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The Ornamental Trees of South Dakota

N.E. Hansen

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The Ornamental Trees of South Dakota

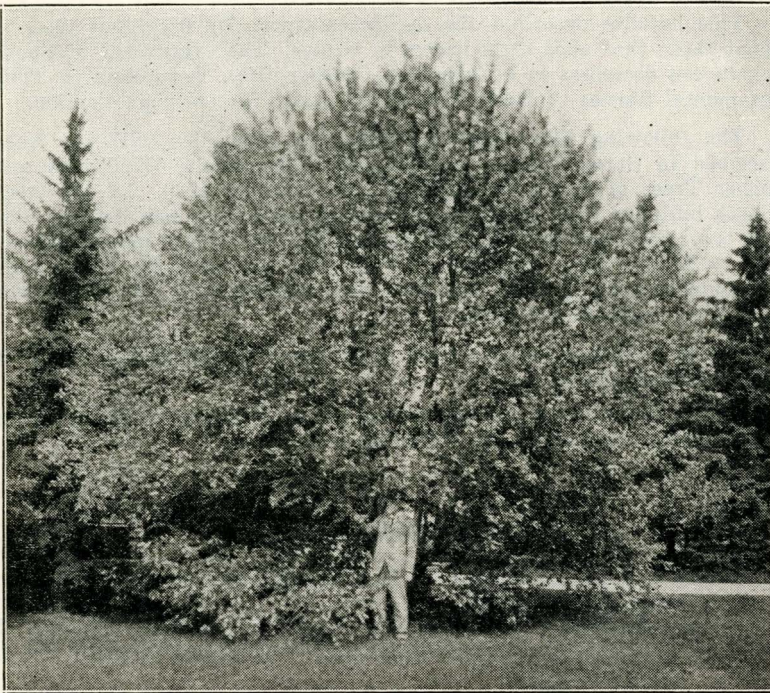


Figure 1—The May Day Tree.

Horticulture Department
Agricultural Experiment Station
South Dakota State College of Agriculture
and Mechanic Arts
Brookings, S. Dak.

The Ornamental Trees of South Dakota

N. E. Hansen

This bulletin describes the deciduous trees. By deciduous trees is meant those that shed their leaves in winter. The evergreens of South Dakota are described in bulletin 254, October 1930. A bulletin on "The Ornamental Shrubs of South Dakota" is ready for early publication.

The following list should be studied in connection with the trees described in South Dakota bulletin 246, "The Shade, Windbreak and Timber Trees of South Dakota," 48 pages, March 1930. All the trees in both bulletins have ornamental value in greater or less degree. The fruit trees described in South Dakota bulletin 244, "Plant Introductions," May 1927, also have ornamental value. For example, the Dolgo crab and Redflesh crab (S. Dak. Bul 237) are ornamental in tree and flower as well as valuable for fruit.

In the following list, the trees are arrayed in alphabetical order of their botanical names.

In this bulletin the number at the end of a quotation refers to the corresponding number in the following list.

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LIST OF BEST ORNAMENTAL TREES FOR SPECIAL PURPOSES

The Best Small Ornamental Tree for Lawn

Acer ginnala—Amur Maple
Acer tataricum—Tatarian Maple.

The Best Small Tree With White Flowers in Early Spring

Amelanchier canadensis—Downy Saskatoon.

The Most Graceful Low Tree

Betula alba—European White Birch
Betula alba pendula laciniata—Cutleaf Weeping Birch

Desirable Small Round Topped Lawn Tree With White Flowers

Native *Crataegus*—Hawthorn

A Small Lawn Tree With Silvery Leaves

Elaeagnus Augustifolia—Russian Olive

Desirable Lawn Trees With White and Pink Flowers

Malus baccata—Siberian crab
Dolgo Crabapple
Redflesh crabapple—small lawn tree with red flower and red fruit with red flesh
Western crabapple—*Pyrus ioensis*
Red Tip crabapple
Cathay crabapple
Amur crabapple
Beauty crabapple
Dolgo crabapple
Populus bolleana—Bolleana Poplar. A slender tree of pyramidal, upright habit. (South Dakota Bulletin 246, page 26.)

Ornamental Tree with Large Leaves and Flowers for the Southern Part of the State.

Catalpa speciosa—Western Catalpa. (South Dakota Bulletin 246, page 11.)

Choice Ornamental Round-Topped Lawn Tree

Celtis occidentalis — Hackberry. (South Dakota Bulletin 246, page 12.)

Graceful Ornamental Tree with Beautiful Fern-Like Foliage for the Southern Part of State.

Gleditsia triacanthos — Common Honey Locust.
Gleditsia triacanthos inermis, the thornless variety preferred.
 (South Dakota Bulletin 246, pages 15 and 16.)

Picturesque Lawn Tree with Beautiful Foliage to Add Variety in Planting

Gymnocladus dioica — Kentucky Coffee tree. (South Dakota Bulletin 246, page 16.)
Juglans nigra — Black Walnut, for southern part of state to add variety in planting. (South Dakota Bulletin 246, page 18.)

Graceful Small Lawn Tree

Populus tremuloides — Quaking Aspen.
 (South Dakota Bulletin 246, page 32.)

Beautiful Native Lawn Tree, Highly Desirable

Quercus macrocarpa — Mossycup Oak (Bur Oak)

A Hardy Oak With Red Leaves in Fall

Quercus rubra ambigua — Northern Red Oak.
 (South Dakota Bulletin 246, page 35.)

Native Plums

Prunus Americana
Prunus Armeniaca Sibirica — Siberian Apricot from Harbin, North China. Flowers pink, very early.
Prunus Padus commutata — May Day Tree — the earliest tree in leaf and bloom of all the trees tested.

A Hardy Ornamental Pear With Shining Leaves

Harbin Pear — *Pyrus ussuriensis*

A Desirable Weeping Willow

Niobe Weeping Willow — *Salix alba vitellina pendula nova*.
 (South Dakota Bulletin 246, page 36.)

A Dwarf Ornamental Willow for Hedges

Ural Willow — *Salix uralensis*, Hort. (South Dakota Bulletin 246, page 42.)

A Graceful Lawn Tree with White Flowers and Feathery Foliage for the Southern Part of State

Robinia Pseudocacia — Common Locust. (South Dakota Bulletin 246, page 35.)

A Desirable Ornamental Willow with Dark Green Shining Leaves

Salix pentandra — Laurel Willow. (South Dakota Bulletin 246, page 40.)

A Beautiful Willow with Silver-White Leaves

Salix regalis — Royal Willow. (South Dakota Bulletin 246, page 41.)

A Hardy Ornamental Willow with Yellow Bark

Salix alba vitellina — Golden Willow. (South Dakota Bulletin 246, page 41.)

A Beautiful Native Tree with Broad Leaves and Fragrant Flowers

Tilia americana — American Linden. (South Dakota Bulletin 246, page 42.)

The Best Ornamental Tree for the Lawn

Ulmus americana — American Elm. (South Dakota Bulletin 246, page 42.)

Feathered Elm — Best Variety. (South Dakota Bulletin 246, page 44.)

A Choice Lawn Tree with Feathery Foliage and Red Fruit

Sorbus aucuparia — European Mountain Ash (the stem must be shaded to prevent sunscald). This Bulletin page 58.

A Valuable Native Elm for the Lawn

Ulmus racemosa — Rock Elm, a native elm tree with corky ridged branches and smooth leaves. South Dakota Bulletin 246, page 48.

RECOMMENDED LISTS OF EVERGREENS

The Best Evergreen for Windbreaks

Pinus scopulorum — Black Hills Pine.

The Most Beautiful Evergreens

Picea pungens — Colorado Spruce.

Abies Canadensis — Black Hills Spruce.

Abies concolor — White Fir.

Best Small Evergreens for the Lawn

Juniperus communis — Common Juniper.

Juniperus scopulorum — of South Dakota.
(Black Hills type)

Juniperus Montana mughus — Mugho Pine.

Best Evergreens for Ground Cover

Juniperus horizontalis — Creeping Juniper.

DESCRIPTION OF ORNAMENTAL TREES

Acer campestre

Acer campestre, Linn.

Hedge Maple

A handsome shrub or small tree native of Europe, extending to the Orient, Asia Minor and northern Persia. It is used for hedges in Europe. There are many varieties and garden forms of this species cultivated in Europe. Not hardy at this station.

Acer dasycarpum heterophyllum, Pax.

(*Acer dasycarpum* var. *heterophyllum aciniatum*, Hort.)

An erect tree with deeply cut and unequally divided leaves. Tested but found lacking in hardiness at this Station.

Many varieties of silver maple have originated under cultivation. The chances are that these have originated from the eastern and southern type of the silver maple, since that probably was the one first cultivated. If really hardy varieties are desired, selection work must be done with the northwestern form of the species.

Acer dasycarpum var. *Wieri*, Schwerin

(*Acer dasycarpum* var. *Wieri laciniatum*, Hort.)

Wier Maple

This is Wier's cut-leaved maple, a graceful lawn tree, with leaves deeply cleft, with finely cut narrow lobes. The general experience in this state is not favorable as to its hardiness.

Acer ginnala**Amur Maple**

Acer ginnala, Maximowicz. (*Acer tataricum* var. *ginnala*, Maximowicz)

"Native of Manchuria, North China, Mongolia and Japan. A hardy maple forming a large shrub or small tree now 11 feet high. Full of seed this year. The bright red coloring of leaves in the autumn makes this graceful dwarf maple desirable for the lawn." N. E. Hansen, (9).

A small tree or large shrub of bushy habit. Allied to *Acer tataricum*, but the leaves are three-lobed with the terminal lobe elongated; flowers yellowish, fragrant, appearing about the third week in May. The leaves of *Acer tataricum* are roundish oval or oblong cordate; flowers white; the wings of the fruit bright red in summer.

Acer glabrum**Rocky Mountain Maple**

Acer glabrum, Torrey

A handsome shrub or small tree native from Montana and South Dakota to California and New Mexico. Noteworthy for its graceful shining leaves which are smooth and entirely free from down.

"A shrub or small tree growing along streams in the Black Hills." T. A. Williams, (28).

Acer negundo argenteo variegatum, Bonamy.

"This is a variety of boxelder with leaves bordered with white. It is often seen in public parks in Germany and other parts of Europe. We have imported it twice, in 1896 and 1899, and find it tender, the leaves failing to withstand the hot sun." N. E. Hansen, (9).

In Europe this tree is much grown in town gardens, and is also grown in pots for indoor decoration. This first appeared in 1845 as a "sport" on the green-leaved type in a nursery in Toulouse, France.

"Leaves with broad white margin. Probably the most effective of all variegated hardy trees." Alfred Rehder, (22).

Acer negundo violaceum, K. Koch.

A variety of boxelder imported from Europe. A tree of vigorous growth; leaves large; young shoots covered with a purplish bloom. Lacking in hardiness at this station.

Acer nikoense, Maximowicz**Nikko Maple**

Native of Japan; also of Central China where it attains a height of 40 feet. The leaves turn brilliant scarlet in autumn. Winter-killed at this station.

Acer palmatum**Japanese Maple**

Acer palmatum, Thunberg. (*Acer polymorphum*, Sieb. & Zucc.)

A shrub or small tree native of Japan, but in late years has been found by Wilson in Central China. Under cultivation in Japan an ex-

traordinary number of varieties have been produced, differing in color and form of leaf. At the World's Fair at Chicago in 1893 one tree of Japanese maple top-worked with some 42 varieties was a remarkable feature of the Japanese exhibit. Not hardy on the open prairie. We have two species of the red cut-leaved variety grown in tubs and wintered in the cellar. They are worthy of this extra care.

Acer platanoides**Norway Maple**

Acer platanoides, Linn.

Native of Central and Southern Europe to the Ural mountains and the Caucasus. A large handsome ornamental tree with round spreading habit, resembling the sugar maple. Cultivated in many varieties in Europe and the eastern part of the United States. The tree keeps killing back at this station. It is evidently not for the open prairie.

Acer platanoides schwedleri, (2).

Schwedler Maple

A beautiful variety of Norway maple, with bright red leaves which later turn to dark publish green. Not hardy at this station.

Acer pseudoplatanus**Sycamore Maple**

Acer pseudoplatanus, Linn.

Native of the mountains of Central and Southern Europe to the Caucasus. Called the Plane tree in Scotland. A deciduous tree of large size. Cultivated in many varieties in Europe. Tree not hardy at this station.

Acer sieboldianum, Miquel**Siebold's Maple**

A small tree native of Japan. Similar to the Japan maple. Not hardy at this station.

Acer tataricum**Tatarian Maple**

Acer tataricum, Linn.

"Native of southeastern Europe, through Hungary, through Asia Minor and the Caudcasus. A handsome large shrub or small tree. Specimens are six feet in height with handsome foliage. It has killed back only once, in the winter of 1898-99." N. E. Hansen, (9).

These trees are now 22 feet in height. They are very ornamental trees of wide-spreading bushy habit. They do not make a tall direct stem like other maples. They are a good lawn tree. The abundant red seeds in autumn give a pleasing effect. The leaves are yellow or red-dish-brown after frost in autumn.

"Handsome and distinct maple with attractive red fruit in late summer and bright green leaves turning yellow in autumn." Alfred Rehder, (22).

Ailanthus glandulosa**Ailanthus (Tree of Heaven)***Ailanthus glandulosa*, Desfontaines.

Native of China and Japan. There are eight or nine species of *Ailanthus* in central and southern Asia and in northern Australia. *Ailanthus glandulosa* attains a height of 100 feet. *Ailanthus* is derived from the native name "Ailanto," meaning a tree tall enough to reach the skies. It is a tree of very rapid growth and is much planted as a street tree in the eastern states because the leaves resist smoke and dust and are not attacked by insects. For street trees only the pistillate or female trees should be planted because the blossoms of the staminate or male trees have a disagreeable odor. Known also as Chinese sumac. The tree has run wild in northeastern United States and Ontario, spreading freely both by suckers and seeds. Winter-killed at Brookings and kills to the ground at Vermillion.

"Originated in Japan. An upright rapid growing tree, with long, slender fern-like leaves, free from disease. May be cut to the ground each year and will grow in shrub form, cylindrical appearing. It is excellent where a small tree or large shrub is wanted. 4 to 6 feet." D. B. Gurney, Yankton, 1929.

"The free growth by suckers makes that a weed-tree, often very difficult to eradicate, coming up year after year even when ruthlessly cut down, and growing two or three meters high in a season." N. L. Britton (6).

Alnus glutinosa**European Alder***Alnus glutinosa*, Gaertn.

The alders are closely allied to the birches (*Betula*), but are easily distinguished by the winter buds which are nearly always on a distinct stalk. The European alder is native of Europe, West Asia and North Africa. There are about 30 species of alder in the northern hemisphere and in the Western hemisphere extending south to Peru. Most of the species do best on a soil too damp for other trees. This tree kills back in severe winters but has survived at Brookings for many years, making a low bushy tree. Dippel lists nine varieties, the Cut-Leaf alder being the only one tested here.

Alnus glutinosa laciniata**Cutleaf Alder**

This is a horticultural variety of *Alnus glutinosa*, with cut-leaves. "The name *Alnus laciniata* is often misapplied also to featherleaf alder, a horticultural variety of *Alnus incana*." Winter-killed at this station.

Amelanchier canadensis**Downy Saskatoon***Amelanchier canadensis*, Medikus

A bushy tree seldom over 25 feet; often a mere shrub, but sometimes ranging to 50 feet. The only *Amelanchier* with the young leaves hairy on both surfaces. Distributed from Newfoundland west to Nebraska and south to the Gulf Coast.

"Larger than the preceding (*Amelanchier alnifolia*), with ovate or ovate-oblong pointed leaves; flowers large in drooping racemes; fruit

glodose, crimson or purplish; edible. This has been reported from Sioux Falls, and what is probably this species was collected in Grant county." Thomas A. Williams (28).

"Along the Sioux river near Sioux Falls." D. A. Saunders (26).

"Sioux Valley to Big Stone lake. Usually in open thickets but not common." W. H. Over (19).

"The profusion of white flowers produced by the serviceberry in early spring makes it a pretty ornamental tree or shrub at that time of the year. It may be planted to supply food for the birds or to produce fruit for home use. The wood is occasionally used for handles of tools or other small implements." Samuel B. Green (8).

"There are few more delightful small trees than this is when seen at its best, which, at Kew, is usually about the second week in April; the whole tree then becomes sheeted with white. Unhappily, it is a very fleeting beauty, lasting, as a rule, less than a week. Its autumn beauty is more durable, and it is then one of the most striking of hardy trees, the foliage changing before it fails to a rich soft red; in some forms, however, to a clear bright yellow." W. J. Bean, Royal Botanical Gardens, Kew, England (3).

Amelanchier canadensis obovalis

Long-leaf Saskatoon

The saskatoon or junberry is also called the shadbush because the shrub blossoms about the time the shad "run."

"A small bush or tree common in Quebec, Ontario and the North-eastern states, and in localities westward to the Mackenzie river, North Dakota, Minnesota and Missouri. A dwarf form of this, with large fruit, is cultivated to some extent through the northern states. The Indians of Minnesota and Dakota gather the berries in rather large quantities and sell small quantities in some of the remote towns." Samuel B. Green (8).

Aphananthe aspera, Planchon

This genus comprises three or four species in Australia and East Asia; a tree allied to the hackberry but the flowers are always dioecious. Native of Japan, East China and Korea. Winter-killed at Brookings. In the East the experience is that it is not hardy north of Georgia.

