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THE ALPINE BEARBERRIES AND THE GENERIC STATUS OF ARCTOUS.

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To those who are familiar with the flora of Canada it has long been known that there are two shrubs passing as *Arctostaphylos alpina*; one, the typical form of the species, with black or purplish-black pulpy strong-flavored berries; the other with more juicy and milder scarlet berries. Though not recorded in North America until 1852, the red-berried shrub was well described from Siberia as early as 1769. In his *Flora Sibirica*, J. G. Gmelin described the shrub from three districts, representing the full breadth of Siberia: "in the region of the Kutschakou mines among the Verkouturie chain" of the Ural Mountains (in northwestern Siberia near the Russian border); "on mountain barrens about the Olakmink fortification" (on the Lena River northeast of Lake Baikal); and "in the hills of Ochotsk at the mouth of the Marecan River." These plants were listed as *Arbutus caulibus procumbentibus, foliis rugosis serratis* of Linnaeus's *Flora Lapponica*, which is the black-berried *Arctostaphylos alpina*; but in his description Gmelin said that the berries are "red . . . with abundance of juice and an insipid taste."¹ The first record of the scarlet-fruited shrub in North America was apparently by Sir John Richardson, who, in the enumeration of the trees and shrubs of British America, wrote of the Alpine Bearberry, *Arctostaphylos alpina* (L.) Spreng. (*Arbutus alpina* L.): "there are two varieties, one

¹ "In regionem Kutschakouensis fodinae intra catanem montium Verchoturensium et in sterilibus montasis intra Olecmense munimentum, vt et Ochotii ad Marecani fluuii ostium in collibus occurrit. Baccas magnas habet, rubras, . . . succi plenas, gustuque fatuas." — J. G. Gmel., Fl. Sib. iv. 119 (1769).

with bright red and more juicy fruit; the other, having a dark purplish-black berry, of more fleshy consistence, and a stronger peculiar flavor. Both are eaten in the autumn; and, though not equal to some of the other native fruits, are not unpleasant. The two kinds are exactly alike in foliage."¹ In 1884, Professor John Macoun wrote: "Both Hooker and Gray state that the berries of this species are black, on the contrary, those on specimens obtained on Anticosti and the Rocky Mountains [of Canada] are bright red."² In 1901, Britton & Rydberg, in an enumeration of plants from Yukon, after listing specimens (as *Mairania alpina*) add: "The red-fruited form collected also by Tarleton below Selwyn River";³ in 1902, Miss Eastwood, enumerating the plants of Nome City, Alaska, described the material as having "leaves thin, deciduous, . . . surface smooth . . . fruit a red, juicy berry"⁴ and added the comment: "The berries which were collected and preserved in formalin may not be ripe. According to the descriptions they are black when ripe"; in 1907, Miss Farr, in her *Catalogue of the Flora of the Canadian Rocky Mountains and the Selkirk Range*, after listing stations at Banff, on Mt. Sulphur, at Field and in the Yoho Valley, said: "The drupes are a bright, clear red in color";⁵ and in the same year Mr. Stewardson Brown, in his *Alpine Flora of the Canadian Rocky Mountains*, describes the shrub (as *Mairania alpina*) as having "leaves thin . . . berry bright scarlet."⁶

But through all this period the scarlet-fruited plant, treated merely as a color-form of the polar *Arctostaphylos alpina*, received no name. Very recently, however, in the enumeration of woody plants from western China, *Plantae Wilsonianae*, Rehder & Wilson have set off the shrub as *Arctous alpina*, var. *rubra*,⁷ distinguished in the diagnosis merely by its red fruit, but with a supplementary note that "the leaves of the red fruited variety, both in the Asiatic and American specimens, are thinner and larger, while those of the typical form are smaller and of firmer texture."⁸ The specimens cited by them are the

¹ Richardson, Arctic Searching Expedition, 433 (1852).

² Macoun, Cat. i. 294 (1884).

³ Britton & Rydberg, Bull. N. Y. Bot. Gard. ii. 179 (1901).

⁴ Eastwood, Bot. Gaz. xxxiii. 209 (1902).

⁵ Farr, Contrib. Bot. Lab. Univ. Pa. iii. No. 1, 61 (1907).

