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New Hardy Fruits for the Northwest

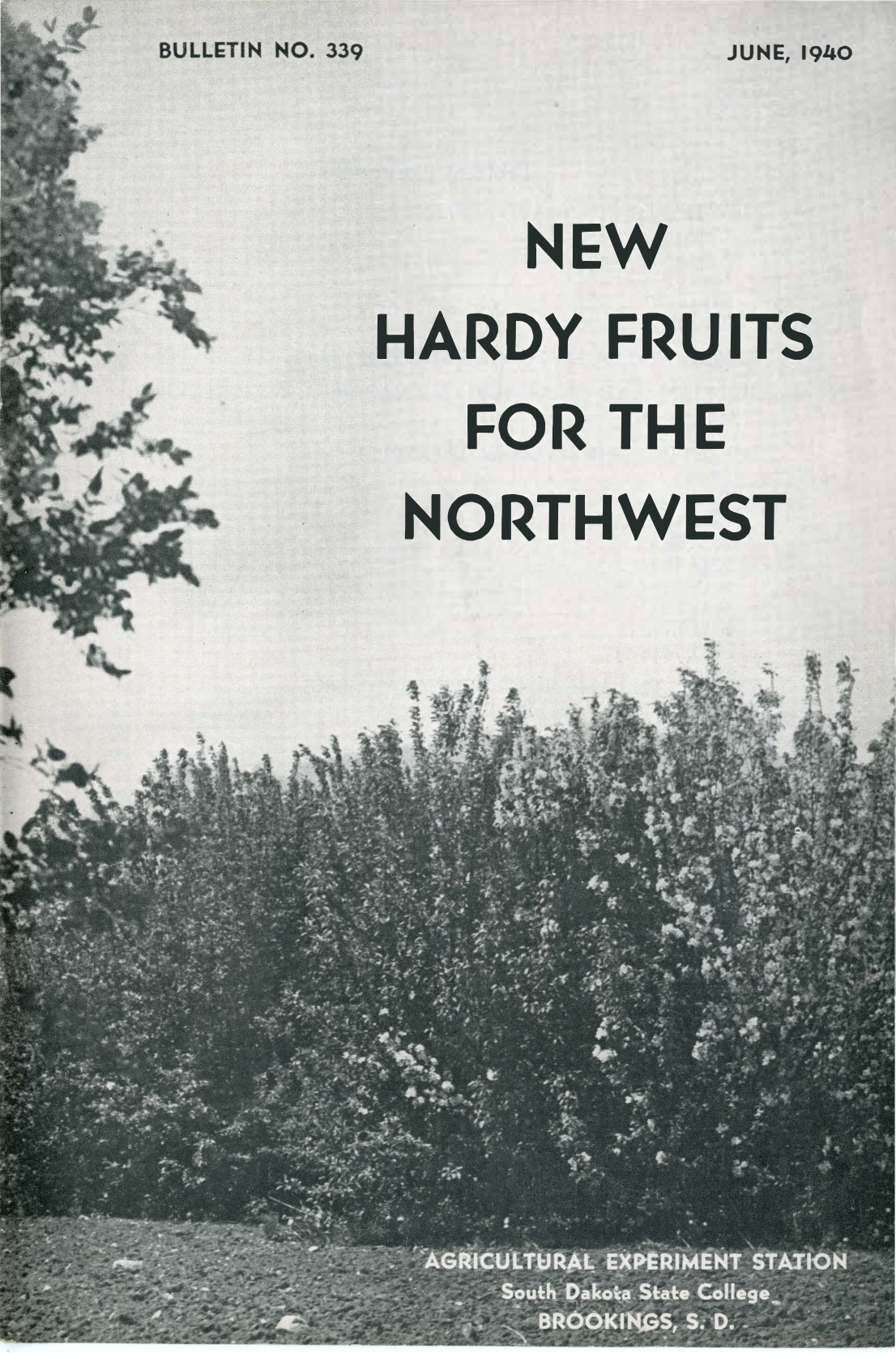
N. E. Hansen

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NEW HARDY FRUITS FOR THE NORTHWEST

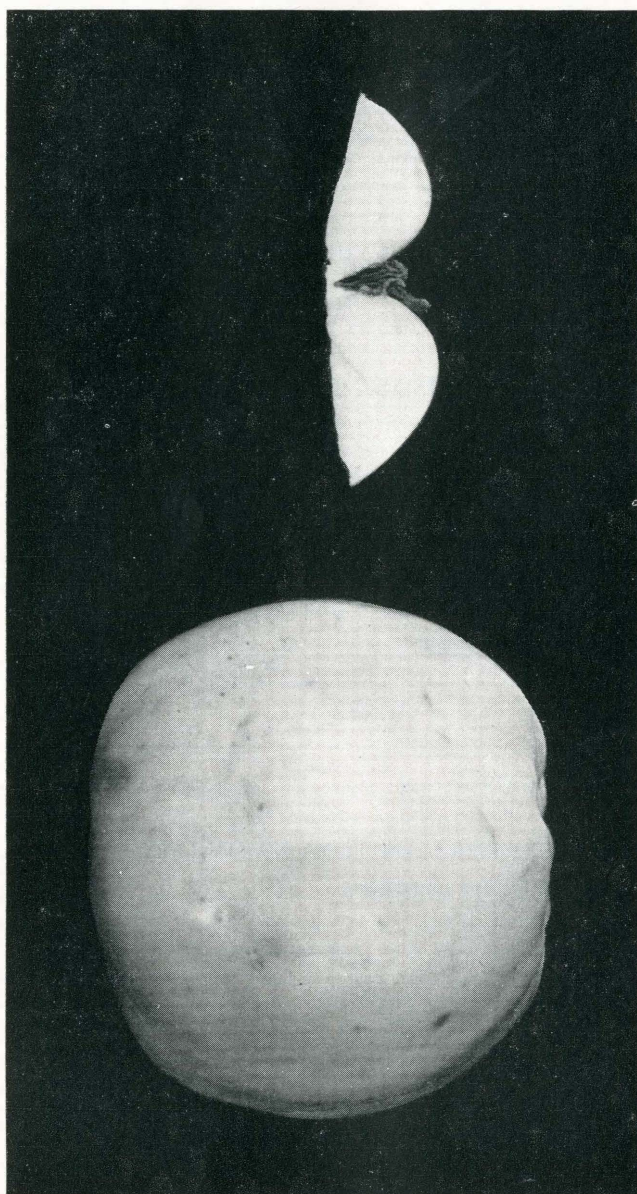
AGRICULTURAL EXPERIMENT STATION
South Dakota State College
BROOKINGS, S. D.

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COVER PAGE: View in the seedling orchards at the Agricultural Experiment Station, South Dakota State College. As soon as they bear, the trees are thinned, leaving those with good fruit. The best seedlings are given a name and propagated for trial elsewhere.

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Goldo Apple (*Actual Size*)

New Hardy Fruits for the Northwest

By Niels E. Hansen
Horticulturist Emeritus

This bulletin is a record of new hardy fruits introduced by the South Dakota Agricultural Experiment Station from 1927 to 1940. Record of previous introductions is contained in Station Bulletins 224 and 309. In all cases the year of introduction follows immediately after the name and the pistillate or female parent is listed first in the pedigree.