Betula alba,

Betula alba, Linnaeus (*Betula pubescens* Cy.)

European White Birch

"Native of Central and Northern Europe to Western and northern Asia. A tree of graceful habit with silvery white bark and slender branches. In the timber plantations on the station grounds this tree has made a rapid growth and has proved very hardy. Specimens standing in open exposure in sod on the college campus have sometimes suffered after a severe winter following a dry summer, but the tree is sufficiently hardy for ornamental purposes and should be planted, especially when the more expensive cut-leaved weeping birch can not be afforded." N. E. Hansen (9).

"The stem of the birch is "one of the masterpieces of nature,-----amongst the common effects to be seen in all northern countries, one of the most brilliant is the opposition of birch trunks in sunshine against the deep blue or purple of a mountain distance in shadow." Philip Gilbert Hamerton, in the "Sylvan Year."

There is a large number of cultivated varieties of the Europe white birch of which two have been tested at this station. The *Betula Alba* of Linnaeus is made up of two species, *Betula Alba* and *Betula Verrucosa*. The two forms are easily distinguished as the *Betula Alba* has down twigs and *Betula Verrucosa* has warted twigs.

Betula alba pendula laciniata, Hort. var.

Cutleaf Weeping Birch

"There are many beautiful specimens of this species on the college campus and private lawns at Brookings and in other parts of the state. It is probably the queen of lawn trees for South Dakota. It is a tall, slender tree with erect central trunk and long, graceful drooping branches, which with the white bark and delicately cut leaves, make it a beautiful tree. The pruning knife should be used with great caution—if at all. The many slender weeping branches from the main stem add to the beauty of the tree and should not be removed unless very near the ground." N. E. Hansen (9).

Recently a large number of cut leaved weeping birch, standing in sod on the State college campus at Brookings, died from hard winters freezing—dry seasons. Those that were heavily watered in the fall and those standing in cultivated ground where there was more moisture available survived. The essential point that must be remembered in planting this tree is to water very heavily in autumn before winter sets in. Trees standing in the sod on the lawn may be given sub-irrigation through a section of a pipe set slanting near the stem of the tree with the top end even with the surface. Between waterings this pipe may be closed with a wooden plug.

At Yankton: "Cutleaf weeping birch is a magnificent tree, without question the most popular and the most planted of all pendulous or so-called weeping trees. It is a tall, slender tree with vigorous growth. It has an erect central trunk, somewhat pyramidal in shape with graceful, drooping branches and glistening silvery white bark. The foliage is fine, thin, deeply and delicately cut, and of a beautiful shade of green. The whole tree presents a soft and delightful effect not found in any other hardy ornamental tree. At time of planting these trees prune them severely and wind three-fourths of the trunk of the tree with wrapping paper. Hold this in place with burlap. Do not wind too tight. Give them a thorough cultivation and you will have no trouble in growing them." D. B. Gurney, Yankton, 1929.

In Minnesota: "This is a very handsome tree, with finely divided leaves and a drooping habit to the smaller branches. Desirable for lawn and park planting in retentive moist soil, but is very short-lived in dry locations." Samuel B Green (8).

The Cutleaf weeping birch is probably the queen of all lawn trees but is expensive. This is because it does not come true to seed but must be grafted or budded. If the seed is sown it reverts back to the common



Figure 2—Cut leaf Weeping Birch

European White Birch. It may also be propagated by inarching but not by cuttings. Since the new federal rules restrict the importation of trees that can be propagated in America, this tree has become scarce in the nurseries. Our propagators are endeavoring to supply this demand.

Betula alba purpurea, Hort. var.

Purpleleaf White Birch

"Dippel refers this to *Betula alba atropurpurea*, and gives Blood Birch as the common German name. A tree now nine feet in height with the younger branches purplish brown to black. The young leaves are dark purple fading to dark green. A handsome tree of unique appearance. It appears sufficiently hardy for ornamental purposes, having killed back a little but once since planted in the spring of 1897." N. E. Hansen, (9).

In later years this tree was too crowded by other trees for a fair test.

Betula glandulosa, Michx.

Dwarf Birch

A dwarf shrub creeping on the ground at high elevations, rarely more than four feet high anywhere. Native of North America across the continent from Newfoundland to Alaska, south to Michigan and in the Rocky Mountains to Colorado; also found in Greenland.

"A small shrub with the "branchlets conspicuously dotted with resinous, wart-like glands." Found in the Black Hills near Rapid City and at Rochford, apparently common in the higher hills." Thomas A. Williams, (28).

"A low shrub, abundant in many places in the Black Hills." D. A. Saunders, (26).

"Reported by P. A. Rydberg as growing in the Black Hills," W. H. Over, (19).

Betula lutea

Yellow Birch

Betula lutea, Michx.

The Yellow birch, also called Gray birch, has silvery gray or yellowish bark. Under suitable conditions it makes a large tree 100 feet in height with trunk four feet in diameter. The wood is valuable for furniture and other purposes.

"Native from Newfoundland, south to North Carolina and Tennessee, west to Minnesota. As received from Wisconsin this proved very susceptible to sunscald and quite tender, especially in open exposure. Not recommended." N. E. Hansen, (9).

"It requires a cold, moist soil to develop its best form, and suffers severely from drouth. On this account it is not desirable as an ornamental tree or for prairie planting." Samuel B. Green, (8).

Betula nigra

River Birch

Betula nigra, Linn.

"Red or River birch. Native from Canada southward to Virginia, Carolina and Florida, westward to Minnesota, Kansas, and Texas. Young plants received from the Arnold Arboretum in spring of 1899 kill back at the tips every winter and are now low bushes two and one-half feet in height." N. E. Hansen, (9).

"Generally found along river banks and in moist places. The River birch is seldom used as an ornamental tree, although it is very beautiful and does well in any good retentive soil." Samuel B. Green, Forestry of Minnesota. (8).



Figure 3—Niobe Weeping Willow

Betula occidentalis. Hook.

Black Birch

A large tree attaining a height of 100 feet. Native on the Pacific Coast from Washington north to British Columbia; also in the Rocky Mountains from New Mexico northward into Canada and extending eastward to South Dakota.

"A small tree with rather dark colored bark and the younger branches more or less resinous-dotted. Common in the Black Hills." Thomas A. Williams, (28).

Betula papyrifera

Canoe Birch

Betula papyrifera, Marsh. (*Betula papyracea*, Aiton)

The Paper Birch or Canoe Birch is a large tree attaining a height of from 60 to 120 feet. It extends across the continent from the Atlantic to Pacific coast; extending from Newfoundland, Hudson Bay and Alaska, south to Colorado. This tree was used by the Indians in making canoes.

"A large tree. the chalky-white bark of which comes off in thin papery sheets. Common in deep wooded canyons in the Black Hills." Thomas A. Williams, (28).

"Common in the Black Hills." D. A. Saunders, (26).

"Big Sioux Valley up to the western shore of Big Stone Lake and in the Black Hills. Not abundant and does not attain as large size here as eastward." W. H. Over, (19).

Carpinus laxiflora, Blume.

Japanese Hornbeam

The Hornbeams are allied to the birches and include about 20 species native of North America, Europe and Asia. *Carpinus laxiflora* is a native of Japan. Winter-killed at this station.

Castanea dentata

American Chestnut

Castanea dentata, Borkh. (*Castanea americana*, Raf.)

Native from southern Maine to Michigan, south to Alabama and Mississippi. An ornamental tree highly esteemed where it is hardy. The nuts are of excellent flavor; and the wood is valuable. Winter-killed at this station.

Castanea pumila

Chinquapin

Castanea pumila, Mill

A shrub or small tree native from Pennsylvania to northern Florida and Texas. Winter-killed at this station.

Cercis canadensis

American Redbud

Cercis canadensis, Linn.

A handsome ornamental tree with rosy pink flowers. Native from

New Jersey south and west to Missouri and Texas. One of the most beautiful of North American trees when in flower. Winter-killed at Brookings.

"This species is reported by Engelman to be found at the mouth of the Sioux river. It has not yet been collected there or elsewhere in the state. If it reaches our southeastern limit it must be quite rare." D. A. Saunders, (26).

Cercocarpus parvifolius

Valley-mahogany

Cercocarpus parvifolius, Nutt. (*Cercocarpus montanus* ag.)

A bushy tree native from Nebraska and Oregon to lower California and western Texas. It is of interest to note that this species is found in the Black Hills of South Dakota. One specimen of this species, the original source unknown, winter-killed at Brookings.

"Mountain Mahogany (*Cercocarpus parvifolius*, Nutt.) A small to medium sized shrub with small, wedge-shaped, silky-hairy leaves and fruits with feathery tails four inches in length. Found in the Black Hills and seemingly very rare." Thomas A. Williams. (28).

D. M. Andrews, Boulder, Colorado, writes: "Mountain Mahogany, six feet. A nearly evergreen rosaceous shrub of peculiar and attractive habit of growth. Flowers white, early, followed by the long, plumose achenes, which are three to five inches long, strangely curled and twisted, arranged above and on each side of the slender branches, so that at a little distance they have an appearance suggestive of ostrich plums. Easily transplanted, and thrives anywhere. L. H. Bailey (2).

CRATAEGUS

Crataegus includes all the hawthorns; a large genus of shrubs or small trees, nearly always thorny; sometimes extremely thorny. The spines of *Crataegus* are modified branches. The many thorns have made some species popular for hedges. The seeds generally lie over one year before germinating. There are about 60 species native of the Old World, but in eastern and central North America more than 900 species have been described. In the Kew Gardens in London, November 1911, a census of American hawthorns showed that 922 species had been described by various authors. The work on nomenclature has not been completed.

The hawthorn is closely related to the apple and pear. The pear may be grafted on the hawthorn. The word *Crataegus* is derived from the ancient Greek word *kratos*, strength, referring to the hardness of the wood.

The American hawthorns are highly ornamental trees with showy flowers in the spring and conspicuous red fruits in the autumn and early winter. The fruit of some species is edible.

It has not been possible to test all these many species of *Crataegus* at this station.

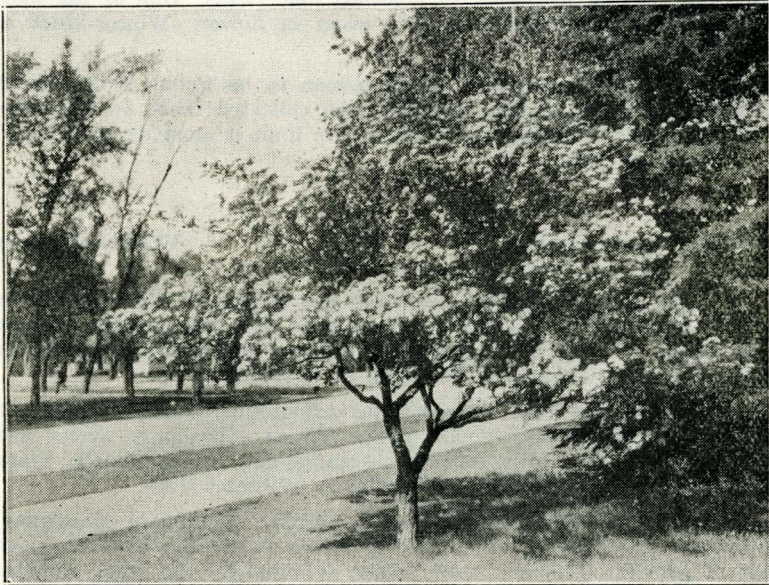


Figure 4—Common Hawthorn

All the hawthorns native of South Dakota are desirable for ornamental planting. We need not wait until the nomenclature is fully established. The horizontal branches of many of these hardy hawthorns repeat the flat lines of the prairie so they are eminently suited for landscape gardening upon the prairie.

Crataegus coccinea, Linn.

The form described here is the native South Dakota form. According to Bailey in *Cyclopedia of Horticulture*, *Crataegus coccinea* is in part a synonym of *Crataegus rotundifolia*, Moench, native from Nova Scotia to Saskatchewan to Illinois and Virginia.

"Hawthorn (*Crataegus coccinea*, L.) A large shrub or small tree with reddish branches and stout chestnut-brown thorns; berries red, about one-half inch in diameter. Apparently common throughout the state. The variety *macracantha* with larger spines, flowers and fruits and thicker leaves also occurs, seemingly widely distributed." Thomas A. Williams, (28).

Crataegus coccinea

Scarlet Thorn or Red Haw

"A shrub or small tree with a maximum height of 30 feet, and the trunk may develop a diameter of 12 inches. The spines are stout and about 2 inches long. Leaves are slender petioled, broadly ovate, trun-

cate at the base, acuminate apex; very sharply corymbose flowers are numerous and about one inch broad. The globose fruit one-half to two-thirds inches in diameter, is glabrous.

Its Manitoba home is in thickets within the grain belt of the Province.

The fruit has been mixed with the saskatoon berries and choke cherries, pressed into cakes and dried for winter use. However, in the fruit garden its use, if any, will likely be as a stock upon which to graft hardy species of *Pyrus* genus.

Annual Report of State Horticultural Society South Dakota, 1918-1919 Article "Native Fruits of Manitoba" W. R. Leslie, (17).

***Crataegus coccinea submollis*, Sargent.**

A tree received here under this name, attained a height of 18 feet, spreading habit, large red fruit of excellent quality. Laves are turning a yellow-brown in autumn, persistent. A good bearer.

Crataegus cordata

Washington Hawthorn

Crataegus cordata, Ait. *Crataegus phaenopyrum*, Medikus. *Crataegus acerifolia*, Moench. *Crataegus populifolia*, Wai.

Native from Virginia to Alabama and Missouri.

"A very desirable species, with beautiful fall coloring and large clusters of bright red fruit remaining a long time on the branches. Formerly much used for hedges." L. H. Bailey (2).

"Of our four plants from Arnold Arboretum, two winter-killed and two killed to the ground but are sprouting from the roots." N. E. Hansen (9).

***Crataegus crus-galli*, Linnaeus**

Cockspur Thorn

A low wide spreading tree with horizontal or drooping thorny branches; seldom over 25 feet in height. The leaves are thick dark green and shiny. Native from Quebec to North Carolina, west to Michigan. This species bore very heavy crops of small red fruit at Brookings. The trees are beautiful in the fall with the brilliant red fruit and leaves. The fruit often remains on the branches until spring.

"The ample bunches of handsome flowers appear after the leaves are fully grown, and then the tree is an object of rare beauty. It is perhaps more extensively planted both in this country and in Europe for ornamental purposes than any other American species, excepting perhaps the Washington Haw, and it is also valued for hedges." R. B. Hought (12).

Crataegus macrantha

Spike Hawthorn

Crataegus macracantha, Lodd. *Crataegus coccinea macracantha*, Dudley.

Long Spined Thorn-apple.

"Common in thickets in the Minnesota, Sioux and James valleys, and in the Black Hills." D. A. Saunders, (26).

"*Crataegus macracantha*: Shiny shrub with red fruit in thickets of the eastern part of the state." W. H. Over (19).

Crataegus mollis

Downy Hawthorn

Crataegus mollis, Scheele. *Crataegus tiliifolia*, Koch. *Crataegus acerifolia*, Hort. *Crataegus coccinea*, var. *mollis*, Torr. & Gray.

A tree attaining a height of 30 feet, with red fruit about one-half inch across, having thick mealy flesh and four or five stones. Native from Ohio to South Dakota and Kansas. According to Bailey in "Standard Cyclopedia of Horticulture," *Crataegus mollis* is "One of the most decorative species, with large, bright green foliage and showy flowers and fruits, ripening in September, but dropping soon after maturity."

"Hairy hawthorn (*Crataegus mollis*, T. & G.) Much like the preceding (*C. coccinea*) but with larger leaves, often roughish above, more or less hairy beneath, usually cordate at the base; fruit larger, shoots densely pubescent. More or less common in the eastern part of the state." Thomas A. Williams (28).

Crataegus mollis (T. & G.) Scheele. Red-fruited thorn.

Crataegus tomentosa mollis, gray.

"Occasional in thickets in the Minnesota, Sioux and James Valleys." D. A. Saunders (26).

Red Haw (*Crataegus mollis*) A shrub locally common over the state with fruit as above." W. H. Over (19).

Crataegus mollis tiliifolia, Koch.

Imported from Europe. This tree winter-killed at Brookings.

Crataegus monogyna

English Hawthorn

Crataegus monogyna, Jacquin. *Crataegus oxyacantha*, Hort.

A thorny shrub or small tree to 35 feet. Native of Europe and north Africa to the Himalayas. This species consisted of two very distinct forms but is now divided into two separate species, *Crataegus monogyna* and *Crataegus oxyacantha*. *Crataegus monogyna* has fruit containing but one stone. Under cultivation it has varied extensively into many varieties. Much used in England for hedges. The flowers are very fragrant. Our tree attained a height of 12 feet, open spreading habit. Leaves turn yellow in the fall and the fruit is oval, red, about one-half inch in diameter. The thin open habit did not indicate perfect hardiness.

Crataegus monogyna var. *albo-plena*, Schneid.

Crataegus monogyna flore albo pleno.

A variety with white double flowers. The trees were shortlived at Brookings.

Crataegus monogyna flore roseo-plena

A variety with double rose-colored flowers. An imported tree budded on pear did not last.