⁶ S. Brown, Alp. Fl. Can. Rocky Mts. 214, 215 (1907).

Rehder & Wilson treat the name *Arctous* as masculine but Niedenzu, who first took up the name (originally coined without explanation of its origin by Gray for a section of *Arctostaphylos*) for the genus, treated it as feminine, and it seems proper in such a case to follow the decision of Niedenzu.

⁸ Rehder & Wilson, Pl. Wils. pt. iii. 556, 557 (1913).

type, *Wilson* no. 4025 from western Szech'uan in China, and two of Rehder's collection from near Banff and near Laggan, Alberta; but three of the above references to red berries in America (including Macoun's note on the *Anticosti* shrub) are given and the conclusion drawn that, "It seems to be the common form of western North America" and "The plant of eastern North America has bluish black fruit like that of Europe." The record from *Anticosti* clearly indicates, however, that the shrub is not strictly of "western North America" but occurs also near the easternmost margin of the continent; and in studying the plant as a member of the flora of eastern America the writer has found that, besides the characters indicated by Rehder & Wilson, the scarlet-berried shrub has several others which are of greater import and mark it as a well-defined second species of the section *Arctous*, a group of *Arctostaphylos* heretofore considered monotypic.

Briefly, the differences between *Arctostaphylos alpina* and the scarlet-berried plant are as follows. In *A. alpina* the persistent inner scales of the winter-buds are obovate and rounded at summit; in the scarlet-berried plant ovate or lanceolate and acuminate: in *A. alpina* the leaves are very rugose, subcoriaceous and marcescent, their margins, especially toward the base and on the petioles, ciliate with stiff bristles 1–2 mm. long; in the other shrub the leaves are less rugose, thinner, and more or less definitely deciduous, their margins without definite cilia, the usually longer petioles glabrous or at most minutely pilose-ciliate at base: in the black-berried plant the seeds are 2.7–4.6 mm. long, 2–3.6 mm. wide; in the red 2.5–3 mm. long, 1.6–2.2 mm. wide: the black-fruited shrub is, in America at least, primarily if not always a shrub of acid or noncalcareous rocks; the red-fruited both with us as well as in China a plant of limestones.

That *Arctostaphylos alpina* in eastern America is a shrub of acid or noncalcareous habitats is well-known to those whose explorations have extended from New England to Labrador. The specimens and records of exact stations in eastern America, west of Greenland, make this apparent: Cape Prince of Wales, Hudson Straits, "where the rocks were found to be chiefly coarse, red granitite-gneiss";¹ Cape Chidley or Chudleigh, where "the rock everywhere consists of ordinary varieties of gneiss";² Nachvak, Labrador, where the "mountains . . .

¹ Low, Geol. Surv. Can., Ann. Rep. n. s. xi. 372 (1899).

² R. Bell, Geol. and Nat. Hist. Surv. Can. Rep. of Progr. for 1882-'84, 18 DD (1885).

proved to be mostly Laurentian gneiss";¹ Hopedale, Labrador, its rock "of the ordinary Laurentian gneiss . . . with veins of quartz and of granite";² Indian Harbor, Labrador, with "hills . . . formed of a pale whitish foliated syenite";³ Battle Harbor, Labrador;⁴ L'Anse au Loup and Blanc Sablon, Labrador, with their lowlands of Laurentian gneiss;⁵ Barred Island and Baccalieu Island and Twillingate, Newfoundland;⁶ open granite crests, Mt. Steepmore, Newfoundland; open granitic ledges, Mt. Musgrave, Newfoundland; Laurentian uplands back of Balena, Newfoundland; crests of Huronian hills, Miquelon; La Tabatière and Mécatina, Saguenay Co., Quebec, in the gneissoid region of the "North Shore";⁷ crests of hornblende schist, Flagstaff Peak, Mt. Albert, Quebec; Traveller Mt., Maine, "composed of a beautiful drab colored siliceous slate";⁸ Mt. Katahdin, Maine; and the White Mts., New Hampshire.