New Hardy Standard Apples

Pyrus Malus

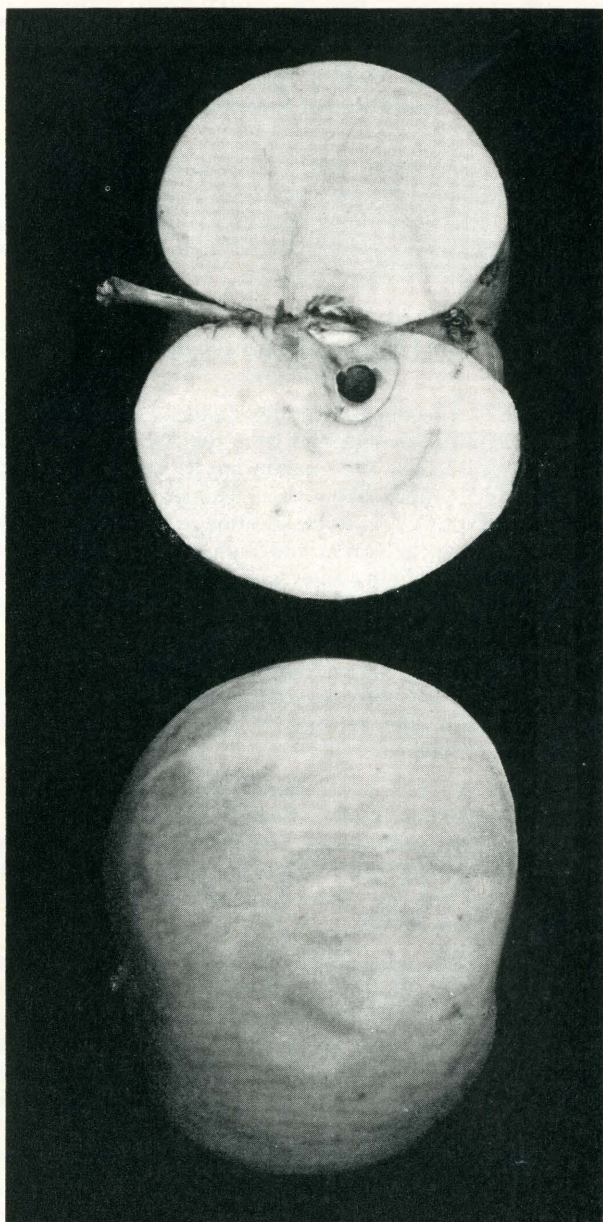
GOLDO apple—1922. A seedling of Grimes Golden topgrafted on Duchess of Oldenburg apple. Goldo is condensed from the names of these two varieties. Goldo is distinguished by the smooth, hardy, vigorous growth of the original tree. The fruit is much like Grimes Golden in general appearance and has an excellent flavor. A decided acquisition as a variety combining the hardiness of Duchess with the season and high quality of Grimes Golden. The flesh cooks quickly into light yellow sauce of excellent flavor. The fruit is larger than Grimes Golden. Recent reports show Goldo to be an early and heavy bearer and the fruit runs large.

KAZAN apple—1934. A seedling of Anisim. Fruit round, $1\frac{7}{8}$ inches across, conical, regular, brilliant red with crimson stripes, a beautiful fruit. Flesh white, juicy, subacid, flesh often red next to the skin. The enormous crops make the size medium or below.

LINA apple—1933. A seedling of Malinda and much like it in conical shape with blush, but with no knobs. Remarkable for its perfectly conical shape with no corrugations in the basin. The flesh is mild subacid and cooks up easily. Name derived from Malinda. If a late yellow apple is desired, the Lina should be tested. Fruit $2\frac{1}{2}$ inches across, somewhat conical, truncated, good juicy subacid. A good crop in 1939.

SEMLA apple—1940. An open-pollinated seedling of Wolf River apple. Fruit very large, 3 inches in diameter, oblate with red stripes with mixed and solid red over yellow ground, with grayish net-veining. Basin smooth, abrupt, narrow; cavity acute, narrow, russeted. Flesh pleasant subacid. When propagated and under orchard conditions probably the fruit will be larger than three inches. Excellent quality sauce. (Semla: the Russian for "family.")

TOLMO apple—1932. A seedling of Tolman Sweet topgrafted on Duchess of Oldenburg apple. Introduced as Otto, but this name is now cancelled because the name had already been used for a Canadian seedling. Tolmo is condensed from the names of the parent varieties. Fruit good size, $2\frac{3}{4}$ inches in diameter; Duchess coloring, with white flesh, pleasant subacid; quality very good. Season fall. A strong grower and a heavy bearer.



Tolmo Apple (*Actual Size*)

Apples with Red Flowers and Red Flesh

Apples with red flowers, skin, and flesh, are a new departure, and will be useful both as ornamental trees on the lawn and for fancy fruit in the orchard. The fruit is red and good for red sauce and red jelly. The first of this series was the Hopa crab.

The author has been working in this line for many years, especially after his second tour of agricultural exploration to Russia when he met Mr. Niedzwetzky at Vernoe, now called Alma Ata, in northeast Turkestan, near the Chinese border. Mr. Niedzwetzky, an official in government service, found this remarkable type of apple in the Tian Shan Mountains that separate Russian Turkestan and western China. This type was named *Pyrus Malus Niedzwetzkyana* after he sent it to Europe. In America, the accepted common name now is the Redvein Crab.

A large number of Redvein crab hybrids with standard apples are now coming on at this Station. These are not old enough to bear fruit but the young wood is red under the knife, and the young leaves are tinted with red, which previous experience indicates that the fruit will be red inside and out, and that the flowers will be red. Nineteen of these new seedlings were selected and propagated for further trial in 1938; the best of these will be named as soon as fruited and deemed worthy. Hopa, Redflesh, Red Tip, Zaza, Zelma and Zita have already been reported.

Siberian and Manchurian Crabapple Stocks for Apples

Root-killing of standard apples on common apple stocks occurs frequently in the Prairie Northwest. A variety may be hardy but if the root is tender, the tree is short-lived. Experiments for many years by the writer and reported in S. D. Bulletin 65, Root-killing of Apple Trees, July, 1899, (now out of print) demonstrates that the Siberian crab does not root kill and is a dependable hardy stock. Gradually through the years the use of Siberian crabapple for stocks is increasing. The trees makes a strong smooth growth in the nursery.

One chief difficulty is the extra expense. The ripe crabapples have a good market value and this makes the seed expensive. The large hybrid crabs often are poor seeders. The Virginia crab is an example; cytological research shows it to be a triploid with 51 chromosomes. The old Yellow Siberian crab yields good seed but is now very scarce owing to the advent of new varieties with larger fruit.

The pure *Pyrus baccata* often bears fruit less than one-half an inch across and is hardy but too small to be of market value; the trees are planted for ornament and for bird-food. Orchards of such trees should be planted to furnish a steady supply of seed for stocks. One of these forms of *Pyrus baccata* now coming into prominence in Minnesota is the Manchurian crab (*Pyrus baccata* var., *Mandshurica*, Maxim), gathered by the writer in 1924 in the mountain region, about 50 miles east of Harbin, Manchuria. These trees are heavy croppers for small trees. The fruit is $\frac{3}{8}$ to $\frac{1}{2}$ inches across; about 1,650 fruits to a pound. The seedlings are good for budding and make strong trees

in nursery; they are now in commerce. The species *Pyrus baccata* is an omnibus species, including many forms varying from tall trees in the Lake Baikal region to much smaller trees farther east. Some trees of this species bear fruit freely at five feet in height.

At the South Dakota Station many Siberian crabs have been tested for stocks. Amur, Beauty, Dolgo, and Alexis all make good stocks. Of small fruited primitive forms of *Pyrus baccata*, the Irkutsk seedlings make good stocks.

Improving the Siberian Crabapple

Pyrus baccata

Out of thousands of hybrids of the Siberian crab, *Pyrus baccata*, with the standard tame apple, produced here and elsewhere, the limits of variation begin to appear. Whitney, Hyslop and Transcendent are some of the earlier crabs. As a class some are too large for a crab and too small for an apple.

In order to obtain larger size a multitude of back-crosses with the standard apple have been produced here and in other states and especially in Canada. Some back-crosses, seven-eighths apple and one-eighth Siberian crab, at Otawa, are of full apple size. The present problem is: Can the hardiness of the Siberian crab be combined with the large size of the standard apple, or will the hardiness be intermediate?

The Jonathan apple is not hardy in the north, but as it transmits red color and superb quality it has been used extensively in these experiments. Perhaps the best that can be done is to obtain the full Jonathan flavor with a somewhat smaller size of fruit.

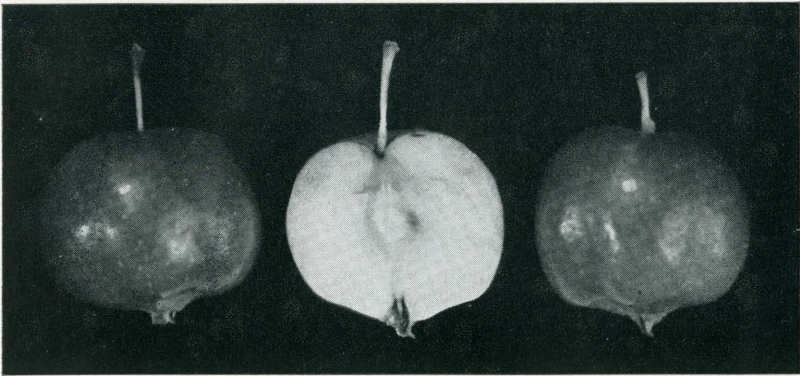
In S. D. Macata and S. D. Jonsib, the Siberian crab is the pollen parent. In most of the older hybrids the Siberian crab is the seed parent. It is the theory of the author that larger fruit is to be expected from hybrids with the Siberian crab as the pollen or male parent.