Crataegus nigra

European Black Hawthorn

Crataegus nigra, Waldst. et Kit. *Crataegus carpathica*, Lodd.

A small tree native of Hungary. Fruit black, one-half inch across, juicy, with 5 stones. Trees short-lived at Brookings.

***Crataegus oxyacantha*, Linnaeus var. *sorbifolia*, Lange.**

Sorbifolia means "mountain-ash-leaved." A hybrid of unknown origin, from the Botanical gardens at Paris. Four trees all winter-killed at Brookings.

Crataegus pinnatifida

Chinese Hawthorn

Crataegus pinnatifida, Bunge.

Native of southeastern Siberia, Korea, Mongolia and north China. A small tree 15 to 20 feet high; thorns absent or quite short. The young shoots smooth; large deeply cut leaves, 5 to 9 cleft. Small dark red fruit about 5-8 inch in diameter. The tree at Brookings attained a height of 17 feet, upright habit; hardy.

Crataegus pinnatifida major

Peking Hawthorn

Crataegus pinnatifida, Bunge. Var. *major*, N. E. Br. *Crataegus korolkowii*, Regel.

Crataegus korolkowii, Regel, is an improvement on *Crataegus pinnatifida*. Leaves larger, less deeply lobed; fruit pear-shaped, one inch long. Cultivated in China for its edible fruit. A beautiful hardy ornamental tree.

Crataegus punctata

Dotted Hawthorn

Crataegus punctata, Jacquin

A tree about 30 feet in height with horizontal branches, forming a broad flat top in the old trees; native from Quebec to southern Minnesota, south to Illinois and Georgia. The fruit is red, three-fourths inch in diameter.

"The Dotted Thorn is one of the most abundant and widely distributed of the thorns, their picturesque flattened tops dotting the dry slopes and pasture-lands of almost every landscape of the northern Atlantic states. The tree is sometimes 25 or 30 feet in height, usually with rigid horizontal branches which form a peculiarly flat top, and short ridger trunk 12 to 18 inches in diameter." R. B. Hough (12).

The tree is remarkably thorny, making it a safe home for the shrike or butcher bird where cats cannot intrude and where the thorns are convenient for impaling its prey. The Dotted thorn is a handsome tree both in flower and fruit.

***Crataegus punctata*, Jacquin, var. *aurea*, Aiton.**

Crataegus punctata var. *xanthocarpa*, Roem. *Crataegus crocata*, Ashe.

A variety of Dotted hawthorn with yellow fruit. The tree grew 17 feet in height with wide spreading branches and bore heavy crops of yellow fruit. The leaves turn bright yellow in autumn.

Crataegus rivularis

River Hawthorn

Crataegus rivularis, Nuttall. *Crataegus Douglasii* var. *rivularis*, Sargent.

A large shrub or small tree of pyramidal habit; native from Wyoming to Colorado, California, Utah and Oregon. Fruit shining black, one-half inch in diameter. Tree short-lived at Brookings.

Crataegus rotundifolia

Roundleaf Hawthorn

Crataegus rotundifolia, Moench. *Crataegus coccinea* var. *rotundifolia*, Sarg. *Crataegus glandulosa*, Willd.

A bush or small tree, to 20 feet. Native from Nova Scotia to Saskatchewan, south to Illinois and Virginia. The most northern *Crataegus*. Here the tree grew 12 feet high; a slender grower, habit thin and open; fruit round, red, about one-half inch long.

***Crataegus sanguinea*, Pallas.**

A small tree up to 20 feet high; usually unarmed or with short spines. Native from southeastern Russia across Siberia.

"*Crataegus sanguinea*, Pall. Dippel calls this "Blood Thorn." Native of Siberia, northern China, Mongolia and Manchuria. A hardy small tree now seven feet high with reddish glossy twigs and white flowers, followed by red berries three-eighths of an inch in diameter." N. E. Hansen (9).

***Crataegus sanguinea* var. *chlorocarpa*, Schneid**

Crataegus sanguinea var. *xanthocarpa*, Regel. *Crataegus sanguinea fructu luteo*.

A yellow-fruited form. Tree too crowded for a good test.

***Crataegus sanguinea* Schroederi, Regel**

Crataegus chlorosarca, Maxim.

"*Crataegus sanguinea* Schroederi, Regel. Hardy; specimen four and one-half feet high. This summer the leaves are badly browned." N. E. Hansen (9).

A variety with handsome foliage and black green-fleshed fruit. The young trees did not get well established.

Crataegue tanacetifolia, Persoon

Tansy-leaved Thorn

A shrub or small tree with short spines or unarmed; fruit pubescent, one inch across. Native of southeastern Europe, Asia Minor and the Caucasus. Trees short-lived at Brookings.

Cydonia oblonga

Common Quince

Cydonia oblonga, Mill. *Cydonia vulgaris*, Pers. *Pyrus Cydonia*, Linn.

A shrub or small tree. The fragrant fruit is not edible in the raw state, but is excellent for jellies, conserves and flavoring. In nursery catalogues, "standard pears" are on pear stocks; "dwarf pears" are on quince stocks. Dwarf pears bear fruit much earlier than standard pears and are planted closer together.

"*Cydonia vulgaris*, Pers. Quince. Probably a native of eastern and central Asia. Quince stocks from Germany winter-killed the first winter." N. E. Hansen, (9).

Experiments in later years with quince stocks, planted in nurseries for budding to pears, amply demonstrated that quince stocks are too tender for this region.

Elaeagnus angustifolia

Russian-olive

Elaeagnus angustifolia, Linnaeus

There are about 40 species of *Elaeagnus* in Southern Europe, Asia and North America, all highly ornamental shrubs or trees, with handsome foliage and fruits.

Elaeagnus angustifolia is believed to be the Wild olive of the classic authors. In Portugal it is called the Tree of Paradise from the rich fragrance of the flowers. A missionary student from Persia, attending school in Minnesota, remarked one day upon the fragrance that filled the air. It was just like his old home in Persia. He soon found that it was due to a tree of this species, in bloom on the campus, the same as at his Persian home.

"*Elaeagnus angustifolia*, the so-called Russian olive, is a small tree, growing to the height of about 20 feet, but often spreading widely. It blooms early in June and the flowers are very fragrant but not very conspicuous. It is desirable for its silvery foliage, but needs a dark background, as of evergreens or burr oaks to bring out its full beauty. It is a native of the steppes of Russia, and is well adapted to prairie conditions." L. R. Moyer, Montevideo, Minnesota (18).

"The experience since 1901 shows that the Russian Olive does not endure a series of wet seasons. It does better in dry seasons than in moist ones. A tree or two is pleasing to add variety to the lawn." N. E. Hansen (9).

In propagation an important point was worked out by Col. C. W. Gurney of Yankton. The young leaves are sensitive to splatterings of mud after a heavy rain. As soon as it dried this should be brushed off to prevent injury to the leaves.

ELAEAGNUS ANGUSTIFOLIA, LINN.

Oleaster, Narrow-leaved Oleaster, Russian Olive or Russian Oleaster. Native of the countries bordering the Mediterranean Sea, across the Caucasus and northern Persia to southern Siberia and northern China. The wide geographical range of this tree has given rise to some confusion. The form from southern Europe known as *E. hortensis*, Bieb., has not proven hardy in the Northwest. It was not until the Russian Mennonites brought to Nebraska, Kansas, the Dakotas and Minnesota a hardy form of the species from Russia, that the tree attracted attention. It was probably first introduced into South Dakota by the German immigrants from Russia and they have many trees and hedges of it, especially in the southern part of the state. This form is generally known as the Russian Wild Olive, although Russian Oleaster would be a more exact name. It is allied to the Buffalo berry and does not belong to the olive family. The silvery leaves gives it an olive-like aspect. Forms a small tree some thirty or more feet in height with rounded top and entire narrow leaves about three inches long, silvery white beneath, light green above. The small yellow blossoms appear the latter part of June and are remarkable for their spicy fragrance, making the tree a center of attraction while in bloom. The tree is valuable for stock-proof hedges on land too dry for other trees. If cut back in the early years it will make the hedge more thorny. In western Nebraska it has been put at the head of the list of deciduous trees after some fifteen years' trial. The tree has proven hardy at Brookings, Milbank, Huron and many other places in the state. In the fall of 1897 at Uralsk, on the Ural river, a part of the eastern boundary line of European Russia, in latitude 51 degrees, the writer noticed a fine hedge of this tree, grown without irrigation. This place is on the dry, open steppes with much alkali in the soil, being a part of the Aral-Caspian depression, with an annual rainfall of only 12.6 inches. The hedge on the Station grounds at Brookings, shown in the plate, was set with one year seedlings in the spring of 1896, and has borne seed two years. Three trees set some ten years in a clump of shrubbery on the College campus have not been pruned and are now 25 feet in height. A specimen standing in sod, but irrigated, at Huron, has attained a height of some thirty-five feet in ten years.

Numerous tubercles are found on the roots of this tree and some European authors consider it a case of symbiosis or copartnership with nitrogen-forming bacteria, enabling the tree to get nitrogen direct from the air.

Propagation: The easiest method of propagation is by seed. The small silvery berries should be picked in the fall before being taken by the birds and soaked for one day, this softens the pulp so it can be easily washed off. The pits are then mixed with moist sand in a small box with holes in the bottom for drainage. We prefer to use a box not more than a foot deep. The box may be put in a cool cellar until winter comes, or it may be buried at once two or three inches below the surface with mulch over to prevent drying out. When winter comes care should be taken that seed be thoroughly frozen by removing most or all of the mulch. This process of burying in sand is called stratifying by nurserymen. The seeds germinate at low temperature and

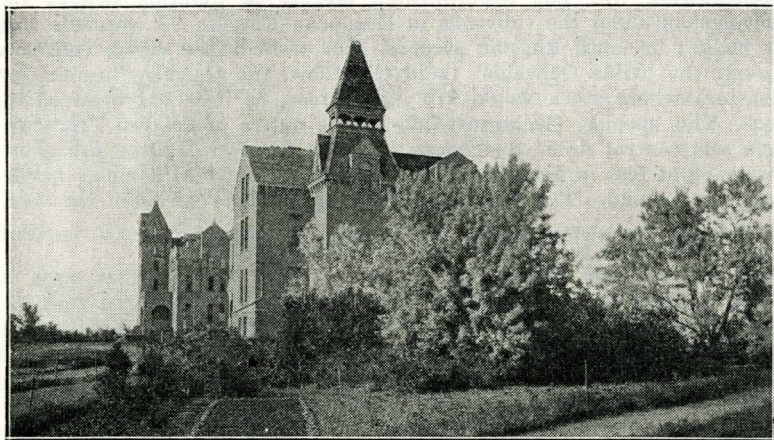


Figure 5—Russian Oleaster

should be sown in drills as early as possible in the spring. Some prefer to sow the seed at once when gathered in the fall, but on heavy clay soil trouble would ensue by seed being heaved out by the frost, and also by freezing too dry in snowless winters. The seed heats very quickly if put in piles when first picked, so it must be spread out in thin layers to be cured before it is safe to ship.

This valuable tree is now generally propagated by Dakota nurserymen and sold at reasonable rates. This Station has sent out many trees for trial in this state during the past four years, but this work has been discontinued as the nurserymen have taken up the work and we are busy with other new plants.

T. L. McCrea, of Tyndall, S. D., in reply to our inquiry, writes under date of December 29, 1899: "It was first introduced in Bon Homme county by the Russian Mennonites. Ten years ago I procured a few bushels of seed and sowed it thick in rows about four feet apart. I sold only a part, taking up clean as far as I went. The balance (a fine grove) has stood as it came up without thinning or trimming, through the dry summers and cold winters and is perfectly healthy today. It is very ornamental with its silvery leaf, fragrant blossoms, and clusters of berries or seed. As a hedge it will turn any stock that osage orange will. Horses or cattle will not attempt to go through it, and it does not sap the ground like the osage orange."

Foreign Notes: Sometimes notes of methods followed in other countries are of interest, even if not always fully applicable to our conditions.

The following is condensed from a translation* from a pamphlet by N. K. Sredinsky, (Kharkhof, 1887) a Russian government forester and

horticulturist, who has experimented largely in planting hedges for snow-breaks along the railroads in European Russia: "A valuable tree for hedges in south Russian steppes. For snow-breaks along railroads I plant the 'wilde Oelweide' (wild Oilwillow, the German-Russian for Oleaster) where stock would kill other trees, as it is not browsed by stock. This species, (*E. angustifolia*, L) is native of eastern Transcaucasia and central Asia. Specimens in south Russian gardens are about twenty-eight feet in height and 21 inches in diameter at a man's height from the ground. The trees bear fruit the sixth year from the seed.

*Translated for me from Russian into German by a translator at the St. Petersburg Botanic Gardens, and by the writer from German into English.

When a tree is cut down to the ground the fifth year, a great mass of strong sprouts are produced which attain a height of seven feet the first year and are armed with long thorns. Rabbits, as well as domestic animals, do not attempt to go through such a hedge and it is shunned by various insects injurious for the garden and field. Sow seeds in beds thirty-two inches wide, rows ten and one-half inches apart, not more than one and one-fourth inches deep, and so they do not touch one another. Sow seeds in fall. In winter the beds are covered with five inches of straw, which remains until the seeds germinate in the spring, when it must be removed. This mulching is necessary as it prevents premature germination and consequently injury from late spring frosts. Use decayed straw as it is free from weed seeds. Early in April the mulch should be removed, except a very thin layer which the seedlings are able to penetrate. The germination is regular and no watering is necessary during spring and summer. Weeding must be promptly done. The young shoots of this tree do not suffer from the morning frosts of May as do often the shoots of *Fraxinus*, *Acer platanoides*, *Carpinus* and other species. If the seeds are not planted in the fall, they must be stratified in layers of sand where they will freeze over winter. Upon planting early in spring care must be taken to prevent the seeds losing the moisture imbibed during the winter. As soon as planted, water beds thoroughly and cover with straw to be removed as soon as the young seedlings show.

For a hedge the soil should be plowed ten inches deep and harrowed. If several rows are planted the rows should be ten and one-half feet apart and a strip kept cultivated a similar distance from the outside rows. Set plants with a line, making the holes with dibbles or spades. The plants are set in the spring, ten and one-half inches apart in the rows and one and three-fourths inches deeper than they stood in nursery, and the soil is so firmed about the roots that they are not easily pulled up. Fall planting is not recommended; when it appears unavoidable it is very necessary to mound up the earth around the stem to protect the roots in case the following winter is nearly without snow. The hedge must be thoroughly cultivated three times each season for the first three years, until the branches grow together and keep down weeds. During the first years, the tree forms a single trunk thickly set with branches. In order to give the necessary form of a woven (plashed) hedge, the main stem must be cut to the ground the fifth year, for the most part this is done at the close of winter. In the spring, at the place where the stem has been sawed off, appear a large number of shoots, which soon attain a good height, thickly set with thorns and forming a strong impenetrable mass of interwoven branches. When after some

years occasional ones of these shoots have again formed thick stems and crowd their neighbors, they must be cut down to the ground again, when again a yet stronger, more impenetrable, interwoven mass of branches appear, which in the first year attain a height of over seven feet. Sredinsky in conclusion states that this tree is said to be propagated also by cuttings and stolons, which methods he, however, has not used, but doubts the practicability of growing the trees from cuttings on elevated places on the steppes, and that propagation by seed is easier than by any other method."

***Elaeagnus angustifolia orientalis*, Schldl.**

This species is native of the Orient, Asia Minor and the Caspian Sea region.

"Oriental oleaster. This is a variety from Turkestan with fruit about one inch in diameter. The writer found the fruit much used in Turkestan but thought the berries, although sweet, were too dry to win favor here. In a visit to the Royal Horticultural school of Potsdam near Berlin in 1894 the writer found specimens of this tree sent from Turkestan by a graduate then in the employ of the Russian government in Turkestan. Scions were secured and grafted on Russian olive seedlings at the Iowa Agricultural College. Two of these trees were planted at this station in spring of 1896, but have not proved sufficiently hardy." N. E. Hansen (9).

Fagus

Beech

The beech family, *Fagaceae*, includes the beech, chestnut and oak. This family includes nearly 400 species. There is only one species of beech native of North America. The American beech (*F. Americana*, Sweet) is native from New Jersey and southern Illinois to Florida and Texas.

In Europe and eastern United States the beech is one of the leading forest trees.

"Fagus. All kinds of beech trees are conspicuous by their absence in northwestern catalogs, owing to entire lack of hardiness." N. E. Hansen (9).

Ginkgo biloba

Maidenhair-Tree

Ginkgo biloba, Linnaeus

Ginkgo is the Chinese name of this tree. A tall tree with wedge-shaped leaves. This is closely related to the conifers, but as the leaves fall in the autumn it is considered with the deciduous trees. This one species in North China and Japan is the sole survivor of a larger tribe in geologic time.

"The ginkgo was introduced to America early in the last century; it is generally successful on good soil in the eastern states as far north as eastern Massachusetts and central Michigan and along the St. Lawrence river in parts of Canada. It is of special value for solitary planting to secure picturesque effects. It is considerably planted in Washington, D. C., where it is growing in esteem as a street tree because of its upright habit and freedom from insect injury." L. H. Bailey (?).

The kernels are used for food in China and Japan. According to advice from California, there are some Ginkgo trees in China that survive 40 degrees below zero. It would be worthwhile to secure this type if possible for trial, as the tree is of unique beauty. Imported trees were not hardy at this station.

