without grit-cells.

18. *M. florentina* Schneid. — Italy.

Subsect. 6. YUNNANENSES, subsect. nov. — Calyx persistent: styles 5, glabrous or nearly so: leaves slightly lobed with several lobes on each side or not lobed: fruit subglobose, about 1 cm. across, dotted, with grit-cells.

19. *M. Prattii* Schneid. — 20. *M. yunnanensis* Schneid. — The first species seems to have some relation to the subsect. Kansuenses, while *M. yunnanensis* has leaves similar to those of *M. Tschonoskii*. — Western China.

SECT. III. CHLOROMELES, sect. nov. — *Chloromeles* Decaisne in Fl. des serres, xxiii. 156 (1881). — *M. sect. Calycomeles* Koehne, Deutsch. Dendr. 257 (1893), pro parte. — *M. subsect. Coronariae* Rehder in Sargent, Trees & Shrubs, II. 142 (1911). — Leaves conduplicate in bud, at least the leaves of shoots lobed, rarely without lobes: calyx persistent: styles 5, villous at base; anthers red or reddish; locules of ovary extending with their apex above base of style and core of fruit with free pointed apex: fr. subglobose or depressed, 2–5 cm. across, green or yellowish green, not dotted, without grit-cells.

¹ The styles of this species are glabrous in our specimens, not pilose as described by Batalin.

21. *M. platycarpa* Rehd. — 22. *M. coronaria* Mill. — 23. *M. glaucescens* Rehd. — 24. *M. glabrata* Rehd. — 25. *M. bracteata* Rehd. — 26. *M. lancifolia* Rehd. — 27. *Malus angustifolia* Mill. — 28. *M. ioensis* Britt. — This is a very distinct and at the same time homogeneous group; its species are so closely related that some authors have considered them as all belonging to one species. The type of the section is *Malus angustifolia*, the species upon which Decaisne based the genus *Chloromeles*. — Eastern North America.

SECT. IV. *ERIOLOBUS* Schneider in Fedde, Rep. Sp. Nov. III. 179 (1906). — *Pyrus* sect. *Eriolobus* Seringe in De Candolle, Prodr. II. 636 (1825). — *Eriolobus* Roemer, Syn. Monog. III. 216 (1847). — *Cormus* sect. *Eriolobus* Decaisne in Nouv. Arch. Mus. Paris, x. 157 (Mém. Fam. Pomac.) (1874). — *Eriolobus* sect. *Eueriolobus* Schneider, Ill. Handb. Laubholz. I. 725 (1906), pro parte. — Leaves conduplicate in bud, all deeply lobed, calyx persistent, with reflexed lobes: styles 5, villous at base; stamens 20–30: locules of ovary extending with their apex into base of style and core of fruit pointed and free at apex: fruit ellipsoidal, with grit-cells.

29. *M. trilobata* Schneid. A very distinct species which has no close relation to any other species. — Western Asia.

SECT. V. *DOCYNIOPSIS* Schneider in Fedde, Rep. Sp. Nov. III. 179 (1906). — *Eriolobus* Rehder in Sargent, Trees & Shrubs, I. 74 (1903), pro parte. — Leaves conduplicate in bud, not or very slightly lobed; inflorescence 2–5-flowered; calyx persistent, with upright lobes; stamens 30–50; styles 5, villous at base; locules of ovary extending into base of style and core of fruit pointed and free at apex; fruit 2–4 cm. across, dotted, with grit-cells.

30. *M. Tschonoskii* Schneid. — 31. *M. formosana* Kawak. & Koidz. — 32. *M. laosensis* A. Cheval. (*Pyrus laosensis* Cardot). — This group shows a close affinity to *Docynia* and particularly *M. formosana* much resembles in the structure of its flower that genus, but has only two ovules in each cell. *Malus docynioides* placed by Schneider in this section belongs to *Docynia*. — Eastern Asia.

Malus baccata Borkhausen f. *gracilis*, forma nov.

A typo recedit habitu humiliore, ramis patentibus ramulis gracilibus pendentibus, foliis ab initio glabris, ovato-oblongis vel oblongo-ellipticis, 5–8 cm. longis et 2–4 cm. latis, basi late cuneatis, crenato-serrulatis, petiolis 1.5–3.5 cm. longis, floribus minoribus, circiter 3 cm. diam., stylis saepe 4, fructibus 0.8–1 cm. longis, late obovoideis vel subglobosis, rubris.

Cultivated in the Arnold Arboretum; plants received from the Veitchian Nurseries in 1913 as *Pyrus* sp. Purdom no. 327; type specimens collected May 14 and October 21, 1919, preserved in the herbarium of the Arboretum.

This form belongs to the typical variety of *Malus baccata* (var. *sibirica* Schneid.), but differs from the commonly cultivated form chiefly in the graceful pendent habit, the comparatively narrower obtusely serrulate leaves with slenderer petioles, in the smaller flower with often only 4 styles and in the small fruits. The white flowers are not fragrant.

The exact native habitat of this form is not known with certainty. Purdom sent under No. 329 flowering specimens of *M. baccata* collected at Yen-an Fu, Shensi, and it is probable that No. 327 under which the plants were received from Veitch is a mistake for 329, as the number 327 is represented by a *Caragana* in his collection. None of his flowering specimens, however, agrees with our plant and no fruiting herbarium specimens of *M. baccata* have been collected by Purdom.

***Malus floribunda* Siebold var. *brevipes*, var. nov.**

A typo praecipue recedit foliis minoribus, floribus minoribus, albidis, circiter 2.5 cm. diam., pedicellis brevibus 0.8–1.5 cm. longis ut calyx glabris, petalis late ovalibus 1–1.2 cm. longis; stylis 3–4 quarta parte tantum connatis ima basi glabris et tantum versus apicem partis connatae sparse vel densius pilosis, fructibus subglobosis circiter 1 cm. diam. pedicello erecto vel suberecto 0.6–1.5 cm. longo suffultis.

Cultivated at the Arnold Arboretum under No. 1850 for many years, originally received as *Pyrus Sieboldii* probably from St. Petersburg; type specimens collected May 19 and October, 1898, preserved in the herbarium of the Arboretum.