Dolgo crabapple—1917. Dolgo was selected from a lot of one-year-old *Pyrus baccata* seedlings brought from Russia by the author in 1897. The best one was named Dolgo (the Russian word for "long"), so named in recognition of the *long* conical, intensely bright red crabs about which many inquired at the annual exhibits of this Department at the South Dakota State Fair.

The Dolgo is winning favor over a wide area for its freedom from fire-blight and for its early and heavy bearing. The one-year-old trees in the nursery are of strong growth with wide spreading forks and strongly shouldered limbs that do not split down easily.

In the 1940 List of Fruits recommended for planting by the Minnesota State Horticultural Society, the Dolgo crab is listed as a leading commercial variety for all parts of Minnesota.

At Geneva, New York, the fruit is "full of juice, jellies easily, and makes a rich, ruby-red jelly of beautiful color and excellent flavor. The tree is hardy, vigorous, and productive; the season early September. Splendid for cider as well as jelly."



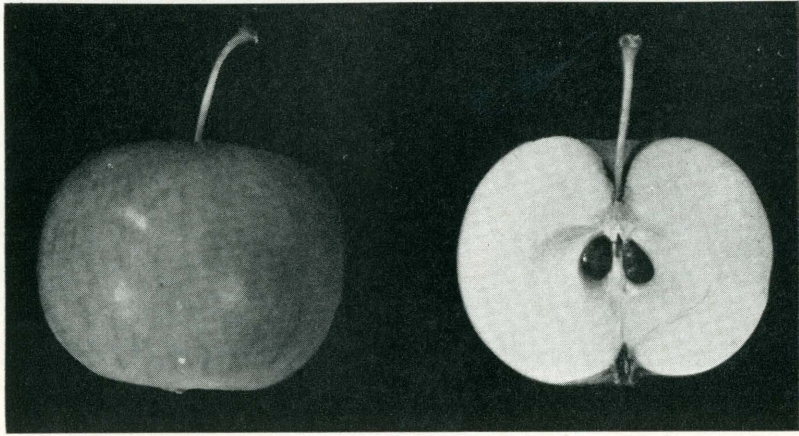
Keo Crabapple (*Reduced in Size*)

KEO crabapple—1940. This is a seedling of the Amur crabapple. The Amur tree was standing far from other apple trees so that Keo is very likely a selfed seedling. The fruit is $1\frac{5}{8}$ inches across, oblate, regular; with a flat basin; flesh white, sauce red-tinted, of excellent quality; the slices retain their shape in cooking. The color is really remarkable; an intense polished bright crimson red all over, shaded deeper on the sun side. The fruit would sell at sight in any market. The fresh fruit is a crisp, pleasant juicy acid, just what is wanted in a crab; it also stands up well, a characteristic derived from the Amur crab which does not soften easily.

There are many varieties of crabapples on the market, but many are rather dull in color. Since the market demand is so strong towards bright red color, this new seedling will attract attention. As with Dolgo, Amur, Beauty, Alexis, and others of similar descent, it is a very heavy bearer.

SAPINIA crabapple—1920. This is a seedling of Winesap apple topgrafted on Virginia crab. The name is made up from these two names. One of the forerunners of a new race of hybrid apples in which the cultivated apple instead of the Siberian crab is the female parent. Fruit thinly washed with dull red, almost two inches in diameter. Flavor subacid. Season late fall. Sapinia is hardy and productive at the Experiment Station at Morden, Manitoba.

S. D. BEN crabapple—1938. Jonathan apple x Tony crab. This makes it one-half Jonathan, one-fourth *baccata* crab, one-fourth MacMahon White apple. Fruit two inches across, nearly all covered with red, striped and mixed over yellow ground with white bloom. The yellow ground is very light and clear. Basin is flat, minutely wrinkled. Flesh white, very firm, juicy, a pleasant, lively subacid; cooks tender into sauce of excellent quality. The sauce is yellow; the slices retain their shape but are tender. An annual bearer. The fruit was not fully colored the last of August. Season evidently winter.



S. D. Ben Crabapple (*Reduced in Size*)

S. D. Bison crabapple—1933. Jonathan apple x Sylvia crab, making it one-half Jonathan apple, one-fourth Siberian crab, *Pyrus baccata*, and one-fourth Yellow Transparent apple. The name was first Bison but is now changed to South Dakota Bison to distinguish it from a Canadian apple seedling. The fruit is large, red, and of excellent quality. The tree is a heavy bearer. Under orchard conditions this may turn out to be almost an apple in size.

S. D. BONA crabapple—1938. Jonathan apple x Sylvia crab. A sister to S. D. Bison. Fruit $1\frac{1}{2}$ inches across, $1\frac{1}{4}$ inches deep, color an attractive deep rich solid polished red, nearly black red; flesh yellow, rich mild pleasant subacid, cooks easily into red sauce of very good quality. Late fall or early winter. Tree a heavy bearer. There are several more seedlings of this same pedigree, all of good quality.

S. D. EDA crabapple—1940. Jonathan apple x Tony crab. This makes it one-half Jonathan; one-fourth *baccata*; one-fourth MacMahon White apple. A sister to S. D. Ben crabapple introduced in 1938. Color a deep solid polished and marbled red, thinly striped over yellow. Flesh a rich, pleasant subacid much like Jonathan. The fruit cooks like a Jonathan and is of excellent quality, the slices retaining their shape. The fruit is unusually heavy for its size. When propagated and given orchard conditions probably the fruit will be larger. Both of these two varieties are choice dessert apples for late fall and early winter.

S. D. JONSB crabapple—1938. Jonathan apple x Irkutsk, Siberian crab *Pyrus baccata*. Fruit $1\frac{1}{4}$ inches across, $1\frac{5}{16}$ inches deep. A beautiful brilliant rich red, striped, splashed, and mixed over yellow ground, with white bloom. The mottled mixed red gives the shady side a rich orange-red effect. Season late fall. Flesh brisk, subacid with sweet aftertaste. In cooking, the sauce is light red, of excellent quality, the slices are tender but retain their

shape in cooking. The tree bore a heavy crop in 1938 and 1939. The highly attractive color, good size and excellent quality of the fruit gives it a claim to recognition as a red crabapple for market.

S. D. MACATA crabapple—1938. McIntosh apple x *Pyrus baccata*. A brilliant polished red all over; flesh rich subacid, cooking up tender into a light colored pleasant flavored sauce. Fruit 1½ inches across, 1⅛ inches deep. Season late fall.