"Planted to some extent in the vicinity of the Twin Cities where it is perfectly hardy, but rather slow growing. A handsome tree with very ornamental foliage. The staminate tree is preferable, as the seeds of the pistillate tree have a very offensive odor. The Ginkgo tree is the sole survivor of a very ancient and interesting group, which in former geological periods occurred abundantly in many parts of the world. It has survived only in China and Japan, and it is doubtful whether even in those countries any truly wild specimens occur." Trees and Shrubs of Minnesota, Rosendahl and Butters (23).

The foul-smelling fruits which continue ripening during several weeks suggest the advisability of planting only the staminate trees, which can be propagated by grafting or budding.

Maackia amurensis

Amur Maackia

Maackia amurensis, Rupr. (*Cladrastis amurensis*, Koch)

A tree with whitish flowers in panicles and large pinnate leaves.

"*Cladrastis amurensis*, Koch. Dippel gives preference to the name *Maackia amurensis*. Native of the Amur provinces, Japan and Manchuria. This tree is now only 18 inches in height, killing to the ground every winter. Too tender." N. E. Hansen (9).

Evidently this plant came from the mild climate part of its habitat. In the fall of 1895 the writer, while hunting for hardy pear trees, found *Maackia amurensis* in the mountains about 50 miles east of Harbin, Manchuria, where the minimum record is 47 degrees below zero, Fahrenheit.

Magnolia acuminata

Cucumbertree

Magnolia acuminata, Linnaeus

A large ornamental tree native from New York to Georgia, west to Illinois and Arkansas. Flowers small, greenish yellow, slightly fragrant. Fruit cylindrical, pink. Winter-killed at Brookings and Yankton.

Magnolia stellata

Star Magnolia

Magnolia stellata, Maxim. *Magnolia halleana*, Hort.

A shrub or small tree with large sweet scented flowers. Native of Japan. Winter-killed at Brookings.

Malus baccata manshurica

Manchurian Crab

Pyrus baccata, Linn. var. *manshurica*, Maxim. *Malus baccata* var. *manshurica*, Echneld.

A low densely branched tree in the open but growing tall in forests. Native of the Amur region, Korea, central China and Japan. The only

form of the Manchurian crab tested at this station is from Manchuria.

"Manchurian Crabapple Seedlings. Introduced 1926. These are seedlings of *Pyrus baccata*, var., *Mandshurica*, Maxim, a form of Siberian crab grown from seed gathered by Prof. N. E. Hansen in 1924, in the mountain region, about fifty miles east of Harbin, Manchuria. The small fruit varies in size; tree is of somewhat stronger growth than the ordinary Siberian wild crab and for that reason is worthy of testing as a stock. The tree is quite ornamental, heavily branched in the open but grows taller when crowded by other trees in the forest." N. E. Hansen (11).

Malus baccata

Siberian Crab

Malus baccata, Barkhausen. *Pyrus baccata*, Linnaeus

"**Pyrus baccata**, Linn. Siberian crab. Native of Eastern Siberia to Manchuria, China and the Himalaya region. Many varieties of the true Siberian crab (those with deciduous calyx) are being tested at this station. All have considerable claim to be considered ornamental trees, but their main usefulness will probably be as a hardy stock for cultivated apples. The question of root-killing of apple trees is considered in Bulletin No. 65 of this station. In Russia *Pyrus baccata* is used as a stock to obviate root-killing." N. E. Hansen (9).

The use of Siberian crab as a stock for budding cultivated apples begun by the writer and reported in Bulletin 65 of this station, has been continued up to the present time. The Yellow Siberian crab seed makes strong seedlings and take buds readily. Many of the forms of the Siberian crab have been found useful as budding stocks.

The Siberian crab is worthy of planting as an ornamental tree for the lawn and in parks. It finds favor in England as an ornamental tree. W. J. Bean writes in "Trees and Shrubs Hardy in the British Isles (5)" "As a tree for gardens the Siberian crab stands in the first rank. It is pretty in April when laden with its abundant white flowers, but its great value and charm are most apparent in autumn, when its plentiful crop of cherry-like crabs turns a brilliant red. They remain long on the leafless branches, and I have seen them lighting up the garden on fine days as late as February. This tree is closely allied to *Pyrus prunifolia*, but the fruit of the latter is more elongated, not indented at the base, and nearly always crowned with the calyx teeth."—"The fruit of *Pyrus baccata*, although harsh when eaten raw, makes a very excellent jelly."

Some of the multitude of hybrids of the Siberian crab with the common apple are worthy of consideration as ornamental trees as combinations of the hardness and productiveness of the Siberian crab with fruit of good size and quality for culinary use. Some of these are: Alexis, Amur, Beauty, Dolgo, Nocalyx, Olga, all originated at this station and described in South Dakota Bulletin 224.

The Dolgo is outstanding at the present time owing to its very early bearing and bright red fruit. The Alexis resembles the Dolgo very closely and is also very productive at an early age. One Canadian reports holds that the Alexis will probably grow even further north in Canada than the Dolgo. The Alexis is a wonderful sight in bloom; the tree forming one huge bouquet of white and pink blossoms.

Since the Siberian crab was introduced into America thousands of hybrids with the standard apple have originated under cultivation. Others have been superseded by later varieties and are now out of cultivation. Some forms of the Siberian crab are subject to fire blight while other forms are quite free from this bacterial disease, which is native of northwestern North America.

The Nertchinsk form of the Siberian crab has been very resistant and is worthy of consideration as ornamental tree.

"Nertchinsk Siberian Crab Seedlings. Introduced 1924. For the far North, it may prove best in the long run to improve the Siberian crab by straight selection through several generations rather than by hybridization with the standard apples. The Siberian crabs vary considerably in hardiness. The one from Nertchinsk, eastern Siberia, near the headwaters of the Amur river, appears to be the hardiest one now available and will go farther north. It is very productive. The fruits make a beautiful sight on the tree and make as fine show as the common European Mountain ash which is not entirely hardy here, often winter-killing after heavy fruiting. Fruits mostly small, for ornament only, and for stocks." N. E. Hansen (11).

Pyrus baccata

Pyrus baccata weever looked just because it had little or no value as a fruit, but for top-grafting the tender varieties are valuable. It makes a pretty upright growth, blossoms when quite young, and which are as pleasing as blossoms from the Wealthys, and the miniature fruit attracts more attention than the larger apples, and besides can be used for jelly making. Beauty and utility, why not grow more varieties that give double value? I am recommending this also on account of its hardiness.—"New Ornamentals" by J. B. Taylor, Ipswich, South Dakota, Annual Report South Dakota State Horticultural Society, 1920, page 27.

Malus ioensis

Prairie Crab

Malus ioensis, Brit. *Pyrus ioensis*, Bailey. *Pyrus coronaria* var. *ioensis*, Wood. *Malus coronaria* var. *ioensis*, Schneid.

A small ornamental tree native of the lowlands of the Mississippi valley. The typical form as described by Rehder ranges from Minnesota to Wisconsin, south to Nebraska, Kansas and Missouri. A variable species. The bright pink flowers and late blooming make it a desirable small lawn tree.

"*Pyrus ioensis*, Bailey. Western Crab apple. Native of the Mississippi valley. In 1896 seedlings of this species were grown at this station from seed gathered near Des Moines, Iowa, but these winter-killed the first winter (see Bulletin No. 65). It is not found native in South Dakota except, perhaps, in the southeast corner. A cultivated variety from Illinois, Bechtel's double-flowered crab, is reported hardy at Yankton and is considered valuable for ornament where hardy. Several large-fruited sports or hybrids (*P. Soulandi*, Bailey) and considered to be natural hybrids of *P. Malus* and *P. Ioensis*, appear hardy. They were top-

grafted in the old station orchard in the spring of 1897 and have fruited the last two years." N. E. Hansen (9).

The Prairie crab, *Malus ioensis*, as found native in Minnesota, has been found hardy at Brookings. An annual bearer; the abundant pink blossoms make it well worthy of general cultivation as a small lawn tree. The hybridization work has been mainly with the wild crab as found native at Elk River, Minnesota and Nevis, Minnesota, noted in South Dakota Bulletins 224 and 237. The named varieties of *Pyrus ioensis* hybrids are: Kola, Red Tip, Shoko, Tipi, Zapta, Chinook, Red-flesh, Wecota and Wetonka. Of secondary hybrids (about three-fourths common apple, *Malus*, and one-fourth wild crab, *ioensis*.) The following have been named: Anoka, Bismer, and Wakpala (11)).

Elk River Wild Crab

A Dwarf Ornamental Lawn Tree

"Offered for the first time. Seedlings of *Pyrus ioensis* from Elk River, about 40 miles north of Minneapolis, on the Mississippi River. Originally found by A. W. Keays. This makes a larger tree than the Nevis wild crab, but begins to bloom very early. The beautiful pink flowers are decidedly ornamental." N. E. Hansen (Spring List, Department of Horticulture, 1930).

Nevis Wild Crab

A Dwarf Ornamental Lawn Tree

"Offered for the first time. The wild American crabapple, *Pyrus ioensis*, from the farthest northwestern point where it has been found native, Nevis, Minnesota, near the headwaters of the Mississippi river. Originally found by James Arrowwood. A beautiful ornamental tree bearing when only four feet high, rich pink flowers in great profusion." N. E. Hansen (Spring List, Department of Horticulture, 1930).

Malus ioensis, Brit. var. *plena*, Rehd

Bechtel Crab

Pyrus angustifolia flore pleno, Hort. *Pyrus angustifolia Bechtelii*, Hort.

Bechtel's Crab is a very handsome lawn tree when in full bloom, with the large, double, pink fragrant flowers. Originated at Staunton, Illinois before 1840 and introduced in 1888. Not sufficiently hardy at Brookings but blooms fairly well in a sheltered position at Sioux Falls and southward. (See South Dakota Bulletin 224 (11) and Spring List for 1929 of the Horticulture Department, Experiment Station, South Dakota State College.

Malus micromalus

Midget Crab

Pyrus micromalus, Bailey. *Pyrus kaido*, Sieb. *Malus micromalus*, Makino.

Probably a hybrid between *Malus spectabilis* and *baccata*. A showy ornamental tree from Japan with bright red flowers and small red fruits. Winter-killed at Brookings.

Malus niedzwetzkyana**Redvein Crab**

Pyrus malus niedzwetzkyana, Dieck. *Pyrus malus*, Linn. var. *niedzwetzkyana*, Ash & Gracib. *Pyrus niedzwetzkyana*, Hemsl.

"Native of the Caucasus, the Kashgar region, Turkestan. Found by Niedzwetzsky near Vernoe, capital of the Semiretchinsk province of Northern Turkestan, in the mountains separating Russian Turkestan from Western China, and by him sent to the German dendrologist, Dr. Dieck. The writer met the former gentleman in Turkestan in the fall of 1897 and also found similar varieties of red-fleshed apples in Turkestan and Western China, especially north of Kashgar. The plant is remarkable for the more or less of red coloring (erythrism) of young wood, cambium, bark, young leaves flowers, fruit and flesh. Its habitat does not give promise of perfect hardiness, but it is interesting as a curiosity. Our first importation from Germany was lost by the root-killing of the stock; later plantings are more promising." N. E. Hansen (9).

The fruit of the Redvein crab is about two inches in diameter, of mild neutral flavor. Of no value for fruit but it is one of the best of the ornamental crabapples.

Later experience indicates clearly that the Redvein crab is not sufficiently hardy for general cultivation at this station, although there is still one specimen tree in bearing, remaining in a sheltered situation. The Redvein crab has been found useful in apple-breeding at this station. The three varieties named so far are the Hopa, Redflesh and Red Tip. In each of these the brilliant red color of the flower is apparent. The descriptions follow:

Hopa Red-flower Crabapple. Introduced 1920. Hopa is the Sioux Indian word for "beautiful." A promising addition to the list of ornamental trees for the lawn owing to its wealth of beautiful deep rose crimson blossoms. A striking sight when in bloom. The fruit is too small to be of value for eating, being less than one inch in diameter, but its bright red color will light up the tree in autumn, and the small size is an advantage as the tree is less apt to be stripped for fruit when standing on the lawn. Female parent, *Pyrus Malus Niedzwetzkyana*, a small red-fleshed apple from Turkestan in the high mountains between Turkestan and China; male parent, *Pyrus baccata*. This was not a hand cross, but it is almost certain that the *baccata* was the pollen parent. Trees of strong growth in nursery. N. E. Hansen (11).

In his "Manual of Cultivated Trees and Shrubs" Alfred Rehder (Arnold Arboretum, Boston, Mass) (22) says, "A handsome form with large purple-red flowers is "Hopa Crab."

(*Malus baccata* x *pumila Niedzwetzkyana*).

Red Tip Crabapple. Introduced 1919. Female parent, a wild crab from Elk River, Minnesota. Male parent, *Pyrus Malus Niedzwetzkyana*, a small red-fleshed apple from Turkestan in the high mountains between Turkestan and China. The pedigree does not indicate any promise as a table fruit, but the red-tipped young leaves make it an interesting tree from the ornamental standpoint. The fruit is small. N. E. Hansen (11).

Redflesh Crabapple: Good for the lawn and for the orchard. Introduced 1928. A most remarkable novelty, that is probably destined to world-wide popularity wherever apples are grown. The tree is ornamental as well as useful, the beautiful red flowers and moderate growth making it a highly desirable lawn tree. The original tree gives promise of being a good annual bearer and bore its first two crops in 1927 and 1928. The fruit in size is 1 1-2 x 1 5-8 inches in diameter, in color a brilliant solid polished dark red all over. The flesh is red throughout and makes excellent red preserves and red jelly which attracted favorable attention at the State college exhibit at the South Dakota State fair, Huron, September, 1928. Season, fall. Pedigree: *Pyrus Malus Niedzwetzkyana* x Elk River, Minnesota, wild crab. The seed parent is from the Tian Shan Mountains that separate Russian Turkestan and western China. N. E. Hansen, Spring List, 1929. Horticulture Department, S. D. Experiment Station.

Malus prunifolia

Pearleaf Crab

Malus prunifolia, Borkh. *Pyrus prunifolia*, Willd. *Malus hybrida*, Loisel

Pearleaf crab is the common name given in "Standardized Plant Names" but "*Prunifolia*" really means plum-leaved.

"*Pyrus prunifolia*, Willd. Native of China and Japan, according to Dippel; and Siberia and north China, according to Koehne. This includes a large number of "hybrids" or Siberian crabs with persistent calyx (the "blossom end" remains attached to the ripe fruit). The Transcendent and Hyslop crabs are good examples. Many varieties are being tested at this station. Some of them, such as the two just named, are very subject to blight; others, such as the Martha crab, are quite ornamental in tree, flower and fruit and are not subject to blight. Some authors consider *Pyrus prunifolia* to be a good species, others regard it as a hybrid group, *Malus* x *baccata*, intermediate between the cultivated apple and the true Siberian Crab. This would make *Pyrus prunifolia* hold a similar relation to the apple that *Prunus hortulana* does to the native plum, it being an intermediate group between the southern *angustifolia* and the northern *Americana*." N. E. Hansen (9).

Later research convinces Rehder (Manual of Cultivated Trees and Shrubs) that *Pyrus prunifolia* is a distinct species. The variety *Pyrus prunifolia* var. *Rinki*, has been found wild in China. As a rule, in the prairie Northwest all Siberian crabs with deciduous calyx segments are referred to *Pyrus baccata*, and all Siberian crabs with persistent calyx segments are referred to *Pyrus prunifolia*. In some hybrids this rule does not always work, because part of the fruits on the same tree have deciduous calyx segments, and part of the fruits have persistent calyx segments.

Malus prunifolia, Borkh. var. *rinki*, Rehd.

Chinese Apple

Pyrus ringo, Wenzig. *Malus ringo*, Carr. *Malus yezoensis*, Koidz. *Malus matsumurana*, Koidz. *Pyrus prunifolia* var. *rinki*, Bailey.

"*Pyrus ringo*, Wenzig. Native of Japan. A small tree of spreading bushy habit, ten feet in height. The rose colored flowers in May are succeeded by small roundish fruits from one-half to three-fourths of an inch in diameter. Our specimens root-killed, so hardiness is uncertain." N. E. Hansen (9).

The abundant red or yellow fruits persist on the tree a long time.
Pyrus ringo, Wenzig

"This tree appears to have been originally introduced to Europe by Siebold from Japan about the middle of last century, but it is not known to be anywhere wild in Japan. It is surmised to be a hybrid between *Pyrus spectabilis* and some form of *Pyrus Malus*. As a tree for the garden its great attraction is its abundant, gracefully pendent, bright yellow fruits, which hang from the lower side of the branches in long crowded rows, and make it probably the handsomest of our yellow-fruited hardy trees. They have an apple-like flavor and are quite pleasant eating." W. J. Bean (5).

The *Pyrus Ringo* received from the importation by Professor J. L. Budd of Iowa State College, Ames, fruited freely. This seed was planted and yielded the Cathay crab described in South Dakota Bulletin 224.