This is a very peculiar form which in its leaf-characters agrees with *M. floribunda*, but the flowers are much smaller, only slightly pink, rather short-stalked and the style is more deeply divided and less densely pubescent. The shrub looks particularly distinct in autumn with its more or less upright fruit on rather stout pedicels rarely more than 1 cm. in length. It is not without hesitation that I refer this plant as a variety to *M. floribunda*, but it shows no characters which point to hybrid influence of any other species, and from *M. Sieboldii* it differs in the leaves which never show the slightest tendency toward lobing. It may be nearer to the wild form, *M. floribunda* var. *spontanea* Koidzumi which according to a specimen before me has smaller lighter colored flowers and smaller leaves than the cultivated typical form.

***Malus kansuensis* Schneider f. *calva*, forma nov.**

A typo recedit pedicellis calycibusque extus et foliis subtus ab initio glabris, ramulis et petiolis basin versus sparse pilosis mox glabris.

CHINA. Hupeh: Fang Hsien, alt. 2300 m., May 28 and September, 1907, *E. H. Wilson* (No. 264, flowers [type] and fruit); without exact locality, *A. Henry* (No. 6754), Shensi: Tai-pei-shan, 1910, *W. Purdom* (No. 1118). Western Szechuan: woodlands around Tachien-lu, 2600–3300 m., June, 1908, *E. H. Wilson* (No. 2996); without precise locality, alt. 3000 m., May, 1904, *E. H. Wilson* (Veitch Exped. No. 3495).

This new form is easily distinguished from the type by the absence of pubescence from the inflorescence and the leaves. The original description of Batalin is chiefly based on Potanin's specimens of which he describes the flowers with pubescent pedicels and calyx; in the description of the leaves as "glabra vel subtus in nervis puberula" he apparently includes fruiting specimens of Henry's No. 6754 which belongs to *f. calva*. Batalin's description of the flowers fits exactly Wilson's specimens from Pan-lan-shan under No. 2995 except that he describes the styles as pilose, while

I found them glabrous; in these specimens the young leaves are densely villose on the whole under side and the same pubescence is present in Purdom's specimens from western Kansu, which are in young fruit; the pubescence never disappears entirely and in Wilson's fruiting specimens under 4115 from Pan-lan-shan and Tachien-lu the mature leaves show more or less pubescence beneath, at least on the midrib and the veins.

Malus Komarovii, comb. nov. — *Crataegus tenuifolia* Komarov in Act. Hort. Petrop. xvii. 435 (1901); xxii. 470, t. 10 (Fl. Manchur.) (1904), non Britton. — Nakai in Jour. Coll. Sci. Tokyo, xxvi. art. 1, 180 (Fl. Kor. i) (1909); Chôsenshokubutsu, i. 292, fig. 346 (1914). — Schneider, Ill. Handb. Laubholz. i. 771 (1906). — *Crataegus Komarovii* Sargent, Pl. Wilson. i. 183 (1912). — Schneider, Ill. Handb. Laubholz. ii. 1005 (1912). — Nakai, Fl. Sylv. Kor. vi. 62, t. 29¹ (1916).

NORTHERN KOREA: "in jugi Koreani, in silvis mixtis primævis," June 20 (old style), 1897, *V. Komarov* (No. 862); Tumen-Yalu divide, prov. Kankyo, August 30, 1917, *E. H. Wilson* (No. 9058; bush 1.5 m.); above Kanin between Keizanchin and Choshin, prov. Kankyo, September 11, 1917, *E. H. Wilson* (No. 9143; bush 1-3 m.; fruit reddish); about middle of Mt. Laoling, prov. Kankyo, alt. 1300 m., September 17, 1917, *E. H. Wilson* (No. 9177; bush 1-2 m.; fruit reddish); "secus torrentes montis Sodenrei," July 10, 1914, *T. Nakai* (No. 1573).

Malus Komarovii is closely related to *M. kansuensis* and similar to its form *calva*, but is easily distinguished by the short pedicels of the fruit which are only 1-1.5 cm. long (2-3.5 in *M. kansuensis*), by the cordate or subcordate base of the more deeply lobed leaves, the sinus of the lower lobes reaching often more than halfway to the middle, and by the oblong-ovate gradually acuminate spreading or often slightly recurved lower lobes provided usually with a small basal lobe, while in *M. kansuensis* the lower lobes are triangular-ovate and abruptly short-acuminate without basal lobes. The resemblance of the leaves to those of certain *Crataegus* has led Komarov in the absence of mature fruit to place this plant in the genus *Crataegus*, but even before examining the structure of the ovary the racemose inflorescence shows at a glance that it is not a *Crataegus*.

As the first specific name given to this plant is a still-born name, the later valid specific name has to be used for the new combination under *Malus*.

Malus honanensis, sp. nov.

Frutex (verisimiliter); ramuli satis graciles, initio laxe floccoso-tomentosi, cito glabri, rubro-brunnei, nitiduli; gemmae juveniles (medio Junio) perulis paucis rubro-brunneis extus glabris margine villosis. Folia late ovata, rarissime oblongo-ovata, vel orbiculari-ovata, acuta, basi truncata vel rotundata, interdum subcordata, 4-7 cm. longa et 3.5-6.5 cm. lata, utrinque lobis 2-5 apicem versus decrescentibus brevibus late ovatis acutis vel obtusiusculis instructa, toto margine subsimpliciter argute serrulata vel interdum crenato-serrulata, initio utrinque laxe villosa-tomentosa, supra

¹ Nakai figures the fruit erroneously with a persistent calyx, but the calyx is finally deciduous, though it remains on the immature fruit a long time together with the remnants of the stamens and the styles.

mox glabra, subtus tarde glabrescentia, reticulo venularum impresso satis conspicuo, nervis utrinsecus circiter 5 rectis sub angulo circiter 45° divergentibus; petioli graciles, 1.5–2 cm. longi, initio villosito-tomentosi, tarde glabrescentes; stipulae lineari-lanceolatae vel subulatae, caducae. Flores (defflorati tantum visi) 5–8 in racemo umbelliformi; pedicelli post anthesin glabri, graciles, 1.5–3 cm. longi, cicatricibus bracteolarum notati; sepala deltoideo-ovata, acutiuscula, 2 mm. longa, extus glabra, intus dense villosa, post anthesin reflexa, verosimiliter demum decidua; petala orbiculari-ovata (unum tantum visum), 7–8 mm. longa, basi subcordata, unguiculo brevi, utrinque glabra; stamina circiter 20, 4–5 mm. longa; discus cupularis, glaber; styli 3, infra medium connati, toti glabri, stamina paulo superantes. Fructus desideratur.