The preference for calcareous soils of the scarlet-berried plant is clearly indicated also by the Canadian stations from which it is definitely known: Anticosti Island, composed of Silurian rocks, chiefly limestones;⁹ Fort Churchill, Hudson Bay, with its areas of Silurian and Cambro-Silurian limestones;¹⁰ Jasper House, Alberta, at the base of a conspicuous limestone mountain;¹¹ Bow River Pass (including Banff, Sulphur Mt., and Laggan), Alberta, where "The rocks composing the mountains on both sides of the valley are almost entirely of the limestone series";¹² Kicking Horse Pass (including Field), British Columbia, with "rocks referred to the great limestone series coming down to the level of the bottom of the valley";¹³ Yoho Valley (North Fork, Cross River), British Columbia, where "the limestones, both in the bottom of the valley and so far as could be

¹ R. Bell, l. c. 14 D D (1885).

² Packard, Lab. Coast, 206 (1891).

³ Packard, l. c. 171 (1891).

⁴ "We pass Outer Battle Island and the 'Two Sisters,' bare, low islands of nearly white gneiss." — Packard, l. c. 137 (1891).

⁵ See Packard, l. c. 116–118 (1891); also Fernald, RHODORA, xiii. 121 (1911).

⁶ All in the sandstone, diorite and serpentine region of Notre Dame Bay (See Howley's geological map).

⁷ See Logan, Can. Geol. 287 (1863).

⁸ C. H. Hitchcock, Prelim. Rep. Nat. Hist. and Geol. Me. for 1861, 403.

⁹ See Logan, Geol. Can. Chaps. x and xii.

¹⁰ See Tyrrell, Geol. Surv. Can., Ann. Rep., n. s., ix. 167, 168 F (1897).

¹¹ "Roche Miette, a notable landmark . . . stands on the east side of the Athabasca a few miles below Jasper Lake" and is composed chiefly of limestone — See McEvoy, Geol. Surv. Can., Ann. Rep., n. s. xi. 29D and Pl. 1 (1900).

¹² G. M. Dawson, Geol. Surv. Can., Ann. Rep., n. s., i. 134 B (1886).

¹³ Dawson, l. c. 139B (1886).

observed, to the tops of the adjacent mountains, have become changed to marble";¹ below Selwyn River, Yukon;² Cape Nome, Alaska.³ Of the three Siberian stations of Gmelin two are definitely located on a geological map of Siberia, Olakminisk and Ochotsk, both in "Paleozoic" areas; and, most important of all, the type station in western China is "by the side of a stream rich in calcareous deposits."⁴

Differing from the black-berried shrub in such essential characters:—the narrower and pointed inner scales of the winter-buds, the thinner and more elongate, more deciduous leaves without the characteristic bristly ciliation, the juicier scarlet berries and the smaller seeds, as well as its usual if not absolute restriction to calcareous soils; the scarlet-berried shrub has abundant claims to specific separation. Before formally transferring it, however, it is necessary to look into the generic name which it should bear. Its black-fruited relative of Eurasia and our northern and alpine granitic, gneissoid and siliceous areas was called by Linnaeus *Arbutus alpina*, but by practically all subsequent botanists has been treated as generically distinct from *Arbutus*, which has a many-seeded berry.

The generic name *Arctostaphylos* Adanson (1763), though very inadequately defined, has been almost universally used for *A. alpina* (L.) Spreng. (1825) and for *A. Uva-ursi* (L.) Spreng. and its allies, but recently Mr. F. N. Williams⁵ has revived the Clusian and Tournefortian *Uva Ursi* on the basis of its post-Linnean use by Miller in the Abridgement of the Gardener's Dictionary in 1754, nine years before the publication of the generic name *Arctostaphylos*. The name or names, *Uva Ursi*, altered by Mr. Williams to *Uva-ursi* and by some others to *Uva-Ursi* has promptly been taken up by several authors to displace *Arctostaphylos*; but as Mr. B. Daydon Jackson well points out: "The proposed use of *Uva Ursi* for *Arctostaphylos* is excluded by analogy: Linnaeus (Phil. Bot. 160 (1751)) says:—'Nomina generica ex duobus vocabulis integris ac distinctis facta, e Republica Botanica releganda sunt . . . [e. g.] Vitis idaea T. *Vaccinium*.'"⁶ Not only is the name *Uva Ursi* excluded by analogy and

¹ Dawson, l. c. 116B (1886).

² The writer has been unable to learn with definiteness the rock at this station.

³ On the latest geological map of North America much of the Seward Peninsula, including Nome, is indicated as Paleozoic.