"Cathay Crabapple. Introduced 1919. A round-topped dwarfish tree of considerable promise as an ornamental for the lawn. In bloom the tree is one huge bouquet of very large white flowers. The flowers are two and one-half inches in diameter, showing tendency to doubling. Cathay is the ancient name for China, referring to its native home. One of the seedlings of *Pyrus ringo* descended from the original importation from Russia by Professor J. L. Budd. The name as now given in Bailey's *Cyclopedia of Horticulture* is Chinese apple, *Pyrus prunifolia*, Willd, var. *Rinki*, Bailey. This seedling is a good representative of this species. Fruit, one and one-half inches in diameter; clear bright yellow all over with some orange blush. Calyx deciduous. Flesh a clear, juicy acid. Original tree has been very productive. The fruit cooks up as easily as *Duchess*, making light yellow acid sauce of good flavor." N. E. Hansen (11).

Pyrus ringo fastigiata bifera, Dieck

Pyrus mitis x *ringo*?, Koehne Ms.

A dwarf crab tree of upright pyramidal growth; flowers large, pink, fragrant; fruits egg-shaped, large for a crab, a little over 1 inch in diameter, yellow stained with red. Supposed to be a hybrid of some form of *Pyrus malus* and *Pyrus ringo*. Not quite hardy at Brookings but hardy enough to bear considerable fruit.

Malus robusta, Rehd.

Cherry Crab

Malus cerasifera, Schneid, not Spach. *Pyrus baccata cerasifera*. *Pyrus cerasifera*, Wenzig, not Tausch.

Introduced about 1815. A hybrid, (*baccata* x *prunifolia*). A large tree with spreading habit; flowers very large, pure white. Fruit variable in size, shape and color. Calyx segments either deciduous or persistent.

This makes a large round-topped tree, a wonderful sight in full bloom, with the great abundance of flowers. Tree hardy and resistant to blight.

S. A. Beach, in "The Apples of New York," refers the old Red Si-

berian crab to this species. This has been generally very hardy and productive throughout the prairie Northwest, but is being superseded by later varieties with larger fruit.

There are many crabs and hybrid crabs which may be referred to this species.

At the South Dakota station the writer has grown many seedlings of the *Pyrus baccata cerasifera*, of which the Amur and Beauty are two of the best. Both of these are of decided ornamental value in flower and fruit.

"Amur crabapple. Introduced 1912. Raised from seed of the selected Siberian crab known as *Pyrus baccata cerasifera*. *Cerasifera* means cherry-bearing, referring to the bright cherry-like color of the fruit. The word Amur refers to the Amur river region, the original home of the pure Siberian crab, *Pyrus baccata*, in eastern Siberia.

"There is a great demand on the market for a medium sized crab apple, not too large in size, free from blight, and equal in color to the Transcendent crab. The Amur is the first attempt in this line after raising thousands of crab seedlings. This is offered as an improvement of the Transcendent crab, not in size but in color. It is intense bright red with a light bloom, a beautiful fruit. The jelly of the Amur is a bright ruby red, while that of the Transcendent is light pink; the Transcendent sauce cooks yellow, that of the Amur a pleasing bright red. The Amur is very upright in growth.

"If the tree proves as productive and free from blight elsewhere as at this Station, Amur will be worthy of trial. The upright habit of the tree and the bright glowing color of the abundant fruit makes the tree very pleasing from an ornamental standpoint, even though the fruit should be ranked too small to compete with the larger crabs.

"The bright red color of the Amur crab makes it desirable for culinary use. The fruit is one and one-half inches in diameter. The tree has been free from blight." N. E. Hansen (11).

"Beauty Crabapple. Introduced 1919. One of our seedlings of *Pyrus baccata cerasifera* raised from seed received from the Botanical Gardens at Petrograd, Russia. The name Beauty has been given to this seedling because it is perhaps the brightest in color of all our crab seedlings. It is a brilliant solid cherry red all over with orange-red underneath, especially on the shaded side. Size is about one and one-fourth inches in diameter. Dots distinct, few, white. Basin deep, irregular. Calyx deciduous with russet scar, and no opening into the core. Flesh white, firm, very juicy, acid. This is of the Cherry crab type. Tree is a very heavy bearer. It is of special promise owing to its tendency to late keeping. The fruit makes a bright red sauce like the Hyslop crab, but the flesh has not the astringency of the Hyslop. The fruit has kept into January in a rather warm cellar. Tree is a very stocky and vigorous grower of wide and strong forks and strongly resistant to blight. This tree should be of special value at the far North as it may mean the beginning of the development of the Siberian crab as a late keeper." N. E. Hansen (11).



Figure 6—Amur Crabapple

Malus scheideckeri**Scheidecker Crab**

Malus scheideckeri, Zabel. *Pyrus pulcherrima*, var. *Scheideckeri*, Bailey. *Pyrus scheideckeri*, Spaeth.

A hybrid originated at Scheidecker's nursery, Munich, Germany. A small tree of upright habit with semi-double pink flowers and yellow fruit.

"*Pyrus toringa*, Sieb. Toringo or Dwarf crab. Native of Japan. *folia*,) according to Koehne. Of two specimens, one winter-killed and one kills to the ground." N. E. Hansen (9).

Malus sieboldii**Toringo Crab**

Malus sieboldii, Rehder. *Pyrus sieboldii*, Regel. *Malus toringo*, Sieb. *Pyrus toringo*, Sieb.

Pyrus toringa, Sieb. Toringo or Dwarf crab. Native of Japan. As imported by Professor Budd, this forms a large fairly hardy shrub six to eight feet in height with small pink to white blossoms and fruit the size of a large pea. The calyx is deciduous. The leaves are very variable ranging from ovate apple-like leaves to leaves lobed like those of the hawthorn. This species is being tested as a dwarf stock for the apple. Five trees of Duchess and Wealthy were budded on *Pyrus toringo* in the fall of 1896, and are now four to five feet in height but have not fruited. They were transplanted last spring. Many young trees of *Pyrus toringo* root-killed in the winter of 1898-99. As received from Arnold Arboretum some, marked "Hillside variety" and *Pyrus toringo atrosanguinea*, winter-killed, while others, marked *Pyrus toringo* and *Pyrus toringo* No. 2, appear hardy." N. E. Hansen (9).

These seedlings are shrubs about six feet high, with spreading branches. They lack much in hardiness but continue to bear some fruit.

Malus soulardi**Soulard Crab**

Malus soulardi, Britt. *Pyrus Soulardii* Bailey

The Soulard crab was the first introduced of what are apparently a group of natural hybrids of *Pyrus Malus* and *Pyrus Ioensis*. "Found wild in the Mississippi valley from Minnesota to Texas, but always local and in different forms of fruit. Named for James G. Soulard, Galena, Illinois, who introduced the first variety to cultivation." Bailey's Standard Cyclopedia of Horticulture.

The Soulard crab is ornamental and hardy at Brookings. The fragrant, pink blossoms, appearing later than the common apple, are very attractive. The Soulard wild crab and many other varieties of the same group, like the Mercer, Giant, Eden and Missouri, bloom freely at Brookings, and will be considered in a later bulletin. (See South Dakota Bulletin 224). These are all natural hybrids, found growing wild.

Many other hybrids of the common apple and the wild American crab have been originated at the South Dakota station. These are mentioned under *Malus ioensis* in this bulletin and in South Dakota Bulletin 224.

MALUS SYLVESTRIS

Common Apple

Pyrus malus, Linnaeus, partly. *Malus pumila*, Mill. *Malus communis*, DC. *Malus ma.us*, Britt. *Malus dasyphylla*, Borkh.

The standard apple is not usually considered with the ornamental trees, although the tree is decidedly ornamental both in flower and fruit. A fruit list of recommended varieties is published by the various state horticultural societies and agricultural experiment stations. For some new hardy apples originated at the South Dakota experiment station see South Dakota Bulletin 224.

According to Rehder (22) "*Malus pumila*, Mill, is the parent of most of our cultivated apples, although some probably are the offspring of hybrids with *Malus sylvestris*, *Malus prunifolia* and also *Malus baccata*."

"The cultivated apple, *Pyrus Malus*, is highly heterozygous. According to A. C. Koch, it is the descendant of six different species, native of the temperate parts of Europe and Asia. This process of amalgamation has taken place during the past four thousand years." (Bulletin 237. South Dakota Experiment Station.)

Malus zumi

Zumi Crab

Malus Zumi, Rehder. *Pyrus Zumi*, Matsumura, Bailey

According to Rehder (22) this is a hybrid (*Malus baccata mandshurica* x *Sieboldii*).

Allied to the Toringo crab; a low, densely branched tree, native of the mountains of central Japan. Flowers pale pink turning to white; fruit one-half inch across, red. Not sufficiently hardy at Brookings.

Phellodendron Amurense

Amur Corktree

Phellodendron Amurense, Rupr.

"*Phellodendron Amurense*, Rupr. Chinese Corktree. Manchurian Corktree. Native of Manchuria, north China, Saghalin, and the Japanese islands of Nippon and Yezo. A fairly hardy ornamental tree with spreading branches; light gray corky bark and large odd-pinnate leaves with three to six pairs or more of leaflets. The leaves and young wood have a strong pungent odor when bruised. The plant is free from insects." N. E. Hansen (9).

Prunus americana

American Plum

Prunus americana, Marsh.

The American plum is native from Massachusetts to Manitoba, south to Georgia, New Mexico and Utah. In the eastern states it has not attracted much attention, being overshadowed by the European plum and later by the Japanese plum, but in the prairie Northwest the American plum has received much attention and many varieties with good fruit have been developed from the northwestern type of the species. These improved wild plums in later years have been superseded

in large measure by their hybrids with other species, especially with Japanese plum and Chinese apricot-plum. To ensue pollination some pure native *Prunus Americana* plums should be included in every orchard.

"*Prunus Americana*, Marsh. Wild Plum. Native in eastern United States from New Jersey and New York south to Florida, west to the eastern slopes of the mountains of Colorado, New Mexico and northern Mexico. The native plum of South Dakota. Four plants received from Arnold Arboretum and planted in the spring of 1899 are only two and one-half feet high and kill back every winter. It is evident that these four are not northwestern forms of the species as we have many varieties of choice wild plums from Wisconsin, Iowa, Minnesota and Manitoba on the station grounds that are perfectly hardy. Our wild plums form a good fruit-bearing windbreak, and are not without value for ornament. Every prairie farmer can grow such a hedge with much profit and pleasure, and plum trees scattered in among other trees in a grove fruit better than those in open exposure. To grow seedlings, treat pits the same as Russian oleaster (*Elaeagnus*) seed, being careful never to let the pits dry out too much, and plant as early in spring as possible." N. E. Hansen (9).

Professor Sargent writes in his magnificent work, *The Silva of North America*: "As an ornamental plant, *Prunus Americana* has real value; the long wand-like branches form a graceful head, which is handsome in winter, and in the spring is covered with masses of pure white flowers, followed by ample bright foliage and abundant showy fruit."

"Wild Plum (*Prunus americana*, Marsh.) The only plum yet found in the state. The fruit varies greatly in size, color and flavor. Many forms occur that are valuable for orchard planting. It is abundant throughout the entire state." Thomas A. Williams (28).

"Very abundant in thickets in the vicinity of lakes and streams throughout the state." D. A. Saunders (26).

"Common along streams and in thickets over the state." W. H. Over (19).

...."*Prunus Americana*. Wild Yellow or Red Plum. A shrub or small tree which under favorable circumstances may attain a height of 30 feet and a diameter of 12 inches. The branches are more or less thorny, bark thick, leaves obovate, acuminate and although pubescent when young, at maturity are glabrous, serrate with gland tipped teeth, rounded at the base, petioles are slender. The flowers appear about the first of May. They are white in lateral sessile umbels on pedicels three-fourths inches long. Leaves appear soon after the bloom. The fruit is globose red or yellow, three fourths to one inch greater in diameter. Skin is tough with little or no bloom. Fruit ripens in September and October. The oval pit is ridged on the ventral side and obscurely grooved on the dorsal.

Americana plums are found in coulee thickets in the southern parts of the province, where it appears to run into the early flowering variety, *Prunus nigra*, which is a sub-species nearly identical with it.

In both of these types, great variety of size and quality in the drupes may be found. Many trees bear palatable fruit which is gathered from the thickets and made into plum preserves, jelly, jam, plum butter and marmalade. Prairie Indians were in the habit of drying them for winter use.

From *Prunus Americana* has been developed in the northwest prairie states by selection under cultivation several hardy varieties which may prove valuable acquisitions to Manitoba orchards.-----"

In connection with this article, see *Prunus nigra*.

"*Prunus americana* Marsh. Wild Plum. The shoots and seeds contain the principle amygdalin, which is converted into hydrocyanic acid. The fruit, it should be said, is entirely harmless." L. H. Pammel, (20).

Prunus angustifolia watsoni

Sand Plum

Prunus angustifolia watsoni, Waugh. *Prunus watsonii*, Sarg.

"*Prunus watsoni*, Sarg. Sand Plum. Referred to *Prunus angustifolia*, var. *Watsoni*, Waugh in Bailey's Cyclopedia. Native of dry regions of Nebraska, Kansas and Oklahoma, and prized by the settlers for food. Of four plants from Arnold Arboretum planted in the spring of 1899, all kill back severely every winter; one is now five feet high and bearing fruit this year. One plant marked "early variety," winter-killed. It is evident that the Sand Plum is not as promising as the western sand cherry for South Dakota." N. E. Hansen (9)).

At the South Dakota station two named varieties have been developed from the Sand plum, the Kaw and Kiowa, described in South Dakota Bulletin 224, as follows:

"Kaw Plum: Introduced 1917. Pedigree: *Prunus Watsoni* x Wolf plum pollen. The color is a pleasing bright dark red with firm skin with fine white dots and white bloom and peculiar crisp texture of yellow flesh. The quality is pleasing to all who have tried it."

"Kiowa Plum: Introduced 1917. Pedigree: *Prunus Watsoni* x Wolf plum pollen. Much like the Kaw. Perhaps only one will be needed."

"It was first recognized as a distinct species by Sargent in 1894, having previously been confused with *Prunus angustifolia*, from which it differs in its thicker leaves, thicker skinned fruit, and smaller more deeply pitted stone. It is very distinct from *angustifolia* in its behavior under cultivation, thriving well where that species is a total failure." W. J. Bean (5).

Prunus Armeniaca

Apricot

Prunus Armeniaca, Linnaeus

"*Prunus Armeniaca*, Linn. Common Apricot. Native of Turkestan and Mongolia, according to one author; by others regarded as Chinese, but it reached Europe at an early date. The common apricots are not hardy in this state; a few Russian apricots have been raised at Yankton, the general complaint appears to be their premature blossoming.

A variety secured by the writer from Vernoe, Northern Turkestan, for the United States Department of Agriculture, kills back severely." N. E. Hansen (9).

According to Rehder the apricot is a native of Western Asia. It was once considered to be native of Armenia, hence the name *Armeniaca*. The apricot is a small round-topped tree with reddish bark and with the abundant pink flowers is decidedly ornamental. The flowers appear so early that they are often caught by frost.

The apricot has been crossed with the sand cherry. The following description is from South Dakota Bulletin 224:

"Yuksa Sandcherry Hybrid: Introduced 1908. This is a hybrid of Western sand cherry with pollen of the New Large apricot of Europe. This hybrid of the South Dakota sand cherry with an European apricot produces an abundance of flowers, but is sterile. Evidently this is not the way to originate a hardy apricot." N. E. Hansen (11).

Prunus Armeniaca Sibirica

Siberian Apricot

Prunus Sibirica, Linnaeus. *Prunus Armeniaca*, var. *Sibirica*, K. Koch. *Armeniaca Sibirica*, Persoon

Native of East Siberia, Manchuria and North China. A bush or small tree 12 to 16 feet; leaves smooth, ovate to rounded, long-pointed with reddish stalks; flowers white or pink; fruit yellow covered with a velvety skin; scarcely edible; the kernels with an almond-like bitter taste. The leaves turn red after frost, which adds to the ornamental effect. Plants brought from the Great Khingan mountains in Northwestern Manchuria in 1924 by the writer, are hardy at Brookings.

"Native of the mountains of Southern Siberia, where, according to Pallas the Russian botanist, some mountainsides are covered with its pink blossoms in May, when the northern sides are purple with *Rhododendron dauricum*." W. J. Bean (5).

Prunus Avium

Mazzard

Prunus Avium, Linnaeus. *Cerasus Avium*, Moench

"*Prunus Avium*, Linnaeus. Sweet Cherry, Mazzard. Native of Europe and western Asia. The sweet cherries are descended from this species, tender and worthless in this state. This does not give encouragement to the trial of the ornamental varieties of the same species. Cherry trees on Mazzard roots, root-killed at this station." N. E. Hansen (9).

Prunus Buergeriana

Prunus Buergeriana, Miquel. *Laurocerasus Buergeriana*, Schneid.

A tree of the Birdcherry (*P. Padus*) group with black fruit. Native of Japan and Korea. Winter-killed at Brookings.

Prunus Cerasifera**Myrobalan Plum**

Prunus Cerasifera, Ehrh. *Prunus domestica* var. *Myrobalan*, Linn. *Prunus Myrobalana*, Loisel.

"*Prunus cerasifera*, Ehrh. (*P. Myrobalana*, Linn.) Native of South-eastern Europe, the Orient, Transcaucasia, Turkestan and Southwestern Siberia. The Myrobalan or Cherry plum is extensively used as a stock on which to bud cultivated plums. Myrobalan seedlings planted at this station for plum stocks in the spring of 1897 nearly all froze out the first winter, and the few survivors died during the following summer. People in this state who plant hardy native varieties of plums, on Myrobalan or other tender roots find that their trees root-kill, leaving the hardy top to die. After tens of thousands of dollars have been wasted in this way, planters may find time to investigate the question a little before ordering their trees.