CHINA. Honan: Sung Hsien, Shi-tze-miao, May 26, 1919, *Joseph Hers* (No. 489, type; No. 573); Teng Feng Hsien, Yu-tai-shan, alt. 800 m., April 23 and June, 1919, *Joseph Hers* (No. 222, 222bis, sterile); Hwei Hsien, Shang-lieh-kiang, June 17, 1919, *Joseph Hers* (No. 725).

This is a very distinct species related to *M. kansuensis* with which it agrees in the structure of the flowers, particularly in the 3 glabrous styles and the triangular-ovate sepals, but the leaves are very different from those of *M. kansuensis* which are usually three-lobed or occasionally five-lobed, and resemble those of *M. yunnanensis* Schneid. The plant might be described as having the leaves of *M. yunnanensis*, but smaller and comparatively broader and acute, not acuminate, and the flowers of *M. kansuensis*. As the mature fruit is not yet known, it remains doubtful whether the calyx is deciduous or persistent.

Mr. Hers notes three different vernacular names for this plant; for no. 222: "ta-yeh-mao-cha" (large hairy leafy Crataegus); for 573: "sung-lo-cha" (meaning doubtful, sung-lo being the classical name of an undetermined vine, or as Bretschneider has it, a mistletoe); for nos. 489 and 725: "mu-hu-li" (fox pear).

***Malus coronaria* var. *dasycalyx*, var. nov.**

A typo recedit calyce villosa, foliis subtus pallidioribus, eis turionum maturis interdum ad costam et venas leviter pubescentibus.

OHIO. Lucas County: Maumee River bank, Walbridge Park, Toledo, May 21 and September 28, 1914, September 29, 1915, *R. E. Horsey* (No. 253, type); near Ottawa Park, Toledo, May 24, 1915, September 29, 1914, *R. E. Horsey* (No. 308); May 22 and September 29, 1914, same place and collector (No. 259). Lorain County: Oberlin, October 4, 1915, *R. E. Horsey & Grover* (No. 496). Harden County: Mt. Victory, May 16 and September 24, 1915, *R. E. Horsey* (No. 349). Franklin County: Columbus, May 17, 1914 and September 24, 1913, *R. E. Horsey* (No. 115). Clark County: Springfield, May 13, 1915, *R. E. Horsey* (No. 337).

INDIANA. Porter County: sand dunes 5 miles north of Chesterton, August, 1915, *C. C. Deam* (No. 18066). Noble County: 2 miles northwest of Wold Lake, May 14, 1919, *C. C. Deam* (No. 27458). Allen County: Godfrey Reserve, 3 miles south of Fort Wagner, May 14, 1919, *C. C. Deam* (No. 27479). Wells County: east of Bluffton, May 19, 1916, *C. C. Deam* (No. 19754); southeast of Bluffton, May 18, 1919, *C. D. Deam* (No. 27487). Whitley County: Loon Lake, May 14, 1919, *C. C. Deam* (No. 27474). Warren County: 2 miles south of Rainsville, May 10,

1919, *C. C. Deam* (No. 27356). Randolph County: 5 miles south of Winchester, May 18, 1919, *C. C. Deam* (No. 27498). Wayne County: Elliott Mill bog, 4 miles southeast of Richmond, May 18, 1919, *C. C. Deam* (No. 27499).

SOUTHERN ONTARIO: woods, Niagara, May 31, 1901, *J. Macoun* (Herb. Surv. Geol. Canada, No. 34405); Amherstburg, June 10, 1882, *J. Macoun* (Fl. Can. No. 81); Fort St. Detroit, May 23, 1869 (Herb. Wm. Boott); all three in Herb. Gray.

This variety seems to be restricted to the southwestern part of the Great Lakes region, its range extending from southern Ontario to central Ohio and to middle and northwestern Indiana and probably to northeastern Illinois.

The flowering specimens show some resemblance to *M. glaucescens* Rehder which is an Alleghanian species ranging from northwestern New York to northern Alabama, but they differ in the more or less villous calyx while the pedicels are glabrate and in the narrower and longer leaves less deeply lobed and less glaucescent; the adult leaves of vigorous shoots differ still more being less deeply lobed, green or only slightly glaucescent beneath and particularly toward the end of the shoots pubescent on the midrib beneath and borne on short, pubescent petioles; such leaves occur in *M. coronaria* but not in *M. glaucescens*.

***Malus coronaria* var. *dasycalyx* f. *Charlottae*, forma nov.**

A typo varietatis recedit floribus semiplenis majoribus.

Hort. E. P. DeWolf, Waukegan, Illinois, June 1, 1919, and June 20, 1920, *E. P. DeWolf*.

This handsome double-flowered form was discovered about eighteen years ago by Mrs. Charlotte M. DeWolf, near Waukegan. It is the second double-flowered form known of American Crab Apples. From the well known Bechtel Crab, *M. ioensis plena*, it is easily distinguished by the characters in which *M. coronaria* var. *dasycalyx* differs from *M. ioensis*.

Malus coronaria Charlottae is apparently fully as handsome as the Bechtel Crab and will probably become like that form a favorite ornamental tree.

***Malus angustifolia* Mill. f. *pendula*, forma nov.**

A typo recedit ramulis gracilibus pendulis.

FLORIDA. Gadsden County: River Junction, June 25, 1914, *T. G. Harbison* (No. 129).

According to Mr. Harbison this form is very conspicuous among other Crab Apples on account of its peculiar weeping habit. It should be introduced into cultivation, as it will prove probably a valuable ornamental tree.

Malus bracteata Rehder in Sargent, *Trees & Shrubs* II. 230 (1913); in Mitteil. Deutsch. Dendr. Ges. XXIII. 261 (1914). — *Pyrus bracteata* Bailey in Rhodora, XVIII. 155 (1916); Stand. Cycl. Hort. v. 2878 (1916). — *Malus redolens* Ashe in Bull. Charleston Mus. XII. 39 (1916).

Malus bracteata originally described from a tree in southeastern Missouri has according to recent extensive collections a much wider range which extends from North Carolina to northwestern Florida and west to southeastern Missouri and central Alabama. The chief characters of *M. bracteata* are

the obtuse or acute, serrate or serrulate never lobed leaves of the flowering branchlets and the slightly lobed rather broad leaves of the vigorous shoots, pubescent beneath at least on the veins. The mature leaves of the shoots resemble those of *M. ioensis* var. *Palmeri*, but that species differs in its tomentose calyx. From *M. lancifolia* which some forms of *M. bracteata* resemble it differs in the broader and thicker strongly veined and pubescent leaves of the shoots, which are in *M. lancifolia* thin and glabrous at maturity and those of the flowering branchlets acute or acuminate at the apex. It is perhaps most closely related to *M. angustifolia* from which it differs chiefly in the broader and larger serrulate or serrate, not crenate leaves usually rounded at base and of thinner texture and not turning brown in drying, like those of *M. angustifolia*. The persistent bractlets which form a conspicuous feature of the Missouri specimens are smaller and early deciduous in most other specimens.