Taming the American Wild Crabapple

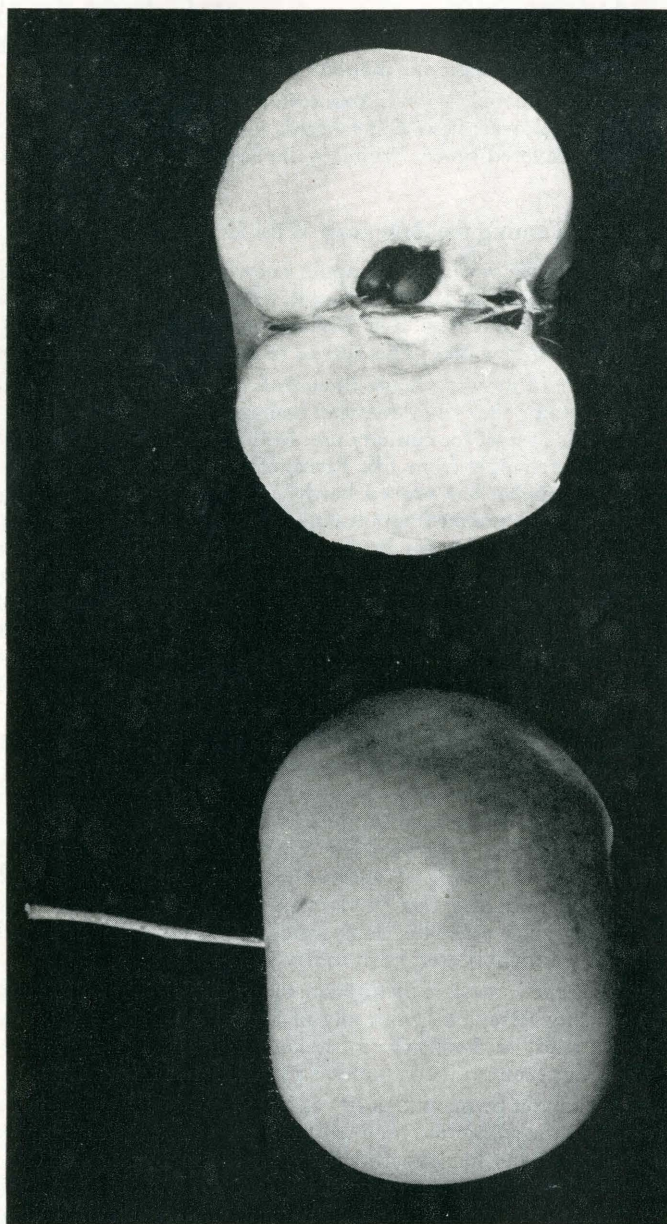
The wild crabapple was the only apple known to the Indians before the white man brought over the cultivated apple which is a native of the temperate regions of Europe and Asia. The Indians cached or stored the fruit outdoors in the earth over winter. This served to tone down the astringency.

The chief hope in growing many thousands of apple and crabapple seedlings has been to tame the wild American crabapple enough so that the fruit would be desirable at least for culinary use. In the seedling plantations of this Station the wild crabapple from Elk River, some thirty miles northwest of Minneapolis, Minnesota, has proved hardy, productive, and practically immune to blight. The abundant fragrant pink and white blossoms in the spring make the trees of great value for lawn and park planting, while the fruit is too sour and astringent to tempt anyone. However, the fruit will keep at least a year and is useful to impart a quincelike flavor to common apple sauce. In fact, some people consider wild American apples a fair substitute for quinces in making preserves. Other advantages are: annual bearing, early bearing, early ripening of wood, winter hardiness, late blooming. Some undesirable characters are the small size of fruit and thorniness of tree.

The Kola crabapple (South Dakota Station Bulletin 224) has become of great interest to cytologists and plant-breeders the world over, because it is the first known tetraploid among cultivated named apples with 68 chromosomes. This was first determined in 1928 by Dr. Bernhard Nebel, Agricultural Experiment Station, Geneva, New York. Later research by Dr. F. B. Lincoln, University of Maryland, shows that Tipi, Shoko, Zapta, and Elk River are all tetraploids; also, that Nevis is a diploid. The Kola and the other wild crab hybrids, such as Shoko, Zapta, and Tipi as pointed out in Bulletin 224, are all heavy annual bearers even in dry seasons.

Tetraploids make it possible to originate many triploid apples (51 chromosomes) by crossing tetraploids with any of the usual diploids (34 chromosomes). Recent study in Sweden and England indicates triploid apples contain more vitamins than ordinary apples, and are higher in quality.

It has been thought by many that it was impossible to improve the American wild crab, but the author has been working with this problem many years, and has produced many hybrids. In later years the main attention has been given to the Nevis wild crab (introduced 1930) *Pyrus Ioensis*, from the farthest northwestern point where it has been found native, Nevis, Minnesota, near the headwaters of the Mississippi River. As far as can be determined the author has done more than any one else to improve this native American



Kola Wild Crabapple (Actual Size)

apple. The work has been a great inspiration and pleasure and from now the progress should be very rapid.

The size of the fruit in the new seedlings increases year by year. The largest in 1938 was Watopa (Elk River, Minnesota x Jonathan), fruit $2\frac{7}{8}$ inches across; in the fruit there is much red color over the green; evidently the Jonathan contributes both size and color. The largest in 1940 was the Nebo; fruit $3\frac{1}{4}$ inches across.

As a class, these American wild crab hybrids are smaller in tree than the standard apple. Such trees can be planted closer together and will be much more convenient for spraying. It will be a dwarfish type of tree, but very productive. It would be an advantage to reduce the size of the standard apple trees because in an old orchard the trees are too tall for convenient spraying.

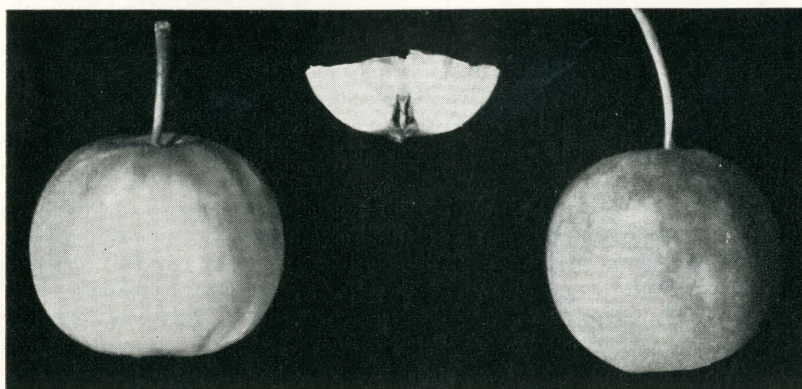
These American wild crab hybrids are not to be considered as perfected varieties, but as one step forward in the work of developing a race of apples of culinary type that will keep one year or more. The trees are early bearers, and as ornamental trees they are worthwhile on any lawn. Under orchard conditions and especially when topgrafted, the fruit will probably attain larger size.

Hundreds of cooking tests have been made of wild crabapples in the course of these experiments. About two bushels of the Forest King were left to freeze solid in an outdoor cellar, to be seeded and stratified as other work permitted. These frozen fruits were always discarded after seeding. But in experimental work it is sometimes best to see what is on the other side of the hill, so, January 18, 1938, a cooking test was made of these frozen crabs. The acidity was greatly modified and reduced, and the slices were tender and kept their shape, instead of breaking down into a mush. The sauce was of quite acceptable quality. Further tests, I hope, will show that these wild American crabs can be frozen solid and used as needed for cooking all winter. Freezing the native wild crabapples before cooking either removes or reduces greatly the native acidity. The fruit of these wild crabs easily keeps a year in a common cellar. In December, 1939, some fruits were cooked that had remained in a warm room after picking until somewhat shriveled. The general effect was to reduce the acidity. It is planned to continue these tests.

AMSIB crabapple—1932. Wild Red (*Pyrus ioensis*) from Iowa x *Pyrus baccata* brought by the writer from Moscow, Russia, in 1906. The name "Amsib" is condensed from the names America and Siberia. Has fragrant wild crab flesh but neutral rather than bitter. It is only an ornamental tree at present, but it is the first hybrid of the native American apple with the Siberian crab and has possibilities for the future.

The Amsib is an early bearer and very productive. This combination of one-half wild crab and one-half Siberian crab combines extreme hardiness with all-winter keeping, but the wild crab dominates in quality. More work should be done. Many more seedlings of similar pedigree are coming on.

In 1939 in the State Orchard at Sioux Falls the Amsib budded on Siberian crab stock, bore a good crop. The round conical fruit was $1\frac{13}{16}$ inches across, bright solid red, striped and mixed red, with green cavity. Calyx



Amsib Crabapple (Reduced in Size)

tube short, broad, approaching conical; stamens marginal. Fruit with many seeds; no wild crab acidity, moderately juicy, white, subacid, hard. The green in the cavity extends out over base. Season late winter and spring.

CHINOOK crabapple—1924. Baldwin apple x wild crab of Elk River, Minn., *Pyrus ioensis*, named after an Indian tribe. Fruit oblate, two inches in diameter, color a fine dark red, subacid, season all winter. Later fruits of the Chinook are 2 x 2½ inches in diameter.

The Chinook Keeps 20 Months and 11 Days: May 14, 1929, fruit of the Chinook was examined and found in good condition, and made a good, pleasant flavored sauce. Fruit picked September 3, 1927 and kept in an outdoor cellar.