A choice purple-leaved ornamental variety, (*P. cerasifera atropurpurea*, Dipp.; *P. Pissardi*, Hort.) winter-killed at this station; also Youngken's Golden Cherry plum a variety of this species grown for its early yellow fruit." N. E. Hansen (9).

Prunus cerasifera pissardi**Purpleleaf Plum**

Prunus cerasifera var. *Pissardii*, Koehne. *Prunus cerasifera* var. *atropurpurea*, Dippel. *Prunus Pissardii*, Carr. *Prunus cerasifera foliis purpureis*, Spaeth.

The Purpleleaf plum is one of the best and most largely planted of all small purpleleaf trees in the eastern states on the Atlantic Coast and in the southern states. It is not hardy at Brookings; but the bright color has been transmitted to the Cistena and Stanapa, which are hybrids with the Sand cherry of South Dakota. See S. D. Bulletin 224 (11).

"In spring this tree, like the type, is laden with blossom, which is of a delicate rose. Its foliage, however, is its most distinctive feature; when it first expands it is of a tender ruby-red, changing later to claret color, finally to a dully heavy purple. Its fruits, too, are purple. This variety was first noted in Persia by Mr. Pissard, gardener to the Shah, and by him was sent to France in 1880, whence it rapidly spread in cultivation and is now a very common tree." W. J. Bean (5).

Prunus Cerasus**Sour Cherry**

Prunus Cerasus, Linnaeus. *Cerasus vulgaris*, Mill. *Cerasus caproniana*, DC. *Cerasus austera*, Ehrh.

"*Prunus Cerasus*, Linn. Sour, Pie or Morello Cherry. Native to Asia Minor and probably to Southeastern Europe. Nearly the entire cherry orchard of many varieties at this station froze out, most of it root and branch, in the winter of 1898-99. This has not encouraged us to test the strictly ornamental varieties. Cherries are not at all on the fruit list of the Minnesota State Horticultural society; nor on the list of the South Dakota State Horticultural society, except for the southern part of the state." N. E. Hansen (9).

Amygdalus Davidiana**Chinese Wild Peach**

Prunus Davidiana, Franch. *Persica Davidiana*, Carr. *Prunus Persica* var. *Davidiana*, Maxim.

A slender willow-like tree; leaves are like those of the peach but smaller and narrower; the light pink flowers appear very early. Native of China. In its native home this wild peach is used as a stock for the cultivated peach. It is also used for this purpose in California. The seed as imported is usually gathered south of the Great Wall, in China. This tree has been tested many years at Brookings but never bears fruit, the fruit buds being tender. The tree survives although not fully hardy. A few trees have been fruited under glass in the greenhouse. The fruit is about one inch in diameter, hairy, gray; the stone small, round free from the whitish dry flesh. The flesh is too dry to be edible.

Prunus demissa**Western Chokecherry**

Prunus virginiana, Linnaeus var. *demissa*, Torrey. *Cerasus demissa*, Nutt.

A western form of the chokecherry native from Washington to Oregon and California, eastward to South Dakota. Leaves more rounded than in *Prunus virginiana*; fruit large, and edible. Deemed worthy of improvement as a fruit tree.

"Wild Cherry (*Prunus demissa*, Walpers.) An erect shrub, much like the common choke cherry, but more tree-like in habit and with larger, purplish-black sweetish fruit. Common in the western part of the state where the fruit is prized very highly for table use." Thomas A. Williams (28).

"*Prunus demissa*, (Nutt.) Walp. Western Wild Cherry. Along streams from the Missouri valley westward." D. A. Saunders (26).

"*Prunus demissa* (Nutt) Walp. Chokecherry. Common in the Rocky Mountains. Cases of poisoning from the species have frequently been reported. L. H. Pammel, Manual of Poisonous Plants (20).

Prunus domestica**Common Plum**

Prunus domestica, Linnaeus

"*Prunus domestica*, Linn. Native country unknown, perhaps Transcaucasia, cultivated from the earliest times in west and east Asia and Europe. This includes the West European and Russian plums; none of the varieties tested at this station have proved of value as compared with the best native Americana plums, being either tender or unproductive. This does not encourage the trial of the double-flowered and ornamental-leaved varieties." N. E. Hansen (9).

Prunus hortulana**Hortulan Plum**

Prunus hortulana, Bailey. *Prunus hortulana* var. *Waylandii*, Bailey

"*Prunus hortulana*, Bailey. A group of hybrid plums between *Prunus Americana* and *Prunus angustifolia*, found native from Maryland and Virginia to Texas, and represented in cultivation by Wild Goose, Miner, Charles Downing and many others. *Prunus angustifolia*

itself, the Chickasaw plum of the south, wild from Delaware south and west to Missouri and Texas, is tender in this state and the hybrids, so far as tested, are not valuable, except the Miner, which is a favorite market variety in the southeast tier of counties, at Yankton and Vermillion." N. E. Hansen (9).

The Miner plum has been superseded by newer varieties. The hortulana plum has yielded many cultivated varieties for the southern plum region.

"Native of the southern and central United States; founded as a species in 1892, but known long before. It has been regarded as a hybrid between *Prunus americana* and *Prunus angustifolia*, but the fact that it comes true from seed is adverse to that theory. Many varieties of it are cultivated for fruits in the United States, which are especially well adapted for the Mississippi Valley and the southern states." W. J. Bean (5).

Prunus Maackii

Amur Cherry

Prunus Maackii, Ruprecht. *Laurocerasus Maackii*, C. K. Schneider.

"*Prunus Maackii*, Rupr. Native of Manchuria. An ornamental tree allied to the European Bird cherry (*P. Padus*, Linn.) with handsome foliage and racemes of white flowers early in May. Our specimens are four feet high and have not yet blossomed." N. E. Hansen (9).

This is a Manchurian Bird cherry attaining a height of 40 feet or more. Very distinct from other cherries in the smooth brownish yellow bark of the main trunk which peels like that of a birch. The young wood is downy. The flowers are white, borne in racemes on the one-year old wood.

The early importations of *Prunus Maackii* contained a remarkable mixture, the May Day tree, which is described under *Prunus Padus Commutata*. *Prunus Maackii* is native of Manchuria, Korea and North China.

Prunus Mahaleb

Mahaleb Cherry

Prunus Mahaleb, Linnaeus. *Cerasus Mahaleb*, Mill. *Prunus odorata*, Lam. *Padus Mahaleb*, Borkh.

A tree of vigorous growth, up to 40 feet high, with broadly ovate or roundish and glossy leaves. The flowers are pure white and very fragrant. The Mahaleb cherry is extensively used as a budding stock for cherries.

"*Prunus Mahaleb*, Linn. Mahaleb Cherry, St. Lucie Cherry. Native of South and Central Europe, the Orient and the Caucasus. The station cherry orchard, with many of the trees worked on Mahaleb roots, root-killed in the winter of 1898-99. The ornamental varieties we have not tested." N. E. Hansen (9).

Prunus Mandshurica**Manchurian Apricot**

Prunus Mandshurica, Koehne. *Prunus Armeniac* var. *mandshurica*, Maxim.

A tree to about 16 feet in height, with round leaves. Distinguished from the common apricot by the sharp teeth and double serration of the leaves; fruit roundish, about one inch in diameter. Both the fruit and seed are sweet. As collected by the writer in 1924, at Harbin and in the mountains about 50 miles east of Harbin, Manchuria, this tree is hardy at Brookings. Their fruiting is awaited with much interest as it is a prominent fruit plant in the native habitat. The first blossoms opened April 16, 1931, color shell-pink, turning later to white. Tree of upright habit; a beautiful ornamental tree, remarkable for the early blossoming.

Prunus Maritima**Beach Plum**

Prunus maritima, Marsh. *Prunus sphaerocarpa*, Michx. *Prunus acuminata*, Michx. *Prunus acuminata*, Michx. *Prunus pubescens*, Pursh.

Prunus Maritima is sometimes cultivated for the profuse white flowers.

"*Prunus Maritima*, Wangenh. Native in North America along the coast from New Brunswick South to Virginia. Of three plants from Arnold Arboretum planted in the spring of 1899, two kill to the ground and one kills back at tips. The Bassett, a cultivated variety, appears fairly hardy." N. E. Hansen (9).

Prunus Maximowiczii**Miyama Cherry**

Prunus Maximowiczii, Ruprecht.

Native of Korea, Manchuria and Japan. Introduced by Charles Sargent of the Arnold Arboretum in 1892. Distinct from other cherries by the conspicuous flower bracts which remain until the fruit is ripe. The leaves turn a brilliant red in autumn.

"*Prunus Maximowiczii*, Ruprecht. Native of Japan. A specimen from Arnold Arboretum, planted inspring of 1899, is now five feet in height with sharply doubly serrate leaves, and is making a strong, hardy growth. The young shoots are tipped with red." N. E. Hansen (9). Hardy at Brookings.

Prunus Mume**Japanese Apricot**

Prunus Mume, Sieb & Zucc. *Prunus Armeniaca Mume*, Sieb.

A native of Japan, where it is much cultivated. There are many double-flowered varieties in Japan where it is much prized for decorations. Winter-killed at Brookings.

Prunus nigra**Canada Plum**

Prunus nigra, Ait. *Prunus americana*, var. *nigra*, Waugh. *Prunus borealis*, Poir.

"*Prunus nigra*, Aiton. An early blooming form of the native plum of the Northwest, found from Newfoundland to Assinaboia, also in New England and the northern Mississippi Valley. In Bailey's Cyclopaedia this is referred to *Prunus americana* var., *nigra*, Waugh. Represented in cultivation by the Cheney from Wisconsin and Aitkin from Lake Itasca in Minnesota, and other choice plums." N. E. Hansen (9).

"Flowers fragrant, produced towards the end of April, turning red-dish with age. This plum has been much confused with *Prunus americana*, from which it differs in the broader, round-toothed, more downy leaves, in the glandular leaf-stalks, larger and more fragrant flowers, and stiffer habit." W. J. Bean (5).

In later years at this station the writer has originated and introduced five varieties from *Prunus nigra* as found native in Manitoba. They are described in South Dakota Bulletin 224, as follows.

PROGRESS WITH MANITOBA NATIVE PLUMS

In the fall of 1895, a lot of pits of wild plums (*Prunus nigra*) were obtained from Thomas Frankland, Stonewall, Manitoba, who gathered them from wild plum trees in the vicinity of Stonewall, a few miles north of Winnipeg. The pits were planted at Brookings, and out of many seedlings, two were selected and propagated under the names Winnipeg and Assiniboin, as noted in Bulletin 130. These have been tested at various places in the North, especially in their native region, and have won favor. Here at Brookings the Manitoba plums are characterized by small size of tree, but extremely early season of fruit. In fact, they are the earliest of all native plums, but are not needed for the main market here since at Brookings larger and better plums can be raised owing to our later season.

In an endeavor to improve the fruit in size and quality a number of hybrids of the Manitoba wild plum with choice plums from California have been made. None of these hybrids is as large as Waneta so will probably be planted mainly in the North. The trees are productive and the large red fruit is of excellent quality. The names are all of Indian tribes at the far North, especially Manitoba. The three named so far are the Cree, Pembina and Ojibwa.

Assiniboin Plum: Introduced 1908. A very early variety grown from native pits (*Prunus nigra*) received from Stonewall near Winnipeg, Manitoba. A favorite in Manitoba for general cultivation. An annual bearer of good fruit. The early blooming is characteristic.

Winnipeg Plum: Introduced 1908. A very early variety grown from native pits (*Prunus nigra*) received from Stonewall near Winnipeg, Manitoba. A favorite in Manitoba for general cultivation. An annual bearer of good fruit. The early blooming is characteristic. A sister variety to the Assiniboin, but the Assiniboin appears to have become more prominent in Manitoba gardens.

Ojibwa Plum: Introduced 1917. Pedigree: X Manitoba wild plum (*Prunus nigra*) pollen. Since the Shiro, one of Luther Burbank's plums, is a complex hybrid of four species, the Ojibwa will be a mixture of five different species of *Prunus*: *Nigra*, *Angustifolia*, *Cerasifera*, *Triflora*, *Simoni*. Flesh yellow, of good flavor; skin thin and free from acidity. This tree seems to be especially worthy of a trial at the North. The original tree has been very productive. At first sight, the pointed shape would make it look like a select pure native Manitoba plum, but the skin is too thin to be a pure Manitoba.

F. L. Skinner, Dropmore, Manitoba, Canada, writes under date of January 19, 1922: "I had a splendid crop from your Ojibwa plum this year."

Cree Plum: Introduced 1917. Pedigree: Manitoba wild plum X Combination plum pollen. In 1901 when the Combination was introduced by Luther Burbank, it was considered the best in quality of 25,000 seedlings.

Pembina Plum: Introduced 1917. Pedigree: Manitoba wild plum X Red June plum pollen. The Red June is one of the earliest and best Japanese plums, imported many years ago from Japan. Many favorable reports have been received as to size and quality of fruit and early productiveness of the Pembina.

Prunus orthosepala

Prunus orthosepala, Koehne

A much branched bush about five feet high; flowers white; fruit red, white-dotted, with bloom.

"*Prunus orthosepala* is a hybrid (*Prunus angustifolia* Watsonii x *americana*), originated in Kansas and introduced in 1880. A spreading shrub to six feet; it differs from *Prunus angustifolia* chiefly in its oblong-lanceolate to obovate-lanceolate slightly larger and broader and more sharply serrate leaves, the larger flowers, and the larger fruits about one inch across." Alfred Rehder (22). Winter-killed at Brookings.

Prunus Padus

European Bird Cherry

Prunus Padus, Linnaeus. *Cerasus Padus* DC. *Prunus racemosa*, Lam. *Padus racemosa*, Schneid. *Padus vulgaris*, Borkh.

Native of Europe, the Orient and Northern Asia to Mongolia, Manchuria and Japan. An ornamental tree with white fragrant flowers, which has been cultivated a long time. There are many named varieties. The European Bird Cherry is much like the chokecherry, *Prunus virginiana*, but with larger flowers in longer, somewhat leafy racemes. In 1906 the writer collected seed of *Prunus Padus* in the Lake Baikal region of Eastern Siberia. This is described in South Dakota Bulletin 224 as follows:

"Lake Baikal Siberian Bird Cherry. Introduced 1912. This is *Prunus Padus* as found wild in the Lake Baikal region of Eastern Siberia. An interesting ornamental tree with large leaves; the fruit is used very extensively by the peasants for culinary purposes, but is not much of an improvement on our western chokecherry, although less astringent. A few three-year-old seedling trees, once transplanted, grown from fruit, were sent out in 1912."

Prunus Padus commutata

May Day Tree

Harbinger Cherry

Prunus Padus var. *commutata*, Dippel. *Prunus Grayana*, Hort. not Maxim. *Prunus Regaliana*, Zabel.

Harbinger Cherry is the name given to the beautiful and hardy ornamental tree, in Standardized Plant Names. This is probably because the green leaves appear the earliest of all trees as the harbinger of spring. In the prairie Northwest the May Day Tree is the accepted name, being the name given by the introducer, Professor J. L. Budd. because it is always in bloom on the first day of May at Ames, Iowa.

Prunus Padus commutata "is noteworthy because it is one of the earliest of all trees to leaf out in the spring." L. H. Bailey (2).

"*Prunus Padus*. Linnaeus, var. *commutata*, Dippel. A wild variety from Manchuria, remarkable for flowering about three weeks in advance of any other bird cherry, being usually in bloom by the middle of April. Its flowers are fully one-half inches across. Sometimes out by late frosts." W. J. Bean (5).
W. J. Bean (5).

"May Day Tree. From the 1922 list. May Day Tree was the name given by Professor J. L. Budd to trees of *Prunus Padus commutata* originally received from the Imperial Botanical Gardens of Russia as a mixture in an importation of *Prunus maackii*. *Prunus Padus commutata* is quite distinct from *Prunus maackii*. The May Day tree is a bird cherry from eastern Siberia worthy of a place on every lawn in the prairie Northwest. It is remarkable for being the first tree to come into full leaf here on the college grounds. The large green leaves and wealth of white blossoms early in the spring make the tree decidedly ornamental. In fruit the tree is no special improvement over our own native chokecherry, but is decidedly superior in habit because it does not send up sprouts or suckers. I am using these seedlings as a budding stock for the Boughen Manitoba chokecherry and the Spearfish Yellow chokecherry because of its vigorous growth and freedom from suckers. These seedlings are all descended from the stock imported from Russia by Professor J. L. Budd, at that time Head of the Department of Horticulture of Iowa State College, Ames." N. E. Hansen (11).

Professor Charles S. Sargent, director of Arnold Arboretum, first observed this mixture which was identified later as *Prunus Padus commutata* in the following article from "Garden & Forest," Boston, Mass., Vol. I, 1888.

MANCHURIAN BIRD CHERRY

"Our illustration represents a flowering branch of a form of *Prunus Padus*, doubtless of Manchurian origin, as it was raised from seed sent many years ago to the Arnold Arboretum from the St. Petersburg garden as *Prunus Maackii*, a Manchurian Bird cherry with pubescent foliage and young branches, while those of this plant are quite glabrous and show no trace of the glandular dots which cover the under surface of the leaves of that species.