Malus ioensis f. *plena*, comb. nov. — *Pyrus angustifolia* fl. *pleno* in Gard. Chron. ser. 3, XIII. 43, fig. 8 (1893). — *Pyrus coronaria* fl. *pleno*, l. c. xxv. 39, fig. 145 (1899). — *M. angustifolia plena* Hartwig in Mitteil. Deutsch. Dendr. Ges. XVI. 268 (1907). — *M. angustifolia* fl. *pleno* Morel in Rev. Hort. 1910, 60, tab. — Burvenich in Rev. Hort. Belg. XXXVIII. 185, tab. (1912). — *M. coronaria* var. *plena* Schneider in Silva-Tarouca, Uns. Freil.-Laubg. 264 (1913). — *Pyrus coronaria* f. *plena* Voss in Putlitz & Meyer, Landlex. IV. 68 (1913). — *Pyrus coronaria ioensis* fl. *pleno* Kache in Gartenw. XVIII. 477, fig. (1914). — *Pyrus ioensis flore pleno* Bean, Trees Shrubs Brit. Isls. II. 286 (1914). — *Pyrus angustifolia Bechtelii* Greening Nursery Co., Descript. Book, 31, fig. (191?).

This double-flowered form of *M. ioensis*, generally known as "Bechtel's Crab" was found near Staunton, Illinois, and was introduced into cultivation by E. A. Bechtel of Staunton about 1888 from a tree found wild northeast of Staunton and known to old settlers for about 40 years (see Garden Mag. XVII. 318 [1913]). Flowering specimens were sent to the Arboretum in 1892 by Mr. Bechtel under the name *Pyrus angustifolia* fl. *pleno*.

HYBRIDS

× *Malus robusta*, nomen nov. = *M. baccata* × *prunifolia* Koehne, Deutsch. Dendr. 260 (1893). — ? *Pyrus baccata* var. *cerasifera* Regel in Gartenfl. XI. 202, t. 364, figs. 1, 6 (var. *cerasiformis* in tab.) (1862). — *Pyrus cerasifera* Wenzig in Linnaea, XXXVIII. 45 (1874), non Tausch. — *Pyrus cerasifera* var. *hyemalis* Wenzig, l. c. — *M. microcarpa turbinata* Carrière, Étud. Gén. Pomm. Microcarp. 71 (1883). — *M. microcarpa cerasiformis* Carrière, l. c. 72 (1883). — *M. microcarpa robusta* Carrière, l. c. 76 (1883). — *M. microcarpa jucunda* Carrière, l. c. 81 (1883). — *M. microcarpa macrantha* Carrière, l. c. 94 (1883). — *M. microcarpa kermesina* Carrière, l. c. 87, fig. 15 (1883); in Rev. Hort. 1885, 112, fig. 21. — *Malus cerasifera* Zabel in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 187 (1903), non Spach. — *Malus cerasifera coccinea* hort. apud Zabel, l. c. — *M. cerasifera*

coccinea macrocarpa hort. apud Zabel, l. c. — *M. cerasifera hiemalis* hort. apud Zabel, l. c. — *M. cerasifera jenensis* hort. apud Zabel, l. c. 188 (1903). — *M. cerasifera odorata* hort. apud Zabel, l. c. — *M. odorata* Hort. Gall. ex Zabel, l. c. (1903), pro synon.

This hybrid has been called by many recent authors *Malus* or *Pyrus cerasifera*, but *M. cerasifera* Spach as well as *Pyrus cerasifera* Tausch are synonyms of *M. baccata* var. *mandshurica* and not applicable to this hybrid. The numerous forms of this hybrid are also often found in gardens referred to *M. baccata* Borkh. or *M. prunifolia* Borkh. under various varietal names. Of the different specific names attributed by various authors to this hybrid or quoted as synonyms none seems to be applicable to it. *Malus sibirica* Borkh. is according to the author's description either a form of *M. pumila* Mill. or *M. astrachanica* Dum.-Cours. *Pyrus microcarpa* Wendl. (not *P. microcarpa* Spreng.) of which I have not been able to find the place of publication is cited by Roemer (Syn. Monog. III. 214 (1847)) as a synonym of *M. baccata*, while *M. microcarpa* Carr. is a collective name for all Apples with smaller fruit than those of the common cultivated Apple; it seems to have been first applied to *M. microcarpa fastigiata* (in Rev. Hort. 1879, 215) which is apparently a form of *M. pumila*. *Pyrus rubicunda* Hoffmanns. (*M. rubicunda* Roem.) is probably a form of *M. prunifolia* or of *M. sylvestris*. *Pyrus ceratocarpa* Wender. has been taken for a form of *M. prunifolia* (*M. prunifolia* ζ *ceratocarpa* Roem.) and *P. sphaerocarpa* Wender. is probably *M. baccata* var. *mandshurica* Schneid. to which variety also *P. suaveolens* Wender. may possibly be referable.

To this hybrid belong many of the forms cultivated under the name "Siberian Crabs" and the "Red Siberian" (colored plate in Beach, Apples of New York, II. 264, tab.) may serve as a representative of this group. One of the oldest forms is probably "Biggs' Everlasting Crab" mentioned by Loudon who states that it was raised in the Cambridge Botanic Garden by Mr. Biggs from seed received in 1814 from Siberia.

× *Malus robusta* var. *persicifolia*, var. nov.

A formis aliis recedit praecipue foliis oblongo-lanceolatis, 5–7.5 cm. longis et 1.5–2.5 cm. latis. — Arbor parva ramis suberectis satis robustis, folia acuminata, basi cuneata, argute serrulata, ab initio fere glabra, maturitate subchartacea; petioli 1–1.5 cm. longi; flores albi; in alabastro leviter carneo suffusi, 2.5 cm. diam.; pedicelli 2–2.5 cm. longi, ut calyx glabri: fructus subglobosus, circiter 1.5 cm. diam., plerique calyce deciduo interdum parvo persistente coronati, flavi, colore rubro suffusi.