FOREST KING wild crabapple—1938. Found near the Wisconsin border in the woods near Winnebago, Illinois, about 1904. Tree had a heavy crop in 1937 following the drouth year 1936; also a very large crop in 1939. Fruit regular round, truncated with white dots; green to golden yellow, unctuous, 2½ inches across, 2¼ inches deep, weight 5¼ ounces. Surface light greenish yellow to golden yellow. Dots minute, white or green, numerous. Cavity acuminate, stem filling the lower part of the cavity. Seeds plump. Flesh white, juicy. Flavor acerb, crabby, but much milder than the ordinary wild crab.

The Forest King should be in the collection along with Mercer, Missouri, Giant, and other large crabs. These large-fruited American wild crabs are usually classified as *Pyrus Souldardii*, and are regarded by botanists as natural hybrids of *Pyrus ioensis* and *Pyrus Malus*.

GEORGE MILLER wild crabapple—1939. Found by George Miller, near his home at Muscatine, Iowa. Not yet fruited at the South Dakota Station.

NEBO apple—1940. Alexander apple x Mercer wild crab. Fruit 3 ¼ inches across, round, regular, truncated, slightly tapering; basin narrow, shallow, smooth; cavity obtuse. Color red, striped, grayed, mixed and splashed. Flesh pleasant subacid, juicy, cooks up easily into excellent sauce. The tree is pro-

ductive. The largest so far of all these apple seedlings. (Nebo: the Russian for "sky.")

The Alexander was introduced into England from Russia in 1817 and later from there to America, the year unknown. It is the Emperor Alexander, one of the largest of all apples, and classified as a member of the Aport group of Russian apples. The huge Wolf River from Wisconsin is no doubt a seedling of the Alexander.

Mr. N. K. Fluke, Davenport, noted the origin of Mercer or Fluke crab in the annual report of the Iowa State Horticultural Society for 1886 on page 514:

"Through Mr. Witherell of this place I procured scions of a sport of our true native crab, the fruit of which (I am told by the son of whose land it stood in Mercer County, Illinois) often measured ten inches in circumference. The original tree blew down and was destroyed by a storm."

Ten inches in circumference means a diameter of 3.2 inches. The usual size here at the North is up to two and seven-eighths inches in diameter.

S. D. WALDO crabapple—1938. Fluke No. 10 x Duchess apple. This is 87.5 percent *Malus* apple, 12.5 percent *loensis* wild crab. The calyx tube is cylindrical and the stamens marginal, showing the influence of *loensis*. Fruit 1¾ inches across, oblate, angular, truncated, color a rich striped mixed red all over yellow ground. The flesh is a rich aromatic sweet subacid. An excellent eating crab. In cooking, the sauce is tinted light red, the slices retain their shape and the quality is very good. The tree is an enormous bearer, but greatly crowded in seedling row.

Fruits of S. D. Waldo crab were frozen solid by outside exposure and then cooked January 27, 1940. The fruit was of a pleasant, subacid flavor like a baked apple, the slices retained their shape and yet were soft.

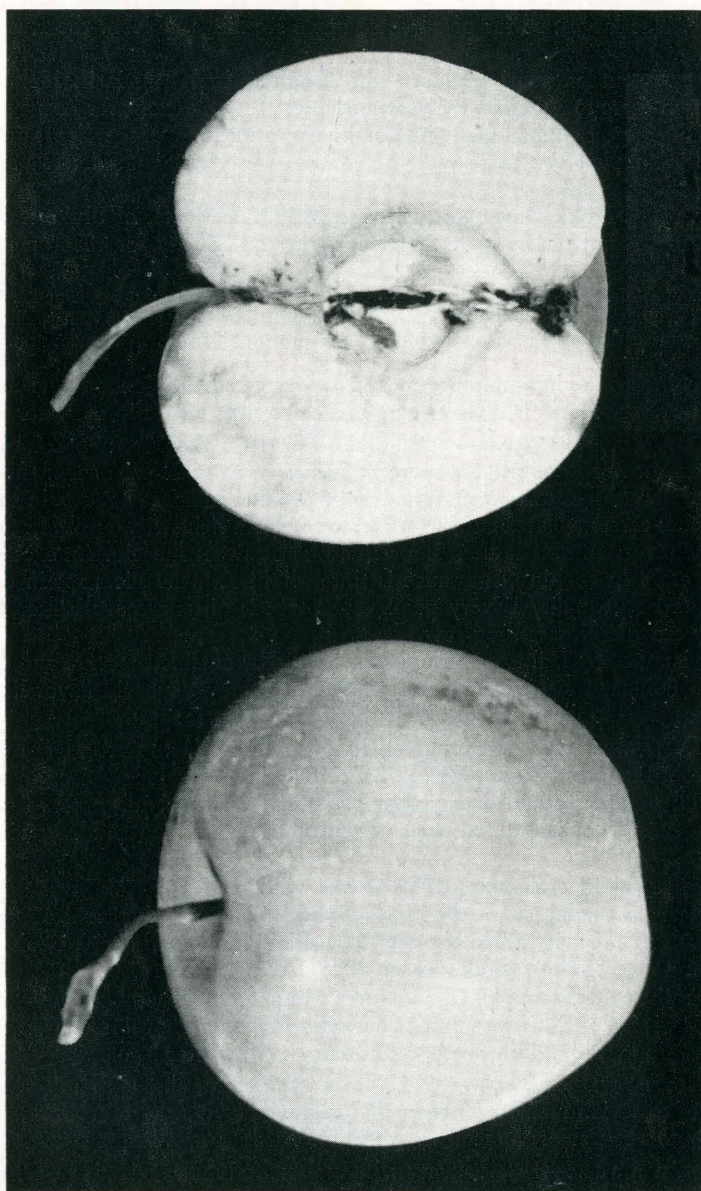
S. D. WENDEL wild crabapple—1938. Charlamovsky apple x a large wild crab from Andrew County, Missouri. Fruit 1¼ x 1 5/16 inches deep; a brilliant solid bright red all over yellow ground; flesh firm, juicy, sharp clear acid, not acerb, cooks into red sauce of neutral flavor. Evidently a long winter keeper.

WAHOYA wild crabapple—1938. Nevis wild crab x Wolf River apple. Fruit perhaps the largest of the Nevis Hybrids, 2¾ x 2½ inches deep, solid red over green. Cavity green out over base. Flesh mild acerb, acid. Cooks up tender into light yellow sauce. Season all winter.

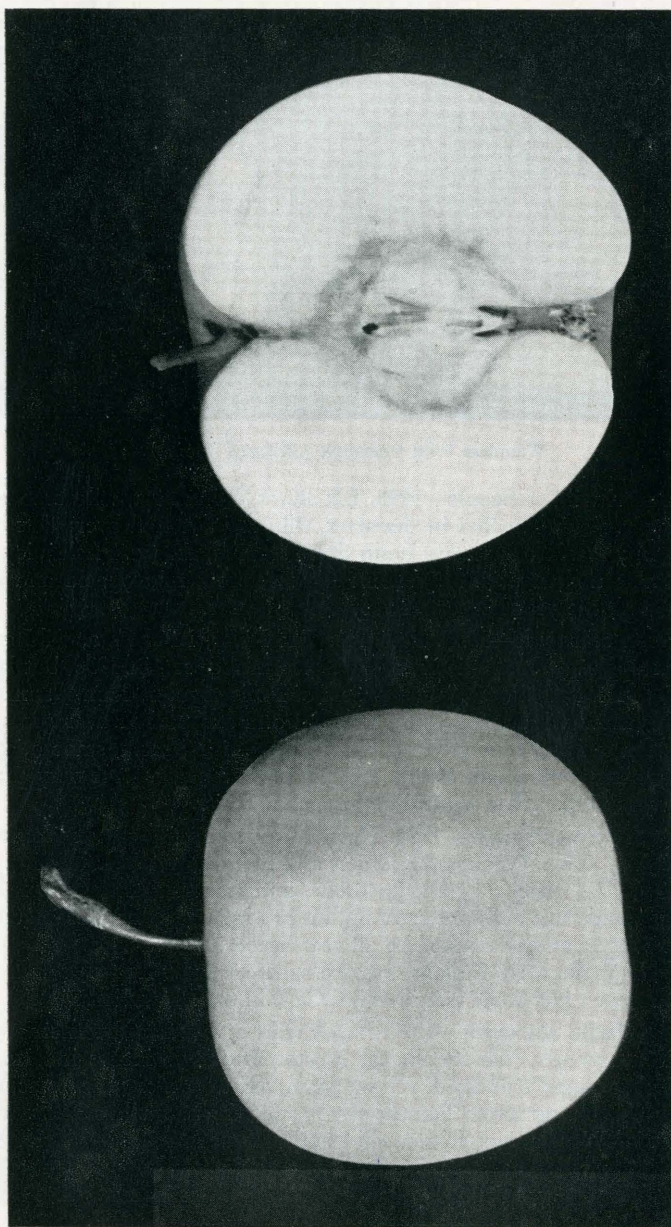
WAKAGA wild crabapple—1938. Nevis, Minnesota wild crab x Wolf River apple. Fruit 2½ x 2¼ inches, somewhat cylindrical, unctuous, regular, green, blushed. Flesh acid, mildly acerb, cooks tender. All winter keeper.