⁴ Rehder & Wilson, l. c.

⁵ F. N. Williams, Journ. Bot. xlviii. 183 (1910).

⁶ Jackson, *ibid.* 206 (1910).

by the consistent practice of the "Botanical Republic," but the International Rules specifically cover the case in Article 54. "Names of genera must be rejected in the following special cases: . . . 3. When they are formed of two words, unless these two words were from the first united or joined by a hyphen." Miller, and before him Tournefort and Clusius, neither joined the two words by a hyphen nor united them into a single word but wrote with absolute clearness: *UVA URSI*. The name *Arctostaphylos* will, then, continue to be used by those who follow the International Rules.

The taking up of the two unhyphenated words *Uva Ursi*, altered to a compound word *Uva-Ursi*, as has been done by some advocates of the "American" Code, seems to be in violation of the rule in that Code which says: "The original orthography of names is to be maintained, except in the following cases; . . . (a) Manifest typographical errors may be corrected. (b) Adjectival names of species and subspecies agree in gender with the generic name with which they are associated. (c) Generic names derived from personal names should be feminine, . . . (d) In the cases of names proposed in works in which *v* and *j* were used as vowels or *u* and *i* as consonants they should be corrected to agree with modern usage." If this rule is really to be followed by its advocates it is difficult to see how such an altered generic name as "*Uva-Ursi*" is allowable when the "original orthography" of Miller, and Tournefort before him, and Clusius before him, was uniformly the two words *Uva Ursi* or Bear's Grape.

Of late several botanists have been treating the Alpine Bearberry as belonging to a monotypic genus under the name *Mairania* Necker, Elem. Bot. i. 219 (1790), but, as Rehder & Wilson (*l. c.*) point out, *Mairania* was purely synonymous with *Uva Ursi* Tournefort and by neither Necker nor Desvaux, who took up the name, was used to distinguish the Alpine Bearberry as such. The type of *Mairania* is *Arctostaphylos Uva-ursi* (L.) Spreng. as is clearly shown by Necker's statement: "Quaed. Arbut. Linn. *Uva ursi* Tournef." Necker was simply reinstating Tournefort's *Uva Ursi* as a genus under a monomial generic name and separating it from *Arbutus* with which Linnaeus had merged it, saying: "*Hanc cum praecedente [Arbuto], confudit Linnaeus: utramque, meritò separavit Tournefortius, siquidem characterem diversum, monstrant tam fructa quàm numero seminum.*" Britton, in the 2d edition of the *Illustrated Flora*, keeps up *Mairania* for the Alpine Bearberry, ascribing it to Necker but dating it not from

Necker's own publication, as was done in the previous edition, but from Desvaux's *Journal de Botanique*, iii. 36, 292 (1813); but surely Desvaux's treatment gives no ground for generically separating *Arbutus* or *Arctostaphylos alpina* from *A. Uva-ursi*. In fact, it requires a far keener scent for nomenclatorial trails than the present writer possesses to follow Desvaux to any rational conclusion. Here is what Desvaux did. In the body of the volume he wrote:

"[p. 36] MAIRANIA ARCTOSTAPHYLOS, Adanson.

Calix minimus 5 partitus; corolla ovata, limbo parvo, 5 [p. 37, line 1] fido revoluta. Stamina, 10 inclusa; filamenta glabra, an- [line 2] theræ longitudinaliter dehiscentes, et apicè non biperforatæ; [line 3] bacca, 5 locularis, loculis monospermis. Sufrutices folia [line 4] alterna, flores axillares subracemosi.

[line 5] ARBUTUS, L.

[line 6] Calix minimus 5 partitus; corolla ovata, limbo parvo, 5 [line 7] fido revoluta, Stamina, 10 inclusa, filamenta villosa; an- [line 8] theræ poro gemino apicè dehiscentes. Bacca 5 locularis, lo- [line 9] culis polyspermis. Frutices; foli alternans flores terminales [line 10] subracemosi.

line 11] 1. ALPINA, Desv. *Arbutus alpina*, L. Foliis rugosis ser- [line 12] ratis. Habitat in alpibus et pyrenæis.

[line 13] 2. UVA URSI, Desv. *Arbutus uva ursi*, L. Foliis interrimis.]

[line 14] Habitat cum priore."