Cultivated at the Arnold Arboretum; received from the Veitchian Nurseries in 1913 as *Pyrus* sp. Purdom (No. 179); type specimens collected May 8 and August 26, 1918, preserved in the herbarium of the Arboretum.

This is a very distinct looking Apple with rather stout branches fairly closely set with narrow peach-like leaves; but presenting no striking ornamental qualities.

× *Malus adstringens* Zabel = *M. baccata* × *dasyphylla* Zabel in Beiss-

ner, Schelle & Zabel, Handb. Laubholz-Ben. 187 (1903) (= *M. baccata* × *M. pumila*). — ? *M. transcendens* [Hort. apud Nash] in Jour. New York Bot. Gard. XIX. 195 (1918), nomen.

Zabel's name though published without description may be considered sufficiently fixed by the indication of the parentage and seems to be the oldest name for the hybrids between *Malus baccata* and *M. pumila*. *Malus adstringens* is similar to *M. robusta* and not always easily distinguished from it, particularly as ternary hybrids like *M. (baccata* × *prunifolia*) × *pumila* probably occur, but the generally more pubescent leaves, the shorter stalks of the flowers and fruits, the larger, often depressed fruits with more impressed calyx will distinguish this group of hybrids which is also included under the general term "Siberian Crabs." Forms like "Hyslop" (see Beach, Apples of New York, II. 257, tab.), "Transcendent" (Beach, l. c. 266, tab.) and "Martha" (Beach, l. c. 259, tab.) may serve as types of this group of hybrids which is from an economic point of view more important than the forms of *M. robusta*.

× *Malus sublobata*, comb. nov. (= *M. prunifolia rinki* × *Sieboldii*). — *Pirus Ringo sublobata* Zabel, Syst. Verz. Münden, 18 (1878), nomen. — *P. Ringo trilobata* Zabel, l. c. (1878). — *Malus Ringo* a. *sublobata* Dippel, Handb. Laubholzk. III. 400 (1893). — *M. Ringo* × *Toringo sublobata* Zabel in Beissner, Schelle & Zabel, Handb. Laubholzk. 188 (1903). — *M. Ringo* × *Toringo trilobata* Zabel, l. c. 489 (1903).

Arbor coma pyramidalis ramis suberectis vel adscendentibus, vel coma rotundata ramis patentibus; ramuli satis robusti, juniores tomentosi, demum glabrescentes, fusco-purpurei; gemmae perulis tomentosis partim glabrescentibus. Folia vernatione partim conduplicata, partim involuta, ea ramulorum brevium anguste elliptica vel elliptico-oblonga, 3.5–8 cm. longa et 2–3.8 cm. lata, breviter acuminata, basi cuneata, argute simpliciter serrata, rarissime lobis brevibus 1–2 instructa, initio utrinque villosa-tomentosi, supra mox glabra, subtus tomento persistenti tenui vestita; petioli 1–4 cm. longi, graciles, pubescentes; folia turionum late ovata ad oblongo-ovata, ad 8 cm. longa et ad 7 cm. lata, basi rotundata vel late cuneata, superiora plura vel pauca utrinque, vel uno latere tantum, infra medium lobo brevi acuto instructa, maturitate chartacea; petioli plerique 1.5–2 cm. longi. Flores 3–6, albo-rosei, 3.5–4 cm. diam.; pedicelli 1.5–2.5 cm. longi, ut calyx albo-villosi: lobus calycis anguste triangulari-lanceolatus, circiter 7 mm. longi; petala ovalia, circiter 2 cm. longa, basi rotundata; styli 5 vel 4, raro 3, circiter 1 cm. longi, staminibus paulo longiores. Fructus subglobosus, 1.5–2 cm. diam., interdum leviter costatus, flavus, calyce persistente basi in tubum brevem connato coronatus vel interdum calyce deciduo.

Cultivated at the Arnold Arboretum under No. 3833–1, of unknown origin; type specimens collected May 25, 1916, and September 23, 1918, preserved in the herbarium of the Arboretum.

This is a very handsome tree of pyramidal habit, or in one form with a round head, conspicuous in autumn by its numerous yellow fruits. It has

the general appearance of a vigorous form of *M. robusta*, but the veneration of the leaves which at least on the upper part of vigorous shoots are distinctly lobed and the number of styles which varies to 4 and even to 3 show the influence of *M. Sieboldii*. Of the origin of our plants nothing certain is known; the form with the round head probably came up in a lot of mixed *Malus* seeds brought in 1892 by Professor Sargent from Japan. As it appears from the synonyms enumerated above, forms of similar origin had been cultivated by Zabel in the arboretum at Muenden, Germany, before 1878, but a plant received as *M. Ringo sublobata* from Spaeth's nursery near Berlin, Germany, in 1900, proved to be a form of *M. robusta*.

× *Malus Arnoldiana* Sargent in Arnold Arb. Bull. no. xxii. 2 (1912), nomen. — Dunbar in Garden Mag. xxx. 22. fig. (1919) (= *M. baccata* × *floribunda*.) — *M. floribunda* var. *Arnoldiana* Rehder in Moeller's Deutsch. Gärt. Zeit. xxiv. 27, 2 figs. (1909). — *Pyrus pulcherrima* var. *Arnoldiana* Bailey in Rhodora, xviii. 155 (1916); Stand. Cycl. Hort. v. 2875 (1916). — *Malus pulcherrima* var. *Arnoldiana* [Nash] in Jour. New York Bot. Gard. xix. 194 (1918).

When I described this handsome flowering Crab in 1909 as a variety of *M. floribunda*, I believed that *M. floribunda* was probably a hybrid of *M. baccata* and *M. Sieboldii*, but I now consider *M. floribunda* to constitute a species, being led to this change of opinion partly on account of the discovery of a similar wild form described as *M. floribunda* var. *spontanea* Koidz., and partly on account of the fact that the hybrid theory does not satisfactorily explain the characters of *M. floribunda*.