WAKONDA wild crabapple—1931. Nevis, Minnesota, wild crab x Northern Spy apple. Fruit much larger than the original Nevis (*Pyrus loensis*) with considerable red color, indicating hybridity. Tree hardy and productive.

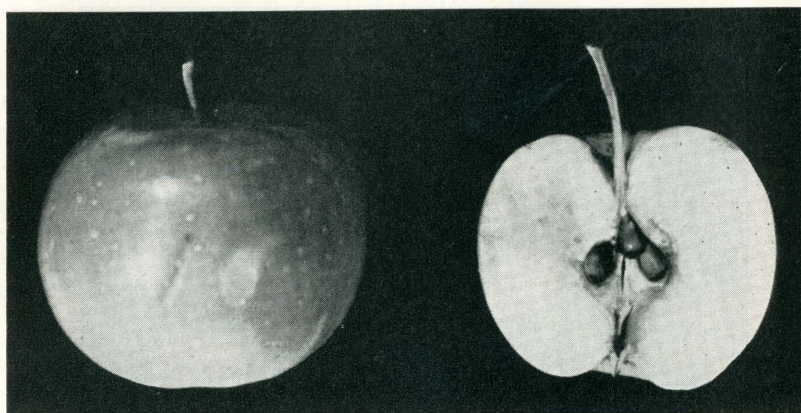
WAKPALA apple—1928. Mercer wild crab x Tolman Sweet apple. This is three-fourths tame apple, one-fourth wild crab. In 1939 the fruit was 2.5 inches across; color yellow lightly striped with red; flesh white subacid with spicy sweet fragrance. Cooks up quickly into excellent light yellow sauce; the slices retain their shape in cooking. Season winter.



Wahoya Wild Crabapple (Actual Size)



Wakaga Wild Crabapple (Actual Size)



Wamdesa Wild Crabapple (*Reduced in Size*)

WAMDESA wild crabapple—1938. Elk River, Minnesota, wild crab x Jonathan apple. Fruit 2 inches in diameter, thin solid red all over; dots large, russet, many areolar; unctuous; basin deep, smooth, abrupt. Flesh juicy acid, acerb, cooks up tender into pleasant light colored, mildly acid and acerb sauce. An all the year keeper. A very heavy bearer.

WATOPA crabapple—1939. Pedigree: Elk River, Minnesota, wild crab x Jonathan apple pollen. A sister to Wamdesa introduced in 1938, but larger, the fruits in 1938 being $2\frac{7}{8}$ inches across. Fruit regular, round, truncated, greenish yellow with much thinly washed and striped red over green and much green out over base (stem end); skin unctuous; basin, smooth, abrupt calyx segments very small, closed. An all-the-year keeper. Tree very productive. Flavor mildly acid to neutral in the cooked fruit.

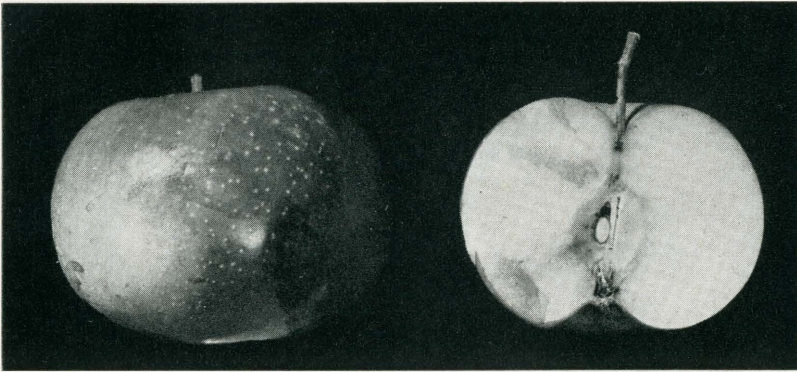
WAZIYA wild crabapple—1938. Nevis Minnesota wild crab x Northwestern Greening apple. Perhaps the largest and best of the Nevis hybrids; fruit oblate, $2\frac{1}{8} \times 2\frac{1}{4}$ inches, green, unctuous, and fragrant like the wild crab. The sharp acid fruit does not cook up but has much less wild crab acerbity. Sister to Wecota and Wetonka. An all year keeper.

Waziya of the early Indians was the spirit of the blizzard as well as of the cool breezes. His home was in Wind Cave in the Black Hills.

WECOTA wild crabapple—1929. Nevis wild crab x Northwestern Greening apple. A winter crab for the far North. Fruit two inches in diameter; cylindrical to round truncated, yellow green; skin unctuous; flavor acid; not very acerb. Cooks up softer than the others and with less wild crab flavor.

Fruits of Wecota kept frozen solid outdoors until February 4, 1939, lost their acerbity when cooked; the flesh was of the consistency and color of baked apples and was mildly acid and quite edible. It indicates that this is a fruit that can stand severe freezing.

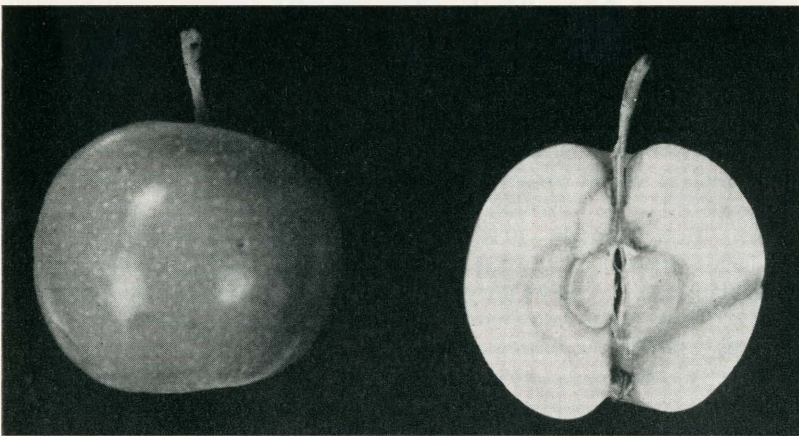
WETONKA wild crabapple—1929. Nevis, Minnesota, wild crab x Wolf River apple. A winter crab for the far North. Fruit two inches across, oblate,



Wetonka Wild Crabapple (*Reduced in Size*)

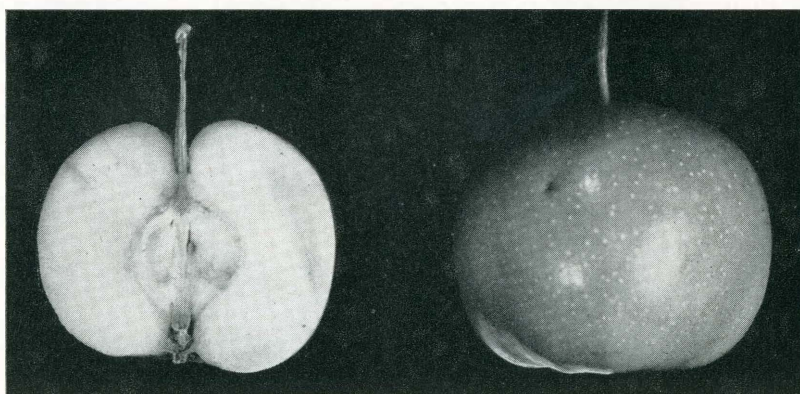
solid bright red over yellow green ground; dots yellow, distinct; skin unctuous; basin wide, slightly wrinkled; cavity shallow, obtuse, green; tube cylindrical; stamens marginal. Flesh acid, solid, not very acerb, does not cook up, neutral flavor. Tree a heavy bearer.