It is certainly evident that the two species, *Arbutus alpina* L. and *A. Uva-ursi* L., were here put under *Arbutus*, not *Mairania*; but, needless to say, by their real characters they both *belong* under Desvaux's definition of "MAIRANIA ARCTOSTAPHYLOS" with "bacca, 5 locularis, loculis monospermis."

In the Errata, on page 292, Desvaux attempted some sort of a disentanglement, saying:

"Page 36, avant-dernière ligne, lisez ARBUTUS, L.

— 37, ligne 5 ARBUTUS, Lin., lisez MAIRANIA, Neck. *Arctostaphylos*, Adans.

— Id. ligne 11, lisez MAIRANIA ALPINA.

— Id. ligne 12 [should have been 13], lisez MAIRANIA UVA URSI."

But this simply made a bad matter worse, for, after making the correction, we get the many-seeded *Arbutus* described as having "Bacca, 5 locularis, loculis monospermis," and the genus *Mairania* or *Arctostaphylos*, with its characteristic drupe with few nutlets, described "Bacca 5 locularis, loculis polyspermis"; and under this mangled generic description we get two species: "1. MAIRANIA ALPINA, Desv. *Arbutus alpina*, L." with its few nutlets, and "2. M. UVA URSI, Desv.

Arbutus uva ursi L." which commonly has its few nutlets fused into 1 stone. This publication of Desvaux's was obviously a hopeless piece of blundering, but, even if one can infer what he might have said if he had written otherwise, there is nothing in it to indicate the slightest tendency to separate *Mairania* from *Arctostaphylos* Adans. nor to treat *Mairania* or *Arctostaphylos alpina* as belonging to a separate genus from *M.* or *A. Uva-ursi*.

But even if the chance (i. e. alphabetical) placing of *M. alpina* before *M. Uva-ursi* in Desvaux's ill-begotten enumeration of the two can possibly mean to followers of the "American" Code that Desvaux was thus setting up a genus *Mairania* including the Alpine Bearberry as opposed to the common lowland Bearberry, it is impossible to see how the "American" Code allows *Mairania* to be taken up in this sense on the basis of Desvaux's publication in 1813 when the name had already been used by Necker in 1790 for *Uva Ursi* of Tournefort; for there can be no question that Tournefort's *Uva Ursi* was the common Bearberry. Tournefort clearly indicated this when he wrote: "I know one species of *Uva Ursi* (*Uvae Ursi speciem unicam novi*)," and when he illustrated the fruit with 5 coherent nutlets.¹

Rehder & Wilson follow Niedenzu, in Engler, Bot. Jahrb. xi. 180 (1889), in using for the Alpine Bearberry the name *Arctous* which was the name given by Gray (*Synoptical Flora*) to a section including *Arctostaphylos alpina* as contrasted with the other species. If the genus *Arctous* is to be maintained it should be under that name; but its claims to generic rank seem to the writer, as they have to many others, extremely trivial and such as even the most extreme devotees of change have not yet ventured to apply to parallel cases in many other genera, such as *Vaccinium*, *Ilex* and *Rubus*. The fullest definitions of *Arctous* (*Mairania* Britton, not Necker) as opposed to *Arctostaphylos* ("*Uva-Ursi*") seem to be those of Drude in Engler's *Pflanzenfamilien* and of Britton in Britton & Brown's *Illustrated Flora*; and, since these emphasize essentially the same points, the English descriptions are here quoted.

ARCTOSTAPHYLOS. "Erect or spreading, low or tall shrubs (some western species small trees). Leaves alternate, petioled, firm or coriaceous, persistent, evergreen. Flowers small, nodding, pedicelled, white or pink, in terminal racemes, panicles or clusters. Clayx 4-5-parted, persistent. Corolla globose, ovoid, urceolate or oblong-campanulate, 4-5-lobed, the lobes recurved, im-

¹ See Tourn. Inst. 598, t. 370 (1700).

bricated in the bud. Stamens 10, rarely 8, included; filaments short, subulate; anthers short, erect, introrse, with 2 recurved awns on the back, the sacs opening by a terminal pore. Disk 8–10-lobed. Ovary 4–10-celled; ovules solitary in the cavities; style slender. Fruit a drupe, with 4–10 seed-like nutlets coherent into a solid stone."