Malus purpurea, comb. nov. (= *M. atrosanguinea* × *M. pumila* var. *Niedzwetzkyana*). — *M. floribunda purpurea* Barbier & Cie. in Rev. Hort. 1910, 539. — *Pyrus Malus floribunda purpurea* R. C. Notcutt in Gard. LXXVIII, 220 (1914). — *Pyrus floribunda* × *P. Niedzwetzkyana* in Gard. Chron. ser. 3, LXII. 221, fig. 84 (1917). — This hybrid was offered to the trade in 1910 by Barbier & Cie. of Orléans, France, and was stated to be a hybrid between *M. floribunda atropurpurea* and *M. Niedzwetzkyana*, which seems to be correct judging from the characters of the plant. This makes it a ternary hybrid, as *M. atrosanguinea* is supposed to be a cross between *M. Halliana* and *M. Sieboldii*. From *M. pumila* var. *Niedzwetzkyana* it differs chiefly in the occasionally lobed, smaller and lustrous leaves, in the longer-pedicled flowers with oblong petals and partly 4 styles and in the smaller fruit with sometimes deciduous calyx; from *M. atrosanguinea* it differs in the purplish young leaves, the purplish wood, in the larger and darker colored flowers and in the much larger fruit with usually persistent calyx.

Besides this hybrid two other hybrids of *M. pumila* var. *Niedzwetzkyana* have been briefly described by Professor N. S. Hansen in a leaflet published by the Department of Horticulture of the South Dakota State College of Agriculture and Mechanic Arts, entitled Northern Novelties for 1920. One of these hybrids is called "Hopa Red-flower Crab" and *M. baccata* is stated to be the male parent; it will, therefore, have to be classified as a variety

of *M. adstringens*. The other hybrid is called "Red Tip Crab" and is a hybrid with a wild Crab from Elk River, Minnesota, as the female parent. As *M. ioensis* is the wild species of that region, this hybrid would be a variety of *M. Soulardii*.

Docynia Decne.

Docynia docynioides, comb. nov. — *Docynia Delavayi* Rehder in Sargent, Pl. Wilson, II. 296 (1915), pro parte, non Schneider. — *Malus docynioides* Schneider in Bot. Gaz. LXIII. 400 (1917).

CHINA. Southern Szechuan: "inter Kua-pie et Ta-tiao-ko," alt. 2700 m., May 23, 1914, *C. Schneider* (No. 1349, type); Chin-chi Hsien, mountain-side alt. 1300 m., August, 1908, *E. H. Wilson* (Arnold Arb. Exped. No. 2998); same locality, July, 1903, *E. H. Wilson* (Veitch Exped. No. 3493). Yunnan: Mengtsze, mountains west, alt. 1800–2000 m. *A. Henry* (Nos. 10036, 10036a).

In examining Schneider's type of *Malus docynioides* I find that there are 3–5 ovules in each cell and that it should, therefore, be transferred to *Docynia*, though the resulting combination is rather unfortunate. This new *Docynia* is so closely related to *D. Delavayi* that some botanists may possibly not consider it specifically distinct, as the two types, though looking very distinct, are apparently connected by intermediate forms. *Docynia docynioides*, however, may be readily separated from typical *D. Delavayi* by the absence of the dense white tomentum of the under side of the leaves, by the thinner, not persistent leaves often, particularly toward the apex, serrate or serrulate, by the smaller number of stamens, and apparently also by the smaller number of ovules, for Cardot (in Rev. Hort. 1918, 131) states that in Franchet's type the number of ovules in each locule is 8–10, not 4 as described by Franchet, and Cardot for this reason transfers the species to *Cydonia* (in which he includes *Chaenomeles*) as *C. Delavayi*, but even if the number of ovules should be ten, this would not be a sufficient reason to transfer the species to *Cydonia* or *Chaenomeles*, as it agrees in all other characters, particularly in the structure of the flowers, with the other species of *Docynia*. The number of ovules, too, in *Cydonia* and *Chaenomeles* is more than ten.

Chaenomeles Lindl.

× *Chaenomeles superba*, hybr. nov. (= *C. japonica* × *lagenaria*). — *Cydonia Maulei* var. *superba* Frahm in Gartenw. II. 214 (1898). — Rehder in Bailey, Cycl. Am. Hort. I. 427 (1900). — *Chaenomeles Maulei superba* Leichtlin apud Zabel in Beissner, Schelle & Zabel, Handb. Laubholz.-Ben. 128 (1903). — Rehder in Bailey, Stand. Cycl. Hort. II. 728 (1914). — *Cydonia Maulei* var. *atrosanguinea* Froebel apud Olbrich in Gartenw. IV. 270 (1900).

This handsome garden form is apparently a hybrid between *C. japonica* and *C. lagenaria*, as already suggested by Zabel (l. c., see above). It differs from *C. japonica* chiefly in the larger, but narrower, acute, more sharply serrate, darker green leaves and in the larger flowers of deep blood-red color, and from *C. lagenaria* in the pubescent young branchlets slightly verruculose the second year, in the smaller, generally obovate-oblong less finely

and closely serrate leaves and in the more upright and compact habit. There are several distinct forms in cultivation.

C. superba f. *alba*, comb. nov. — *Cydonia Maulei* var. *alba* Froebel apud Olbrich in Gartenw. iv. 270 (1900). — *Chaenomeles Maulei alba* Froebel apud Zabel in Beissner, Schelle & Zabel, Handb. Laubholz.-Ben. 182 (1903). — A form with white flowers.

C. superba f. *rosea*, comb. nov. — *Cydonia Maulei* var. *grandiflora rosea* Froebel apud Olbrich, l. c. — *Chaenomeles Maulei grandiflora rosea* Froebel apud Zabel, l. c. — A form with light rose-colored flowers.

C. superba f. *perfecta*, comb. nov. — *Cydonia Maulei grandiflora perfecta* Froebel apud Olbrich, l. c. — *Chaenomeles Maulei grandiflora perfecta* Froebel apud Zabel, l. c. — A form with larger and broader leaves and with scarlet flowers with sometimes 6–8 petals.

In the genus *Chaenomeles* I am not able to distinguish more than three well marked species: *C. sinensis* Koehne belonging to the section *Pseudocydonia* Schneider later considered a distinct genus by its author, and *C. japonica* Lindley and *C. lagenaria* of the section *Euchaenomeles*; the former Japanese and the latter Chinese. The following recently proposed species based on cultivated plants are apparently all forms of *C. lagenaria*: *C. angustifolia* Koidzumi in Jour. Coll. Sci. Tokyo, xxiv. art. 2, 97 (1913); *C. eugenoides* Koidzumi in Tokyo Bot. Mag. xxix. 160 (1915); *C. trichogyna* Nakai in Tokyo Bot. Mag. xxx. 23 (1916); Fl. Sylv. Kor. vi. 42, t. 15 (1916); *C. cardinalis* (Carr.) Nakai in Tokyo Bot. Mag. xxxii. 145 (1918) and *C. eburnea* (Carr.) Nakai, l. c. They may be distinct enough to be ranked as varieties or forms, but as I have seen neither specimens nor plants of any of them I am not able to make a definite statement regarding their systematic standing.