The Old World Bird Cherry is a small tree distributed through the forests of northern and central Europe; it is found in the Caucasus and in the mountains of Afghanistan, and extends through Siberia to Kamtschatka, Manchuria, Mongolia and to Japan. The variety here figured is remarkable in the fact that its leaves appear fully ten days earlier than those of any other tree in the arboretum, a peculiarity which gives to it no little interest and some value as an ornamental tree, apart from its very marked beauty when in flower. The racemes of large white flowers, which are deliciously fragrant, appear here early in May, fully two weeks earlier than those of the earliest of the American Bird cherries, *Prunus*

Virginiana, and long before those of any of the European Bird cherries. No plant of its class in the collection equals this Manchurian tree in the size and beauty of its flowers. It grows with astonishing rapidity and is perfectly hardy; but, although plants here are now nearly twenty feet high and have flowered regularly for several years, they produce no fruit. In regions where late spring frosts, which would prove fatal to the early shoots and leaves of this tree, do not occur, it will prove an important and interesting addition to the list of small, hardy, ornamental trees."

Prunus pendula

Prunus pendula, Hort. *Prunus subhirtella*, Miq., var. *pendula*, Tanaka. *Prunus pendula*, Maxim. *Prunus itasakura*, Sieb. *Prunus Herinciana*, Schneid.

Native of the high mountains of the Japanese island Nippon. A tree fifty to sixty feet high with fountain-like heads of branches. This is the "Rosebud Cherry of old temple gardens." Winter-killed at Brookings.

"This name (*P. pendula*) has been applied, erroneously, to weeping forms of several species, especially to *Shidare-higan*, hort. var. of *Prunus subhirtella*, one of the Japanese Flowering cherries." — "Standardized Plant Names" (1).

Prunus pennsylvanica

Pin Cherry

Prunus persicifolia, Desf. *Cerasus pennsylvanica*, Loisel. *Cerasus borealis*, Michx.

"Wild Red Cherry (*Prunus pennsylvanica*). A small tree with narrow, finely toothed leaves and small reddish, sour fruits. Woods in various parts of the Black Hills." Thomas A. Williams (28).

"This species has only been reported from the Black Hills." D. A. Saunders (26).

"A shrub frequently found in the Black Hills and west shore of Big Stone Lake in Roberts County." W. H. Over (191).

"*Prunus pennsylvanica*, Linn. Wild Pin, Bird or Pigeon Cherry. Native from Newfoundland to British Columbia south to Colorado and North Carolina. In this state reported from the Black Hills. Specimens from Manitoba and North Dakota are hardy at this station. The blossoms, foliage and red bark are ornamental; the tree sprouts considerably. Professor Sargent considers it to be "a handsome shapely, though short-lived tree, which in early spring is conspicuous for the great quantity of flowers which cover its branches." The light cherry red fruit is the size of a pea. The tree may prove valuable for plant-breeding as the fruit varies in size and is nearer in quality to the cultivated sour cherry than any other of our native cherries." N. E. Hansen (9).

Prunus pennsylvanica L. Wild Red Cherry. Common, especially in the eastern part of Iowa and northern states. The leaves are poisonous, as well as the seeds. The fruit is edible." L. H. Pammel (20).

PRUNUS PENNSYLVANICA — WILD RED OR PIN CHERRY

A small tree with a maximum height of thirty-five feet and trunk diameter of one and one-half feet. The oval lanceolate leaves are acuminate at apex, rounded at base, glabrous on both sides, serrulate and slender petioles. The white flowers are borne in lateral corymbose, leafless clusters, unfolding with the leaves in early May. The slender petioles are often one inch long. The bright red globose drupe is one-fourth inch in diameter, lacking bloom. The globular stone is bedded in thin sour flesh.

It is found in stony woods around sheltered spots, especially where clearings have been made, practically throughout the whole province. I have seen vigorous specimens bearing fruit over 350 miles north of Winnipeg. The size of bush, however, was small, none being over ten feet in height.

The aborigine relished the pin cherry and it has continued to be a favorite with the settlers who have come into the regions to which it is indigenous. Jelly made from the fruit is a delicacy. The fruit is also used to some extent in the preparation of cough mixtures.

This cherry has received but little attention. Its desirable qualities warrant the expenditures of such effort being made on its improvement. *P. pennsylvanica* may afford a cheap and hardy stock for larger types of cherries. W. R. Leslie (17).

Amygdalus persica

Peach

Amygdalus persica, Linnaeus. *Prunus persica*, Sieb. & Zucc. *Persica vulgaris*, Miller.

"*Prunus persica*, Sieb. & Zucc. Peach. Supposed to be native to China. A few specimens of peaches have been raised in the southern edge of the state, but they are "scarcer than hen's teeth," and financially it is useless to attempt their cultivation. At this station we have been unable to get the covering thick enough to prevent winter-killing. Trees budded on western Sand Cherry (*Prunus Besseyi*) roots, and grown in boxes which are put in cellar over winter, bore some good peaches this season. This is the first fruit raised on this stock, as far as I know. The trees are dwarfed very much and when in bloom are a mass of blossoms. The many double-flowered and ornamental varieties we have not felt encouraged to give a trial." N. E. Hansen (9).

The peach has been used by the writer at the South Dakota station in hybridization with other species. The Kamdesa is the only result so far. It produces many flowers but no fruit. The following description is from South Dakota Bulletin 224:

"Kamdesa Sand Cherry Hybrid: Introduced 1908. This is a hybrid of the western Sand Cherry with pollen of the Opulent peach. Kamdesa is the Sioux Indian name for "Daybreak." This plant is practically sterile; instead of having one pistil it usually has from two to three and as high as six pistils, so it is an ornamental bush and has no value for fruit. Evidently, this is not the way to get a hard peach since the resulting hybrid of the Sand cherry and peach is sterile."

"*Amygdalus persica* L. Peach. The leaves and seeds are poisonous. They contain amygdalin, from which hydrocyanic acid is derived." L. H. Pammel (20).

Prunus salicina**Japanese Plum***Prunus salicina*, Lindley. *Prunus triflora*, Roxb.

"*Prunus triflora*, Roxb. Japanese Plum. Probably native of China, but introduced into the United States from Japan in 1870. Several varieties have been tested at this station; the Burbank, topgrafted on Desoto, a native variety, fruited in 1898, but froze out the following winter. This is the general experience in Minnesota and Dakota with Japanese plums." N. E. Hansen (9).

The Waneta, Kahinta and Tawena, originated by the writer, are hardy hybrids of the Japanese plum and the native plum. These and other hybrids of the Japanese plum with the Bessey cherry and other species are described in South Dakota Bulletin 224.

Prunus Simoni**Apricot Plum***Prunus Simonii*, Carr.

(Simon Plum.)

The wild habitat of the Apricot plum is unknown, although it is believed to be native of North China; it is cultivated around Peking. It was originally introduced to the Jardin des Plantes at Paris in 1867 by M. Eugene Simon, after whom it is named. The Apricot plum is a small tree of slender narrow-pyramidal habit, with erect upright branches and young smooth shoots. The fruit is two inches wide and one and one-half inches deep, tomato shaped, uniform brick red; the flesh apricot-yellow, with remarkable and very pleasing fragrant aromatic flavor.

"Although called "Apricot" plum, its affinities are doubtful. Some authors regard it as a plum, but it appears rather to be intermediate between that and the nectarine. It is a useful fruit tree in California and has been hybridized with *Prunus triflora*, the Japanese plum. Very distinct in its almost fastigiate habit." W. J. Bean (5).

The Apricot plum winter-kills at Brookings, but the firm flesh and aromatic flavor of the fruit has been transmitted in large measure to the hybrids produced by the writer and described in South Dakota Bulletin 224: Hanska, Inkpa, Kaga and Toka, in which the Apricot plum is the pollen parent, and the Tokata in which the Apricot plum is the seed parent. In the Toka, the peculiar narrow erect growth of the Apricot plum has been inherited. The Apricot plum has also been hybridized with *Prunus Besseyi*, the native Sand cherry of South Dakota, but the resulting hybrid Tokeya lacks in hardiness and productiveness (11).

In California a number of successful hybrids of the Apricot plum and Japanese plum have been produced.

Prunus spinosa**Blackthorn***Prunus spinosa*, Linnaeus

The Blackthorn or Sloe is a much-branded spiny shrub or rarely a small tree. Native of Central and Southern Europe, the Caucasus, North Persia, West Siberia and North Africa. Planted as an ornamental tree, especially the double-flowered form. Some trees of *Prunus spinosa*, imported from Europe, winter-killed at Brookings.

Prunus virginiana**Common Chokecherry**

Prunus virginiana, Linnaeus. *Prunus nana*, Dur. *Padus virginiana*, Roem. *Cerasus virginiana*, Loisel. *Padus nana*, Roem.

"Chokecherry (*Prunus virginiana*, L.). A large shrub known by its astringent fruit, and thin, smooth, sharply-toothed leaves. More or less common throughout the state, but largely replaced by the wild cherry west of the Missouri." Thomas A. Williams (28).

"Along streams and lakes throughout the state." D. A. Saunders (26).

"Common along creeks and in thickets over the state. Probably two or more species abound." W. H. Over (19).

"*Prunus virginiana*, Linn. Chokecherry. Native and common over northern North America to the Arctic circle and occurring in the mountains of Mexico. In South Dakota, common along streams and lakes throughout the state. This tree is quite common upon South Dakota lawns, and even as street trees, being transplanted from the nearest river bank, but the numerous suckers from the root are objectionable. However its perfect hardiness and willingness to grow commends it to many who have failed with eastern and southern trees. The western chokecherry var. *demissa*, Torr. (*P. demissa*, Walp.), is native along streams from Missouri valley westward. As received from near Pierre, is hardy at this station; the fruit averages of better quality than the common chokecherry and the fruit is popular for culinary use." N. E. Hansen (9).

Considerable work is being done with the chokecherry at this station. Trees bearing fruits of mild flavor have been located in various parts of the state and are now under propagation by budding on May Day tree stocks. Only two of these have been sent out so far Boughen Sweet and Spearfish Yellow. noted in South Dakota Bulletin 224, as follows:

"Boughen Sweet Chokecherry. From the 1923 list: W. J. Boughen, Valley River, Manitoba, found a tree of the native chokecherry on his farm, with fruit so much milder in flavor than usual that it may be fairly called a sweet or chokeless chokecherry. Offered for the first time. Mr. Boughen has the first right to name this fruit so we will await developments."

"Spearfish Yellow Chokecherry. Introduced 1924. A yellow-fruited wild chokecherry from Spearfish, South Dakota. An interesting novelty. Of value mainly from the ornamental standpoint, but the fruit has some culinary value. The main objection to our native chokecherry is that the trees send up so many suckers or sprouts from the roots. One-year buds on May Day Tree stock were distributed."

The western chokecherry averages larger and better in quality than the eastern chokecherry. A choice jelly is made from chokecherries; also a jam and butter by adding an equal quality of plums or crabapples.

In Manitoba the native chokecherry is "usually a shrub three to 12 feet high—rarely a small tree 20 to 25 feet with gray bark, thin obovate leaves which are abruptly acuminate at apex, sharply serrulate, somewhat pubescent on lower surfaces. The flowers are in erect loosely formed racemes on pedicels one-fourth inch long. The reddish black drupe is one-third to one-half inch in diameter and is very astringent.

Its wonted situation is along the banks of streams and in ravines and moist woods as well as up in the prairie sandhills. It thrives for some distance north of the wheat line.

The Indians ate the fruit in various forms—fresh; crushed in a mortar; flattened out; dried and then cut in strips about four inches long and one inch wide and stored for winter use; and it was an important ingredient of 'pemmican.' W. R. Leslie (17).

There is considerable danger in eating the fresh fruit of chokecherries and drinking milk immediately afterward. The two make an inurious combination.

'*Prunus virginiana* L. Chokecherry. The leaves and seeds are poisonous. The fruit is so astringent it often produces very unpleasant conditions when eaten in any considerable quantity. Chokecherry is widely distributed in the north. The leaves in the wilted condition contain hydrocyanic acid.' L. H. Pammel, Manual of Poisonous Plants (20).

Ptelea trifoliata

Common Hoptree

Ptelea trifoliata, Linnaeus

An aromatic shrub or small round-topped tree, attaining a height of 40 feet. "The plant is often seen in cultivation, where its bright foliage and buff-colored fruits add pleasing variety to the shrubbery." N. L. Britton (6).

"The bark and foliage are sometimes used medicinally and emit (as well as the fruits) when bruised, a strong, pungent odor resembling somewhat that of the hop, for which the fruits are said to have been used as a substitute—hence the name hop tree." Alfred Rehderfi in Bailey's Standard Cyclopedia of Horticulture (2).

The small greenish-white flowers are followed by flattened, broad-winged, roundish fruits.

'*Ptelea trifoliata*, Linn. Hop Tree. Wafer Ash. Native of the eastern states from New York to Florida, westward to Wisconsin and Minnesota. As received from a nursery in Germany this forms a bush six feet high with handsome glossy leaves with three leaflets. Our plants kill back about one-half every winter and are probably of eastern origin. Possibly the Minnesota form of this species would do better.' N. E. Hanson (9).

"*Ptelea trifoliata*. Hoptree. Small trees 15 to 20 feet high, with glossy, trifoliate leaves that exhale a hop-like odor when bruised. This odor is even more noticeable in the seeds, which hang in hop-like light green clusters far into autumn. Very hardy." D. B. Gurney, Yankton, South Dakota. 1929.

THE GENUS PYRUS

Pyrus is also spelled *Pirus*. All pears, apples, whitebeams, mountain ashes, chokecherries, medlars, quinces and other groups were included in the tribe Pomaceae of the Rose family (order Rosaceae), by Bentham and Hooker of England. in their *Genera Plantarum*, 1867.

Recently the tendency is to divide this large genus and restore the old genera; *Malus* being retained for the apples and *Pyrus* for the pears. All pears and apples are included in the genus *Pyrus* which contains about 60 species. This classification is followed in "Standard Cyclopedia of Horticulture" by L. H. Bailey, and in the "Manual of Cultivated Trees and Shrubs" by Alfred Rehder. In "Standardized Plant Names," the pears are retained in the genus *Pyrus* and the apples are classified in a separate genus, *Malus*.

"There seemsto be good justification for the separation of *Cydonia* and *Mespilus*, and perhaps also for *Sorbus* and *Aronia*, but it is yet to be determined whether the separation of *Malus* (the apple) will meet with continuing favor." L. H. Bailey (2).

Pyrus Balansae, Decaisne

'*Pyrus Balansae*, Decaisne. Native of central to southern Europe, Asia Minor, Caucasus, North Persia, West Siberia. A hardy pear tree of heat, erect growth and small glossy leaves. Present height seven feet. Koehne refers this to *P. communis* and states that our cultivated pears arose from crosses of this species with *P. nivalis*, Jacquin and perhaps with *P. Persica*, Persoon." N. E. Hansen (9).

The tree grew to a height of 22 feet, of slender, very upright growth; fruit one-third inch diameter, yellow russet.

Pyrus betulaefolia

Birnleaf Pear

Pyrus betulifolia, Bunge

"*Pyrus betulifolia*, Bge. Native of North China. A small-leaved, hardy tree, nine feet in height. The young leaves and shoots thickly covered with gray pubescence, the older leaves glossy green on both sides, paler beneath. This tree is a near relative of the pear and shows no blight so far. An ornamental tree only, the brown fruit being the size of a pea. Our plants have not yet fruited." N. E. Hansen (9)).

These trees were nearly all destroyed by fire blight (*Bacillus amylovorus*) when 20 years old. In China this pear is used as a stock on which to graft the large-fruited pears. A graceful tree, attaining a height of 30 feet, attractive in the profusion of white flowers in advance of the leaves, or just the leaves expand.

Pyrus communis

Common Pear

Pyrus communis, Linnaeus

"**Pyrus communis**, Linnaeus. Common Pear. Native of Central and Southern Europe, and Western Asia. The standard varieties of the pear of the eastern states both winter-kill and blight in the Northwest; several Russian varieties proved hardy at this station for ten years, but finally all perished from blight. This does not encourage the trial of the ornamental-leaved varieties of the Pear, several of which are offered in European catalogs." N. E. Hansen (9).

The work with pears at this station is described in South Dakota Bulletin 224.

Pyrus Lecontei, Rehder

This includes the many hybrids of *Pyrus serotina* and *Pyrus communis*, such as Kieffer and Leconte. The Kieffer pear winter-killed at this station.

Pyrus Lindleyi, Rehder*Pyrus sinensis*, Lindley, not Poir

According to Rehder (22) this species, *Pyrus sinensis*, Lindley, is related to *Pyrus ussuriensis* and is made a synonym of *Pyrus Lindleyi*, Rehder.

"**Pyrus Sinensis**. Lindl. Japanese and Chinese pear. Native of Manchuria, the Korean archipelago, China and Japan. As received from the Arnold Arboretum in the spring 1899, one tree winter-killed (perhaps by cellaring during the first winter followed by drouth after transplanting the next spring), but one specimen tree marked 'Var. No. 1, C. S. Sargent,' is a strong growing tree six feet in height with sharply toothed dark green glossy leaves, pubescent young shoots, and spreading branches." N. E. Hansen (9).

These trees grow to 30 feet in height and are very productive and strongly resistant to fire blight. Many trees have been distributed as Russian Sand pear.