ARCTOUS ("MAIRANIA")... "A low shrub, with shreddy bark, alternate thin deciduous leaves clustered toward the ends of the branches, and small white clustered pedicelled flowers. Calyx 4–5-parted. Corolla 4–5-toothed, the short teeth spreading or recurved. Stamens 8 or 10, included; anther-sacs with 2 recurved dorsal awns. Ovary 4–5-celled; ovules 1 in each cavity. Drupe globose, with 4 or 5 separate 1-seeded nutlets."¹

The description of *Arctous* ("Mairania") is briefer than the other, but it seems to contain only these strongly contrasting or by inference opposing characters: *Arctous* "with shreddy bark, . . . thin deciduous leaves" as opposed to *Arctostaphylos* with character of bark not stated, leaves "petioled, firm or coriaceous, persistent, evergreen"; and *Arctous* with nutlets separate as opposed to *Arctostaphylos* "with 4–10 seed-like nutlets coherent into a solid stone." The key states these points concisely:

"Nutlets coalescent; leaves persistent.
Nutlets separate; leaves deciduous.

19. *Arctostaphylos*²
20. *Mairania*."

Some others, Drude² for instance, add to these characters the juicier pulp of *Arctous* as contrasted with the more mealy pulp of *Arctostaphylos*. Niedenzu,³ on the other hand, bases his "generic" distinction chiefly on the anatomical structure of the leaves, *Arctostaphylos Uva-ursi* and others (with the exception of *A. glauca* which is allowed to remain in *Arctostaphylos*) having a more or less dense coat of pubescence on the leaves ("Deckhaare vorhanden"), *Arctous* having glabrous leaves ("Deckhaare fehlen"), etc.

If all these contrasting characters, ascribed by one person or another to *Arctous* as opposed to *Arctostaphylos*, would only exhibit themselves in nature as they do on paper the genus *Arctous* would have much to commend it; but unfortunately not one of the weightier characters stands three minutes' test in a representative herbarium. The shreddy bark, for example, of the trailing branches of *Arctostaphylos* (or *Arctous*) *alpina* is so like that of *Arctostaphylos Uva-ursi* that only after long practice could the two be distinguished by the bark.

¹ Britton in Britton & Brown, Ill. Fl. ii. 572 (1897).

² Drude in Engler & Prantl, Pflanzenf. iv. Ab. 1, 49 (1889).

³ Niedenzu in Engler, Bot. Jahrb. xi. 178, 179 (1890).

In some way the statement has become a fixture in many of the American and European descriptions, that the leaves of *Arctostaphylos* (or *Arctous*) *alpina* are "thin and deciduous." But surely such a statement would never knowingly be made by anyone who, like the writer, has many times tramped over miles of barrens carpeted with the Alpine Bearberry and has eaten quarts of its bitter-sweet berries in the hope of growing to like them. *Arctostaphylos* or *Arctous alpina* certainly *does not* have deciduous leaves! On the contrary they are marcescent, losing their freshness during the winter and persisting, often for many years, as masses of bleached and alternately dry and wet foliage. So persistent are these old leaves, that in collecting the shrub for the herbarium it is necessary to tear off a large proportion of the old foliage in order to display the branches and the newer shoots. That the spick-and-span branches artificially depleted of all old leaves, such as one often finds in the herbarium, should lead to an impression that the leaves are deciduous is not unnatural, but this *post mortem* and wholly artificial character cannot be maintained as generically separating *Arctous* from *Arctostaphylos*.

This observation, that the leaves of *Arctostaphylos* or *Arctous alpina* are marcescent, not deciduous, is abundantly verified by the statements of others who have an intimate acquaintance with the growing shrub. Thus we find in Koch's *Synopsis*: "*foliis . . . glabris, basi integerrimis ciliatisque marcescentibus*";¹ in Ledebour's *Flora Rossica*: "*foliis . . . glabris basi integerrimis subciliatis marcescentibus*";² while Blytt in his *Norges Flora* goes into more detail: "the leaves wither in winter and remain withered during the next summer (Bladene visne om Vinteren og sidde visnede igjen næste Sommer)."³

In the somewhat less coriaceous or even membranous leaves *Arctostaphylos* or *Arctous alpina* certainly differs from all the other members of the group, except the red-berried plant described as *Arctous alpina*, var. *rubra*, and in their glabrous leaf-surfaces these two differ from all other species of the group except *Arctostaphylos glauca*; but the texture and degree of pubescence of leaves surely cannot alone differentiate a genus.