Pyrus L.

Pyrus ussuriensis Maxim. var. *hondoensis*, var. nov. — *Pyrus ferruginea* Koidzumi in Tokyo Bot. Mag. xxix. 158 (1915), non Hooker f. — *P. rufoferruginea* Koidzumi, l. c. 311 (1915). — *P. aromatica* Kikuchi & Nakai in Tokyo Bot. Mag. xxxiii. 33 (1918). — *P. hondoensis* Kikuchi & Nakai l. c. 34 (1918).

HONDO. Mountainous parts near Tonomachi, Kamiheigun, Iwate pref., May 20, 1918, *K. Yamagishi*; same locality, same date, *K. Kikuchi*; mt. near Aidomura, Iwakigun, Fukushima pref., August 22, 1918, *S. Akiyama*; Ajara Mt. near Kuratatemura, Minamitsugarugun, Aomori pref., August 30, 1918, *A. Kikuchi*; about three miles from Yamagatamura, Minamitsugarugun, Aomori pref., August 22, 1914, *A. Kikuchi*; Fujisan, above Subashiri, alt. 1167 m., June 1918, *E. H. Wilson* (No. 10375; tree 5 m.); Soihimura, Chiisagatagun, Naganoken, May 23, 1918, *A. Kikuchi*; Kogoyama, prov. Kai, and Yamanaka, prov. Kai, *T. Komiyama*.

This variety differs from the type chiefly in the more elongate, ovate to ovate-oblong leaves with closer and finer, more appressed and less aristate serration, in the longer pedicels of flowers and fruits and in the often present brown floccose tomentum of the young branchlets and leaves and

of the inflorescence. The tomentose form described as *P. subferruginea* which scarcely differs from *P. aromatica*, may possibly be kept as a distinct form of the var. *hondoensis*, while the type of the variety represents the glabrescent or glabrous form. In Korea and particularly in southern Korea a form with longer pedicels occurs, but the shape and serration of the leaves is that of typical *P. ussuriensis*.

***Pyrus ussuriensis* var. *ovoidea*, var. nov.** — *P. ovoidea* Rehder in Proc. Am. Acad. L. 228 (1915); in Moeller's Deutsch. Gaertn.-Zeit. xxxi. 102, fig. 2 (1916). — Nakai, Fl. Sylv. Kor. vi. 48, t. 17 (1916). — Bailey, Stand. Cycl. Hort. v. 2869, fig. 3278 (1916).

The addition of the var. *hondoensis* to *P. ussuriensis* has lessened the differences between *P. ovoidea* and *P. ussuriensis* and there remains now only the shape of the fruit which can hardly be considered a specific character in *Pyrus*. It therefore seems necessary to reduce *P. ovoidea* to a variety of *P. ussuriensis*.

To *P. ussuriensis* as synonyms or varieties belong probably the following recently published species based mostly on cultivated plants: *P. acidula* Nakai in Tokyo Bot. Mag. xxx. 27 (1916); Fl. Sylv. Kor. vi. 49, t. 18 (1916). — *P. Maximowicziana* Nakai, l. c. 50, t. 20 (1916). — *P. macrostipes* Nakai, l. c. 28 (1916); l. c. 52, t. 22 (1916). — *P. vilis* Nakai, l. c. 28 (1916); l. c. 51, t. 21 (1916). — *P. crassipes* Kickuhi & Nakai in Tokyo Bot. Mag. xxxii. 35 (1918). — *P. obovoidea* Koidzumi in Tokyo Bot. Mag. xxxiii. 123 (1919). — *P. insueta* Koidzumi, l. c. 123 (1919). — *P. tremulans* Koidzumi, l. c. 126 (1919). — *P. insulsa* Koidzumi, l. c. 127 (1919). — *P. iwatensis*, Koidzumi, l. c. 127 (1919). — *P. nambuana* Koidzumi, l. c. 128 (1919). — *P. jucunda* Koidzumi, l. c. 128 (1919).

***Pyrus serrulata* Rehder** in Proc. Am. Acad. L. 234 (1915); in Sargent, Pl. Wilson. ii. 263 (1915); in Moeller's Deutsch. Gaertn.-Zeit. xxxi. 111, fig. 7 (1916). — Bailey, Stand. Cycl. Hort. v. 2870 (1916).

From the specimens collected by Wilson in China this species was described as having 3-4 styles and a deciduous calyx, but plants raised at the Arboretum from seed collected at the same time in China produced flowers with usually 4, very often 5, but very rarely 3 styles and with partly persistent and partly deciduous calyx; between the number of styles or locules and the behavior of the calyx there seemed to be a slight correlation in so far as a larger percentage of the fruits with deciduous calyx had five locules. The few fruits, too, of a specimen collected by Professor L. H. Bailey at Kuling, Kiangsi, in 1917, which otherwise looks like *P. serrulata*, shows five styles and persistent calyx. Whether the variation in the number of styles and in the behavior of the calyx indicates hybrid origin of *P. serrulata* or simply a tendency of the species to vary, I am not yet prepared to say. In species with normally deciduous calyx it occurs sometimes, as I have observed in *P. betulifolia*, *P. Calleryana* var. *Fauriei* and in *P. pashia*, that the calyx wholly or partly persists, but in this case the fruits often do not seem to be quite normal and sometimes are seedless.

***Pyrus Calleryana* Decne. f. *graciliflora*, forma nov.**

A typo recedit ramulis apicem versus tomento canescenti denso ad secundum annum persistente vestitis, basin versus glabris, floribus minoribus circiter 2 cm. diam., staminibus dimidia petala superantibus, antheris roseis. — Arbor: folia ab initio glabra margine tantum villosa: inflorescentia glaberrima, 7–10-flora, laxa; pedicelli 1.5–2.5 cm. longi; styli fere semper 2.

Cultivated at the Arnold Arboretum; raised from seed collected by Mr. E. H. Wilson, at Patung Hsien, Hupeh, in 1907; type specimens collected May 6, 1919, preserved in the herbarium of the Arboretum.

This form looks at flowering time quite distinct from the plants we consider typical *P. Calleryana* on account of its looser and slenderer inflorescence and the smaller flowers with pink, not purple anthers.