"Russian Sand Pear. In noting the behavior of the many pears imported from Northern Europe and Asia and other countries, special attention is attracted to *Pyrus Sinensis* as received from Russia under the name of *Pyrus Sinensis* R&K 453. These trees have proved hardy and have borne abundant fruit. Good seedlings were raised from them. The trees have been very resistant to fire blight. The fruit is small but good for cooking. These seedlings are worthy of planting for those who wish to breed hardy pears and the fruit is valuable for the seed from which to raise hardy seedlings for budding or grafting."

"**P. Lindleyi**, Rehd. (*P. sinensis*, Lindl., not Poir.). Known only from Lindley's description and figure, and perhaps a cultivated form of some other species: the leaves have short and rather small appressed teeth that are not at all acuminate, or those on the short growths nearly cre-

nate-serrate; in shape ovate and abruptly acuminate, rounded at the base and those on the short branchlets mostly subcordate. China. B. R. 1248 (as *P. sinensis*). Lindley's name, *P. sinensis*, has long been used for the sand pears, which plants must now bear the name *P. serotina* var. *culta*." L. H. Bailey (2).

Pyrus ovoidea

Egg Pear

Pyrus ovoidea, Rehder. *Pyrus Simonii*, Hort, not Carr. *Pyrus ussuriensis*, Maxim, var. *ovoidea*, Rehder.

Native of North China and Korea. Trees of the Egg pear were received from the Arnold Arboretum, Boston, in 1897. The upright habit and glossy leaves make this a handsome ornamental tree. The first 20 years there was no fire blight, then these trees were affected, but made a strong recovery and have born considerable fruit since. The trees attained the height of 24 feet. Seedlings from this year have been distributed as noted in South Dakota Bulletin 224.

"**Pyrus Ovoidea Pear.**—As described in Bulletin 159 of this Station, this is the new name of *Pyrus Simoni*, a Chinese wild pear, received from the Arnold Arboretum, Boston. Further investigation in the arboretum has divided the species so that this tree is now called *Pyrus Ovoidea*. The bright red of the leaves in autumn is attractive. The fruit is one and five-eighths inches in diameter, sweet, juicy and of fair quality.

"**Chang Pear.**—Introduced 1926. This seedling was grown from fruit grown on trees of *Pyrus Simoni*, a Chinese wild pear received many years ago from the Arnold Arboretum, Boston, Massachusetts. The original tree bore fruit in 1923 and 1924. Fruit, clear yellow, oblong, pyriform; flesh, white, firm, juicy. As described in South Dakota Bulletin 159, further investigations by Alfred Rehder at the Arnold Arboretum divide the species so that the tree is now called *Pyrus Ovoidea*. the bright red leaves in autumn are attractive. The first fruits of this select seedling pear, Chang, are one and three-fourths inches in diameter and of fair quality. Chang is a Chinese name." N. E. Hansen (11).

The hybrid pears (Gogol, Ming, Pushkin, Tolstoy, Chang, Simola) are described in South Dakota Bulletin 224.

"**P. ovoidea**, Rehd. Differs from *P. ussuriensis* chiefly in the narrower leaves, darker-colored branches, and longer-stalked longer-shaped fruit, which has spreading persistent sepals: in longitudinal section the yellow juicy fruit is described as exactly ovate, broad and rounded at the base, tapering from the middle toward a truncate apex, thus constituting a pear of unusual and distinct shape. China.—Blooms a week ahead of other species of pears; the foliage turns bright scarlet in autumn. Hardy N. Sometimes grown as *P. Simoni*." L. H. Bailey (2)

Pyrus sp. Kashmir

An ornamental tree received from the Arnold Arboretum, Boston, in 1899. Kashmir or Cashmere is a state in northwestern India. This tree winter-killed at Brookings.

***Pyrus prunifolia pendula*, Hort.**

A weeping variety of *Pyrus prunifolia* with rose-pink buds white flowers and yellowish red fruit. Winter-killed at Brookings. It may have been root-killing of the stock.

Pyrus serotina**Late Pear**

Pyrus serotina, Rehder. *Pyrus sinensis*, Hort., not Lindl. nor Poir. *Pyrus montana*, Nak.

Sand Pear

A pear native of central and western China; and on the Pacific Coast as a more or less blight-resistant stock for European pears. The cultivated Japanese and Chinese pears of pomologists are natives of Japan and are forms of this species: *Pyrus serotina*, var *culta*, Rehder. There are many of these varieties such as Chinese Sand pear, Japanese Sand pear and Mikado, but these are not hardy in the prairie Northwest.

Pyrus ussuriensis**Ussurian Pear**

Pyrus ussuriensis, Maxim. *Pyrus Simonii*, Carr. *Pyrus sinensis*, Decne, not Lindl., nor Poir.

Native of Northeast Asia including east Siberia, Manchuria and Korea. A tree attaining large size. The glossy leaves turn a bright red and yellow in autumn. This tree is an ornamental as well as a fruit tree and is hardy enough to serve as a street tree or lawn tree anywhere in the prairie Northwest. But the Ussurian pear varies greatly in hardiness. As received from Liaoyong, south Manchuria, it winter-killed at Brookings. But those from north Manchuria, in the mountains east of Harbin, the northwestern limit of its range, proved hardy and strongly resistant to fire blight (*Bacillus amylovorus*.) Also those received from the Usuri province, the Pacific coast section of east Siberia, proved hardy and strongly resistant to fire blight.

See South Dakota Bulletin 224 for a description of the various northern forms of *Pyrus ussuriensis* sent out from this station and the tour of the writer to North Manchuria in 1894 to collect seed of *Pyrus ussuriensis* in the mountains a few miles east of Harbin, the northwestern form of this species.

It is to this East Siberian and North Chinese form of the Ussurian pear that we must look for the future hardy pears for South Dakota and the prairie Northwest.

***Sorbus alnifolia*, K. Koch**

Micromeles alnifolia, Koehne. *Pyrus Miyabei*, Sargent

An ornamental small tree with dense round head. Native of central China to Korea and Japan.

"*Pyrus Miyabei*, Sargent. Choke Berry (*Micromeles alnifolia*, Koehne; *Sorbus alnifolia*, K. Koch.) A specimen, from Arnold Arboretum, of this Japanese and southern Manchurian tree planted in the spring of 1899, is hardy so far, and forms a neat, handsome small bush with small alder-like leaves." N. E. Hansen (9).

Sorbus aucuparia**European Mountain Ash**

Sorbus aucuparia, Linnaeus Pyrus aucuparia, Gaertner

(Rowan Tree)

An ornamental tree with very showy bright red fruit in autumn, 30 to 60 feet high, native of Europe to western Asia and Siberia. In the mountain regions of Europe it is often planted as a street tree.

The Rowan Tree figures in northern mythology as the tree that saved Thor, god of thunder, when he was being carried away in a flood.

"**Sorbus aucuparia**, Linn. European Mountain Ash. Native of Europe, Caucasus and Northeast Asia. This tree has proved hardy against winter-cold on the station grounds for the past 10 years, but the stem is very susceptible to sunscald on the south and southwest side, so a number of trees have perished as a consequence. This is a choice ornamental tree owing to the cluster of white flowers in May and abundant red berries in summer and fall, but the stem must be protected from the sun. Some of our trees have the main stem shaded by a few sprouts allowed to grow on the south side; if this is objectionable, burlap may be tacked on or the shade given by bushes." N. E. Hansen (9).

Since this time, many more trees of European Mountain ash have failed from dry seasons and sunscald of the stem, especially after a heavy crop of fruit. The trouble with this test is that the original source of these trees is not known, but it probably is western Europe.

"The mountain ash is widely spread over the cool, temperate parts of Europe and Asia, and is abundant in most parts of the British Isles. It is one of the most beautiful of our native trees alike in leaf, flower, and fruit. Its beauty no doubt is greatest when the branches are laden with the large nodding clusters of ripe fruits in September, but where bird life is abundant that beauty soon passes." W. J. Bean (5).

Sorbus aucuparia edulis**Edible Russian Mountain-Ash.**

"**Sorbus aucuparia edulis**. From the 1910 list: Edible Russian Mountain-Ash. While in Russia in 1906 I secured 100 trees of a mountain ash (*Sorbus edulis*) said to bear large edible fruit, used in Russia for culinary purposes. Some of these fruited true to name the past season so it is very probable that they are all true to name. The fruit is much larger than that of the common mountain ash, but must need some special cooking to make it acceptable, although it has much less bitterness than that of the common mountain ash. Certainly an interesting tree and valuable at least for ornament. From the 1917 list: The fruit is sour rather than bitter." N. E. Hansen (11).

These 100 trees from Russia made a very strong, vigorous, upright, growth and produced considerable fruit. However, in open exposure, all were much injured by sunscald of the main trunk. Sunscald is evidently the limiting factor and must be guarded against.

In several tours to Russia the writer has partaken of the fruit cheese or pressed fruit pulp of this mountain ash. The method of manufacture was not studied. There appears to be more than one form of this tree.



Figure 7—European Mountain Ash

Sorbus aucuparia var. edulis, Dieck.

Sorbus aucuparia fructu dulcis, Hort. *Sorbus aucuparia var. dulcis*, Kraetzel. *Sorbus aucuparia var. moravica*, Zengerling.

"Almost glabrous; petioles purplish; leaflets oblong-lanceolate, 2 to 3 inches long, glaucescent beneath, usually serrate only above the middle. The fruits are of an agreeable acid flavor and recommended for preserves. The tree thrives well in cold northern climates where hardly any other fruit-tree will grow." Alfrd Rehder in Bailey's *Cyclopedia of Horticulture* (2).

"*Sorbus aucuparia fructu dulcis*, Hort. This is referred to *Sorbus aucuparia moravica* by Dippel. An edible-fruited variety from Moravia, a province in Austria. A hardy tree of upright habit, not eight or ten feet in height, no fruit so far. In Russia the fruit of the mountain ash is used for cordials and a kind of fruit brick made from compressed fruit pulp." N. E. Hansen (9).

Owing to sunscald of the main trunk this tree did not prove long-lived at Brookings. The thin bark of all mountain ashes makes them susceptible to sunscald.

Sorbus aucuparia pendula,

Weeping Mountain-Ash.

Sorbus aucuparia pendula, Hort.

"*Sorbus aucuparia pendula*, Hort. Weeping Mountain Ash. This tree is a curiosity rather than a nobject of beauty and is as hardy as the common type with the exception that it is even more subject to sunscald. Being grafted five or six feet in height on European Mountain ash stock, leaves on the tall stem exposed to the sun. The long slender branches hang to the ground and give the tree a peculiar expression." N. E. Hansen (9).

Sorbus decora

Showy Mountain-Ash

Sorbus decora, Schneid. *Sorbus americana var. decora*, Sarg. *Sorbus scopulina*, Britt. not Greene. *Pyrus sambucifolia*, Gray not Cham. & Schlecht. *Pyrus sitchensis*, Rob. & Fern., not Piper

"The name *Sorbus sambucifolia* is commonly misapplied to *Sorbus decora*." (1).

In this connection should be studied the following from Rosendahl and Butters (23): *Sorbus sambucifolia* of many authors including Minn. T. and S. 1912, not *Pyrus sambucifolia* C. & S."----"Common in the region north of Lake Superior. Labrador to western Ontario, south to central Maine and northern Minnesota. Blooms in late June and July, fruit ripe in August. This species was long confused with the Asiatic *Sorbus sambucifolia* (C. & S.) Roemer, which is entirely distinct; it has been treated more recently as conspecific with one or more shrubby species of the Rocky Mountain region.—*S. dumosa* Greene and *Sorbus scopulina* Greene. Our plant appears to be amply distinct from the western species. In the region of Lake Superior it is a considerably larger tree than *Sorbus americana*."

According to Rehder (22) *Sorbus decora*, Schneid, extends from "Labrador to Minnesota, southern New York and Vermont. Owing to its larger fruit this species is showier than *Sorbus americana* and often planted. Intermediate forms apparently of hybrid origin are occasionally observed."

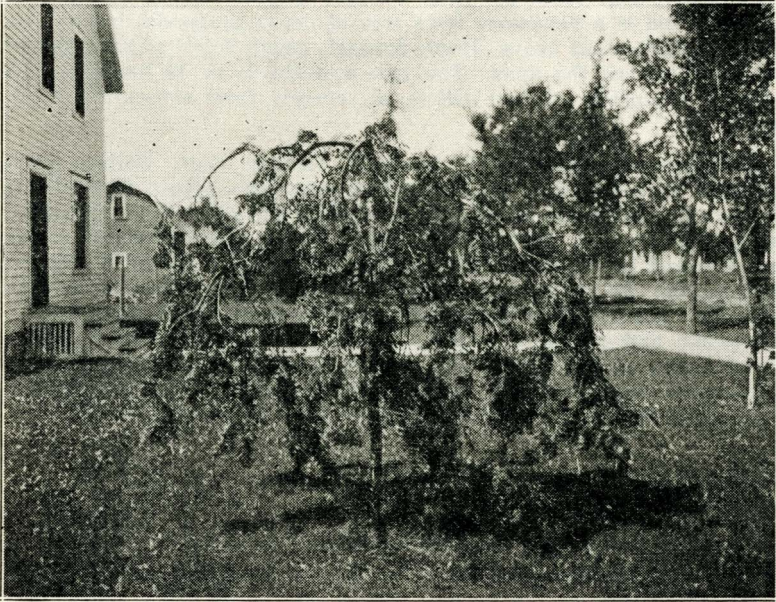


Figure 8—Weeping Mountain Ash

Sorbus quercifolia**Oakleaf Mountain-Ash**

Sorbus quercifolia, Hort. *Sorbus hybrida*, Linnaeus. *Sorbus fennica*, K. Koch. *Sorbus intermedia* x *Sorbus aucuparia*. *Pyrus pinnatifida*, Ehrh. *Pyrus semipinnata* Bechst. *Pyrus semipinnata* Bechst. *Pyrus fennica*, Babington

Sorbus hybrida quercifolia, Hort. Oakleaved Mountain Ash. A natural hybrid of the White Beam tree and European Mountain Ash (*S. Aria* x *aucuparia*) from northern Europe. Dippel says it comes true from seed and is a handsome lawn tree of dense pyramidal habit. The leaves are dark green above, downy beneath, deeply lobed at base, sharply toothed toward the apex. The tree appears to be as hardy as the European Mountain ash and suffers as severely from sunscald." N. E. Hansen (9).

Sorbus semipinnata (Roth) Hedlund, Monogr. Gatt. *Sorbus*. 1901. Oakleaved Mountain-Ash. *S. aucuparia* x *aria*. This hybrid between the European Mountain ash and the simple-leaved European species, *S. aria*, is sometimes planted. It has leaves with a few decurrent leaflets at the base, followed by a deeply lobed middle portion, and a nearly unlobed apical region. In pubescence it closely resembles *S. Aucuparia*. The flowers are larger than in that species with a much deeper hypanthium, and longer and narrower sepals. (Semi-pinnata, partially pinnate.) Several forms of this hybrid are described by European botanists. In this country they generally pass under the name of *S. quercifolia*." Rosendahl & Butters, in "Trees and Shrubs of Minnesota." (23).

Sorbus sambucifolia

Sorbus sambucifolia, Roem. *Pyrus sambucifolia*, Chamb. & Schlecht.

A shrub to eight feet, allied to *Sorbus Americana*. "Native of Northeastern Asia and Japan."----"This species has been much confused with *Sorbus decora* and *Sorbus sitchensis*; it is rare and apparently short-lived in cultivation." Alfred Rehder (22). "*Sambucifolia*" means with leaves like those of the Elder (*Sambucus*).

"Mountain Ash (*Sorbus sambucifolia*, (Chamb. & Schlecht. Roem). A large shrub with compound leaves and red, berry-like fruit. Reported by Mr. Rydberg from the Black Hills upon the authority of Mr. Runkel, a lumberman." Thomas A. Williams (28).

"*Sorbus sambucifolia*, (Chamb. & Schlecht.) Roem. Western Mountain Ash. *Pyrus sambucifolia*, Chamb. & Schlecht. Doubtfully reported by Dr. Rydberg as occurring near Sturgis in the Black Hills." D. A. Saunders (26).

Xanthoceras sorbifolia

Xanthoceras sorbifolia, Bunge.

A very handsome North Chinese shrub or small tree, attaining a height of 15 feet, with stout upright branches, showy white flowers and large greenish fruits similar to those of the buckeye. Our specimen winter-killed at this station.

Zanthoxylum americanum

Common Prickly-Ash

Zanthoxylum americanum, Miller. *Zanthoxylum fraxineum*, Willd. *Zanthoxylum rami-
florum*, Michx.

Also spelled *Xanthoxylum*. From the Greek *Xanthos*, yellow xylom, wood.

The common Prickly ash or Toothache Tree is native from Quebec to Virginia and from Minnesota, South Dakota, to Nebraska and Missouri. A shrub or small tree attaining a height of 26 feet. "This plant furnished most of the Prickly Ash berries of the drug trade, but very little of the bark." Britton, (6).

"Prickly Ash (*Zanthoxylum americanum*, Mill.) A prickly shrub with the leaves, fruit and bark pungent and aromatic. Valuable as a medicinal plant as well as for ornamental purposes. More or less common along woody banks east of the Missouri." Thomas A. Williams (28).

"In woods along streams and bordering lakes from the Missouri Valley eastward." D. A. Saunders (26).

"A shrub growing in thickets along streams from the Missouri River eastward. The branches are covered with short spines and the bark has a pungent taste." W. H. Over (19).