The other really strong character (on paper) is the statement that in *Arctostaphylos* we have "4-10 seed-like nutlets coherent into a

¹Koch, *Syn.* ed. 3, pt. 1, 412 (1857).

²Ledeb. *Fl. Ross.* ii. 908 (1844-46).

³Blytt, *Norg. Fl.* i. 839 (1861).

solid stone," while in *Arctous* there are "4 or 5 separate 1-seeded nutlets." This statement in regard to *Arctous* is unquestioned; but what are the demonstrated facts in regard to *Arctostaphylos*? In *Arctostaphylos Uva-ursi* the nutlets are commonly more or less fused, but anyone who will take the trouble to examine the ripe fruits of a large series of specimens can see for himself that on occasional plants there are fruits which, when pressed between the thumb and first finger or under the thumb-nail, quickly crush into 5 distinct nutlets! If he is keenly enough interested to examine other species, for example *A. pungens* HBK., one of the commonest of Manzanitas, he will have the same experience. In both these common plants and in many other species of *Arctostaphylos* he can find fruits with all the nutlets coherent, with some of them coherent and others free, or with all of them distinct. This again is not merely the writer's observation: it belongs to that common store of knowledge which a very slight study of the literature of the group (to say nothing of the specimens) quickly brings into prominence. Thus, in the *Botany of California* the section including most of the Manzanitas is described: "the stones commonly separate or separable, at least some of them, not rarely some of them united or 2-celled and 2-seeded";¹ in the *Synoptical Flora of North America* the section *Uva-ursi*, containing *Arctostaphylos Uva-ursi*, *tomentosa*, *pungens*, etc., is said to have "its nutlets separate or separable, or irregularly coalescent."² Jepson, dealing only with the Manzanitas (true *Arctostaphylos*) says: "Nutlets distinct, irregularly united in 2s or 3s, or sometimes consolidated into a single stone,"³ and Abrams, dealing with the Manzanitas of southern California, says: "Ovules solitary in the cells, which become bony nutlets or combine into a few-several-celled stone,"⁴ and describes *Arctostaphylos Manzanita* with "nutlets irregularly separable," *A. tomentosa* with "nutlets all separate or some united in pairs," and *A. Pringlei* with "nutlets consolidated into a rough carinate stone, or separable." The maintenance of *Arctous*, then, because its nutlets are separate, as opposed to *Arctostaphylos* with nutlets coalescent, is as artificial as its maintenance because of "deciduous" leaves.

There remains the one absolute fact, that in *Arctostaphylos* the pulp

¹ Gray in Brewer & Watson, Bot. Cal. i. 452 (1876).

² Gray, Syn. Fl. ii, pt. 1, 27 (1886).

³ Jepson, Fl. W. and Mid. Cal. ed. 2, 312 (1911).

⁴ Abrams, Fl. Los Angeles and Vic. 291 (1904).

of the fruit is dryish and unpalatable, in *Arctous* juicier and to some people not wholly unpalatable; but, according to Richardson, *Arctostaphylos alpina* has the "dark purplish-black berry of more fleshy consistence, and a stronger peculiar flavor" than the "one with bright red and more juicy fruit" (*Arctous alpina*, var. *rubra*). Surely, if *Arctous alpina* can be generically separated from *Arctostaphylos* by its "deciduous" leaves, its distinct nutlets, and its juicier pulp, the scarlet-berried shrub, with thinner and nonciliate leaves sometimes really deciduous, and with still more juicy fruit, has just as strong claims to generic separation from the black-berried *A. alpina* with marcescent thickish and more rugose ciliate leaves, and fruit "of more fleshy consistence."

From this analysis of the frail characters pushed to the front by those who urge the generic separation of *Arctous* (*Mairania* of Britton, not Necker) it is apparent that they are not only trivial but largely nonexistent, and that no sound reason has yet been advanced for the separation of the section *Arctous* as a genus.