Fruits of Wetonka crab kept frozen and exposed to a minimum of -30 degrees Fahrenheit were of mild subacid flavor and not acerb, when cooked February 7, 1939. Fruits kept from freezing and cooked at the same time were more of a neutral flavor. Evidently the freezing improved the quality.



Wiyuta Wild Crabapple (*Reduced in Size*)

Wiyuta wild crabapple—1939. Nevis, Minnesota, wild crab (*Pyrus loensis*) x Wolf River apple. Fruit $2\frac{1}{2}$ inches across; 2 inches deep, round, slightly truncated, regular; much striped and marbled red over greenish yellow, cav-



Wotanda Wild Crabapple (*Reduced in Size*)

ity with much green out over base. A great improvement, when cooked, over the Nevis wild crab. Season evidently all winter and spring.

WOTANDA crabapple—1939. Nevis, Minnesota, wild crab x Northwestern Greening apple. The largest of several seedlings of the same pedigree. Fruit $2\frac{1}{2}$ x 2 inches. Very regular, oblate, unctuous, yellowish green. Calyx segments very small, closed. Fruit an all the year keeper; heavy for its size, one fruit weighing a little over four ounces. When cooked, the flavor is mild. Tree productive.

International or Three-Species Apples

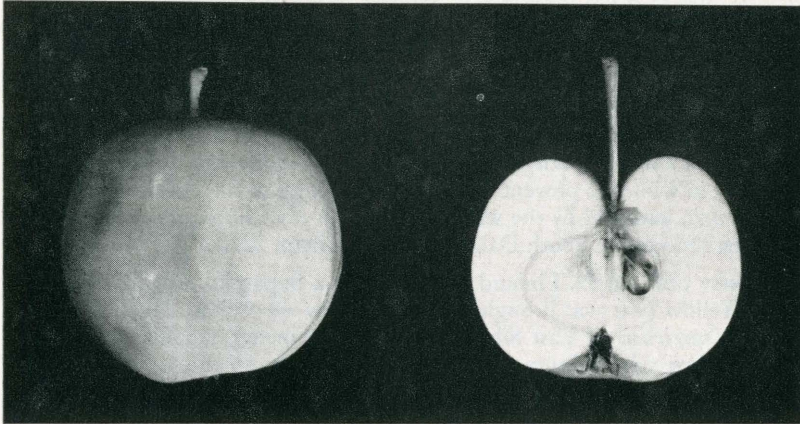
The name International might be applied to many of the hybrid apples now coming into bearing because they combine the apples of three continents: *Pyrus ioensis* of North America, *Pyrus malus* of Europe, and *Pyrus baccata* of Asia. The plan is to combine the long winter-keeping of the American wild crab with the large good quality fruit of the standard cultivated apple and the winter hardiness of the Siberian crab. The varieties have the group named Trio, indicating three-species.

ANN TRIO crabapple—1938. Tony crab x Mercer crab. Fruit $1\frac{1}{2}$ inches x $1\frac{1}{4}$ inches. Remarkable for the bright solid red over orange yellow ground, with white bloom. A very showy fruit, flesh yellow, pleasant acid. Fruit hangs on the tree very late into October and has to be hand-picked. Tree wide spreading, productive. Season all winter.

BEN TRIO crabapple—1938. Progress crab x Mercer crab. Fruit $1\frac{1}{2}$ x $1\frac{1}{2}$ inches deep, a dark solid red all over, with many distinct russet dots, flesh sweet subacid, very good quality, sauce light red. Tree a heavy bearer. Season all winter.

CAL TRIO crabapple—1938. Mercer crab x Sweet Russet crab. Fruit, polished bright red all over, $1\frac{1}{2}$ inches across x $1\frac{3}{8}$ inches deep, solid, juicy, sharp acid with sweet aftertaste. Does not cook up but fairly tender; rather neutral flavor. Promising as an all winter crab.

DAN TRIO crabapple—1938. *Pyrus baccata cerasifera* x Mercer wild crab. An all winter crab, perhaps the best out of a lot of same pedigree. Fruit $1\frac{1}{2}$ x $1\frac{1}{4}$ inches deep; solid polished black red, mixed, splashed and mixed, over yellow ground. Flesh very solid, juicy, sharp acid, the sauce is mild neutral with no acerbity. Season late.



Erl Crabapple (Reduced in Size)

ERL TRIO crabapple—1938. Fluke No. 10 x *Pyrus baccata* x Dolgo crab. Fruit $1\frac{1}{2}$ inches across, solid dull red over green ground, flesh subacid, juicy. Tree with strong forks and a heavy bearer. Flesh white, subacid, red next to skin, remains firm in cooking but is not acerb. An all winter keeper.

FAY TRIO crabapple—1938. Fluke No. 10 x Yellow Siberian crab. Its seedlings should be of value. Fruit $1\frac{3}{8}$ x $1\frac{1}{4}$ inches deep, yellow with dull red cheek, striped and mixed. Flesh solid, juicy, acid; sauce of light color and good quality. Season all winter.

GUY TRIO crabapple—1938. Name withdrawn because the tree is the same as Erl Trio.

HANS TRIO crabapple—1938. Fluke No. 29 x Yellow Siberian crab. Fruit oblate, $1\frac{3}{4}$ inches across, green covered with dull mixed red, flesh juicy, tough, pleasant, subacid; does not cook up but flesh is neutral, not acerb. Season all winter.

JOE TRIO crabapple—1936. *Pyrus baccata cerasifera* x Mercer wild crab. Seedlings from such hybrids should give some highly interesting results. Fruit $1\frac{3}{4}$ x $1\frac{3}{8}$ inches; oblate, yellow with striped and mixed red. Flesh acid, cooks up into very good quality sauce. Season all winter.

KIT TRIO crabapple—1938. Mercer x Sweet Russet Crab. Fruit $1\frac{5}{8}$ inches across, a rich polished yellow all over; flesh pleasant, sweet, juicy; cooks yellow and tender; the slices retain their shape, quality good. A heavy crop in 1939. Season late.

Pears Resistant or Immune to Fire Blight

It has been the endeavor for many years to hybridize the native pear of East Siberia and North China with standard cultivated pears. Several have already been named. It is gratifying to report splendid progress with hybridizing pears. Several new seedlings bore a heavy crop of fruit, excellent in quality and of good commercial size in 1939. The trees are free from fire-blight (*Bacillus amylovorus*) although fire-blight occurs in the orchard, which amply demonstrates that the size and high quality of the standard pears of western Europe can be combined in large measure with the hardiness and immunity to fire-blight of the pears of East Siberia and North China.

Experience here at the South Dakota Station indicates that the ordinary commercial *Pyrus Ussuriensis* stocks winterkill readily and must be mulched carefully in winter to prevent rootkilling. Seedlings of the Harbin pear, *Pyrus Ussuriensis*, gathered by the writer from north Manchuria are entirely hardy and first reported in South Dakota Station Bulletin 224.

FINSIB pear—1939. Finland Early Yellow x Saponsky pear. The Finland Early Yellow pear was brought from Russia by the writer. The Saponsky is *Pyrus Ussuriensis* of East Siberia. Fruits 2 x 2 inches, globular, acute pyriform, yellow with minute russet dots. Stem long, up to 2¼ inches. Flesh juicy, melting; quality excellent. (Name from Finland, Siberia.)

ILYA pear—1940. Vinnaja selenaja ("Green wine"), a Russian pear x a standard pear from southern Missouri. Fruit 2¼ x 2¼ inches, globular, somewhat irregular and obscurely angular, especially around the stem; yellow with minute inconspicuous russet dots. The fruit of the Russian pear was a pleasant subacid, but with prominent grit cells. In this hybrid there is no increase in size but the flesh is tender, melting and free from grit, pleasant subacid. Very juicy when fully ripe. A good summer table and culinary pear. (Ilya: a legendary Russian giant.)

OKOLO pear—1940. *Pyrus ovoidea* (*Simonii*) seedling. Fruit 2¼ x 2¼ inches, obtuse pyriform. Clear light yellow, with multitude of minute dark russet dots. Stem long, stout. Flesh white, firm, juicy; flavor delicious. Tree a heavy bearer. (Okolo: the Russian for "round.")