***Pyrus Calleryana* f. *tomentella*, forma nov.**

A typo recedit ramulis junioribus dense albo-tomentosis, annotinis glabrescentibus vel glabris, foliis initio tomento floccoso obtectis mox glabris costa media utrinque villosa excepta, saepe, praesertim eis turionum, argutius serrulatis nec crenato-serrulatis, inflorescentiis, pedicellis calycibusque albo-villosis.

Cultivated at the Arnold Arboretum; raised from seed collected by Mr. E. H. Wilson in Hupeh in 1907; type specimens collected May 10 and September 22, 1918, preserved in the herbarium of the Arboretum.

This form is readily distinguished from the type by the dense white tomentum of the young growth and of the inflorescence, which on the branchlets often persists until the following year.

***Pyrus Calleryana* var. *Fauriei*, Nakai mscr. in. sched. Herb. Imp Univ. Tokyo ex Nakai in Toyko Bot. Mag. xxx. 30 (1916), pro synon. — *P. Fauriei* Schneider, Ill. Handb. Laubholz. i. 666, fig. 363d' (1906); in Fedde, Rep. Sp. Nov. III. 121 (1906). — Rehder in Proc. Am. Acad. L. 238 (in nota) (1915). — Nakai in Coll. Sci. Tokyo, xxvi. art. 1, 182 (Fl. Kor. I.) (1909); Fl. Sylv. Kor. vi. 54, t. 24 (1916).**

KOREA. Prov. Keiki: mountain slopes near Keijyo (Seoul), September 23, 1918, *E. H. Wilson* (No. 10743; shrub 1–2 m.; fruit russet spotted); Seoul, May 1901, *U. Faurie* (No. 78, type, ex Schneider); "Syon Ouen, circa sepulchrum," May 30, 1906, *U. Faurie* (No. 310); Kazan near Suigen, May 24, 1917, *E. H. Wilson* (No. 8480; tree 8 m.); same locality, September 2, 1917, *S. Tokuda*.

Judging from the specimens before me *P. Fauriei* is only a variety of *P. Calleryana*, smaller in all its parts than the type; the leaves are sometimes broadly cuneate at base and rather thin.

***Pyrus Kawakamii* Hayata in Jour. Coll. Sci. Tokyo, xxx. art. 1, 99 (1911); Icon. Pl. Formos. I. 243 (1911). — *P. Koehnei* Koidzumi in Jour. Coll. Sci. Tokyo, xxxiv. art. 2, 57 (1913), pro parte. — Rehder in Proc. Am. Acad. L. 238 (1915), quoad plantam Formos., non Schneider.**

FORMOSA. Kyoshiryo, prov. Nanto, road-side, alt. 667m., February 11, 1918, *E. H. Wilson* (No. 9835; bush 4 m.); same locality, thickets, November 4, 1918, *E. H. Wilson* (No. 10876; tree to 10 m.); in garden of Chinese at Sozon, prov. Taikoku, October 11, 1918, *E. H. Wilson* (No. 10785; tree 5 m.).

This species had been referred as a synonym to *P. Koehnei* by Koidzumi

and I followed him having seen at that time no specimens of either species. Now I have before me flowering and fruiting material of the Formosan plant and find that the flowers are quite different from those of *P. Koehnei*; the calyx-lobes are short, ovate and obtuse or obtusish, the number of styles is 3 in the several flowers examined and the peculiar construction of the disk in *P. Koehnei* as figured by Schneider is not present. The species is much nearer to *P. Calleryana* and may be only a variety of it; it differs chiefly in the ovate, obtuse or obtusish, not deltoid and acute calyx-lobes, in the broadly elliptic to elliptic-oblong, more coriaceous leaves usually cuneate not rounded at base and more deeply and sharply crenate-serrulate, though similar leaves may be found on specimens of *P. Calleryana* from Kwangtung. The young leaves, the pedicels and the outside of the calyx are quite glabrous.

× *Pyrus congesta*, hybr. nov. (= *P. betulifolia* × *elaeagrifolia*).

Arbor ramis patentibus ramulis subpendentibus junioribus cinereo-tomentosis tomento ad secundum et partim ad tertium annum persistente. Folia ovata vel elliptico-ovata ad elliptico-lanceolata, acuminata vel minora acuta, basi rotundata vel cuneata, 3–6 cm. longa, ea turionum semper anguste elliptica ad elliptico-lanceolata, basi cuneata et ad 7 cm. longa, basi excepta argute serrulata, initio utrinque, supra laxius tomentosa, demum supra costa media villosa excepta glabra, intense viridia, lucida, subtus pallidiora tomento tenui oblecta, nervis utrinque elevatis conspicuis sub angulo circiter 45° divergentibus; petioli 0.5–2.5 cm. longi, graciles, tomentosi. Flores 6–9 in umbella satis densa 3–5 cm. diam., albi, 2–2.5 cm. diam.; pedicelli 0.5–2 cm. longi, ut calyx villosito-tomentosi; calycis lobi triangulari-ovata, obtusiuscula, 1.5–2 mm. longa, reflexa, utrinque villosa, dimidium tubum aequantes; petala ovalia, 0.8–1.2 cm. longa; stamina 25–30, petala dimidia aequantia; styli 3–4, rarissime 5, basi sparse pilosi vel fere glabri, staminibus breviores. Fructus subglobosi, 3–9 in umbella congesta, 1–1.5 cm. diam., brunnei, punctulati, pedicellis robustis 0.5–1.5 cm. longis suffulti, calyce persistenti lobis reflexis coronati; semina 6 mm. longa, obovoidea.

Cultivated at the Arnold Arboretum, of unknown origin, probably from seed collected in the Arboretum; type specimens collected May 13, 1909, and September 30, 1913, are preserved in the herbarium of the Arboretum.

This hybrid resembles most *P. betulifolia* Bunge from which it chiefly differs in the finely serrulate narrower leaves, those of the shoots mostly elliptic-lanceolate and cuneate at the base, tomentose on both sides when unfolding and with permanent tomentum beneath, in the larger short-stalked flowers with 3–4 or rarely 5 styles and in the larger fruit with persistent calyx. The other parent is apparently *P. elaeagrifolia* of which there was a tree near the *P. betulifolia* from which the seed was probably taken. From that species it is easily distinguished by the broader serrulate leaves, the 3–4 styles, only very rarely 5, and the smaller fruit in dense clusters of from three to nine.

(To be continued)



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