The scarlet-berried shrub, which led to this exposition of a typical case of the elevation to generic rank of long-known and already closely studied sections and subgenera, the sort of hasty change that some people consider "progressive," may be called, then, by the scarcely distinctive name

ARCTOSTAPHYLOS rubra (Rehder & Wilson) n. comb., rami prostrati, cortice brunneo in lamellas secedente, ramulis adscendentibus; bracteis interioribus persistentibus gemmarum lanceolatis vel ovatis acuminatis; foliis membranaceis deciduis vel paullo marcescentibus planis vel rugosis glabris, laminis oblanceolatis vel cuneato-obovatis 1.3–4.5 cm. longis 0.6–1.6 cm. latis crenatis eciliatis basi integris apice obtusis vel acutis, petiolis pallidis 0.5–1.5 cm. longis glabris vel minute piloso-ciliolatis; baccis coccineis vel rubris succulentis, seminibus 5 distinctis 2.5–3 mm. longis, 1.6–2.2 mm. latis.

Stems prostrate, covered with a loose brown bark exfoliating in thin layers; branchlets ascending: inner persistent bracts of the buds lanceolate or ovate, acuminate: leaves membranaceous, deciduous or slightly marcescent, flat or rugose, glabrous; the blades oblanceolate or cuneate-obovate, 1.3–4.5 cm. long, 0.6–1.6 cm. wide, crenate, not ciliate, entire at base, the apex obtuse or acute; petioles pale, 0.5–1.5 cm. long, glabrous or minutely pilose-ciliolate: berries scarlet or red, succulent; seeds 5, distinct, 2.5–3 mm. long, 1.6–2.2 mm. wide.—*Arbutus caulibus procumbentibus, foliis rugosis serratis*, J. G. Gmelin, Fl. Sib. iv. 119 (1769), not L. Fl. Lapp. *Arctostaphylos alpina* (red-fruited variety or form) Richardson, Arct. Search. Exped. 433 (1852);

Macoun, Cat. Can. Pl. i. 294 (1884); Eastwood, Bot. Gaz. xxxiii. 209 (1902); Farr. Contrib. Bot. Lab. Univ. Pa. iii. No. 1, 61 (1907). *Mairania alpina* (red-fruited form) Britton & Rydberg, Bull. N. Y. Bot. Gard. ii. 179 (1901); S. Brown, Alp. Fl. Can. Rocky Mts., 214 (1907). *Arctous alpinus* [a], var. *ruber* [ra] Rehder & Wilson, Pl. Wils. pt. iii. 556 (1913).—Calcareous soils, Siberia and western China; in North America known from Alaska, Yukon, British Columbia, Alberta, Keewatin, and Quebec (Anticosti Island). For citation of stations see pages 21, 22, 24 and 25.

GRAY HERBARIUM.

SYSTEMATIC STUDIES ON OENOTHERA,—IV. OE. FRANCISCANA AND OE. VENUSTA, SPP. NOVV.

HARLEY HARRIS BARTLETT.

(Plates 107 and 108.)

THE allies of *Oenothera Hookeri* form an especially difficult group from a systematic standpoint. In as much as they are open-pollinated forms and range throughout most of the far West from Oregon and Washington to Mexico, the chances are great that numerous spontaneous hybrids exist. Although the writer has had a number of forms related to *Oe. Hookeri* in cultivation during the last three years, it has been very difficult to arrive at any conclusion in regard to specific lines in the group. Aside from the more narrow-leaved forms one of which probably represents the true *Oe. Hookeri* T. & G., the cultures have included two very satisfactorily distinct new species, which can be safely characterized at this time. One of them, *Oe. franciscana*, has been cultivated by the writer through three generations. The seeds were taken from a packet accompanying a herbarium specimen which was collected July 30, 1905, at Carmel Beach, Monterey County, California, by Prof. C. P. Smith, of the Maryland Agricultural College, (C. P. Smith 1063, in herb. Bartlett.) They were planted in the open in the spring of 1910. Since the species is rather persistently biennial unless the seeds are started during the winter in the greenhouse, the plants failed to mature during the first season. One plant, however, bore in the axil of a rosette leaf, a single precocious flowering branch



Fernald, Merritt Lyndon. 1914. "THE ALPINE BEARBERRIES AND THE GENERIC STATUS OF ARCTOUS." *Rhodora* 16, 21–33.

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