SELENGA pear—1939. Saponsky (*Pyrus Ussuriensis*) x White Doyenne pear. Fruit oblong pyriform, 1¾ inches across, 2½ inches deep, yellow with minute russet dots, quality excellent, season October. Tree productive and blight-resistant. (Selenga, a river in East Siberia.)

S. D. VALYA pear—1938. Lincoln x Russian Sand pear. The reciprocal hybrid of the Sladky. Fruit nearly two inches across, round tapering to stem, yellow with minute russet dots. Good quality. A good tree, no blight, bore a heavy crop in the drouth year 1936.

SUNGARI pear—1940. Vinnaja Selenaja x *Pyrus ovoidea* (*Simonii*). Fruit 2 x 2½ inches, oblong pyriform, with long stem. Clear yellow with faint russet dots. Flesh tender, pleasant, very juicy when fully ripe, excellent for table or for cooking. A valuable fall pear. (Sungari: a river in northeast Manchuria.)

TANYA pear—1939. Ideal x East Siberian (*Pyrus Ussuriensis*). A red late-keeping pear of medium size and good quality. Hardy and blight-resistant.

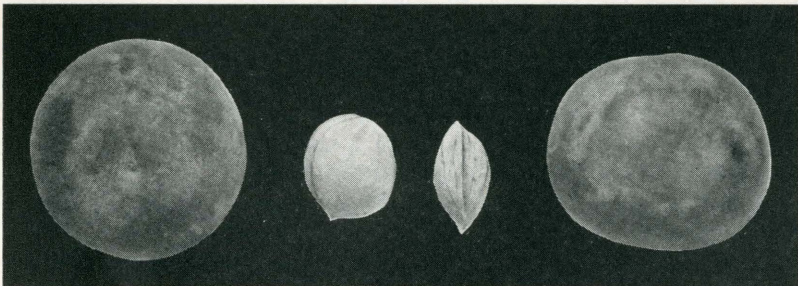
YERMAK pear—1939. Seckel x East Siberian pear (*Pyrus Ussuriensis*). In this pear hardiness and resistance to blight is combined with excellent quality. In the fruit, the Seckel, the highest in quality of all pears grown in America, contributes superb quality; and in tree the Siberian pear gives extreme hardiness. Resistance to fire-blight comes from both parents. Upon the original tree, much crowded in the seedling rows, the fruit is about the same size as Seckel, the seed parent. Season, early October. (Yermak, the Cossack conqueror of Siberia about 400 years ago.)

Select Native Plums, *Prunus Americana*

Many thousands of seedlings of the native plum of South Dakota have been grown in the effort to obtain varieties with large fruit, larger at least than the common run of plums brought to market. Many people like the stronger flavor of the native plum especially for preserves and jams. Some are heavy bearers at an early age, of low spreading habit, and the fruit with relatively small pit. They can always be used for pollinating the hybrid plums that bloom at the same season. Named native plums previously described and considered valuable are Huya, Teton, Topa, Wastesa, Yuteca, and Zekanta, in S. D. Agr. Exp. Sta. Bul. 224.

For the early history of plum culture in this state see "Plums of South Dakota," by N. E. Hansen, S. D. Exp. Sta. Bul. 93, May 1904. (Not available for distribution.)

There are great possibilities in the native plums of South Dakota. In a 10-year test at the State Orchard at Watertown, on a hill without protection, the Teton was hardier and bore more fruit than other native plums from further south and east. In other words, the indigenous plum *Prunus Americana* varies in hardiness according to the locality where it is native. Native plums of southern origin are usually too late in season at the North. It was early apparent that the southern plums were not hardy, while those of more northern origin were hardy and productive.



Oacoma Plum (Reduced in Size)

OACOMA plum—1938. Fruit red, round, $1\frac{3}{8}$ inches across, of very best quality eaten fresh or as preserves. Skin thin, dissolves in cooking. The pit is rather small, round, flattened, with smooth rounded edges and no sharp points. The high quality of this pure native South Dakota plum should quickly make it a general favorite. The tree is hardy and a heavy bearer. The original tree of Oacoma was found a few miles west of Oacoma in Lyman County and was first sent out as South Dakota No. 12 in 1934.

Hybrid Plums

Work with the native plum, *Prunus Americana*, nearly stopped when the large hybrids such as Waneta appeared. Nurserymen quickly replaced the selected native plums with the large hybrids in response to the popular demand. Kahinta, Waneta, and Tawena were described in S. D. Agr. Exp. Sta. Bul. 224. Kahinta was introduced in 1912, Waneta in 1913, and Tawena in 1924.

TECUMSEH plum—1918. Shiro x Surprise. An extra large plum. As Shiro is one of Burbank's hybrid Japan plums combining four species, Surprise pollen makes this an amalgamation of five species. In late years Tecumseh has become popular and considered one of the best of the hybrids over a wide area and northward into Manitoba. It does not overbear so that it is usually an annual bearer. The season is very early.

These three sister varieties (Kahinta, Waneta and Tawena) are hybrids of the Japanese plum (*Prunus salicina*, Lindl., *P. triflora*, Roxbg) with the native plum *Prunus Americana*. The Japanese plum came to the United States from Japan in 1870, but is recorded as having originally come to Japan from China.

Fragrant Plums

In the first hybrids of our native plum (*Prunus Americana*) with the Chinese apricot-plum (*Prunus Simonii*), there were 16 seedlings. The strong flavor and firm perfumed flesh of the apricot-plum are combined with our native plum to produce fruits of superb quality. When cooked the strong apricot flavor is entirely unlike the flavor of the native plum. The trees possess the hardy characteristics of *Prunus Americana* and bud or graft well on native plum seedlings. Of these Kaga, Hanska, Toka, Inkpa, Tokata were distributed

Hanska was introduced in 1908, Kaga and Inkpa in 1909, Toka in 1911, Tokata in 1912. Tokata is regarded by many as the finest of all in its superb flavor. Kaga, Toka, Hanska, and Tokata are now widely grown in many states for the excellent flavor of the firm fragrant flesh. In Minnesota they are excellent pollinizers for other hybrid or native plums.

Kota is another of the 16 original seedlings worthy of introduction because of its larger size.

KOTA plum—1939. A sister to Kaga, Toka, and Hanska, but the fruit averages larger. Fruit $1\frac{3}{4}$ inches across, $1\frac{1}{2}$ inches deep, a vivid dark red with large distinct yellow dots and white bloom; oblate, with slightly sunken apex;

suture very wide and shallow; cavity deep, regular, acute; stem stout. Flesh very firm, richly fragrant and delicious. In general, the multitude of large yellow dots is a distinguishing characteristic. Kota is very productive. It made a splendid record in the State Orchard at Sioux Falls.

Progress with the Manitoba Native Plum

Prunus nigra

The selection work with the Manitoba native plum culminated in the Assiniboin and Winnipeg. The Assiniboin is highly popular in Manitoba. Thousands of seedlings have been grown from this variety. Of the hybrid seedlings Cree, Pembina, and Ojibwa were named and are much grown at the North, especially Manitoba.

All are described in S. D. Agr. Exp. Sta. Bul. 224.

The Hansen Bush Cherry

Selections of *Prunus Besseyi*

Improving the South Dakota native sandcherry, *Prunus Besseyi*, began in 1895 and was first reported in S. D. Agr. Exp. Sta. Bul. 97, (1904) by the writer. The second million seedlings covering fourteen generations is now being grown. This selected strain is now called the Hansen Bush Cherry. In 1938 and 1939 about one thousand plants out of 35 acres of seedlings were marked for further propagation. It is the plan to breed the best of these true to seed as rapidly as possible. In the meantime the selected plants are budded on native plum. Plants on their own roots may be obtained by layering. A number of plants in the State Orchard at Watertown yielded 12½ pounds of fruit per plant the past season. Many one-inch sand cherries have appeared, but not introduced as they were evidently chance hybrids not up to Sapa or Opata. Every farm in the state should contain at least a hundred Hansen Bush cherry plants to serve as a good source of fruit. Home-makers living near the State Orchard at Watertown save the flesh, using hand cherry-pitters, and can from 1,000 to 1,500 quarts annually.

In selection the weight of 100 ripe cherries is determined, then the fruit is pitted and the ratio is determined between the weight of 100 pits and 100 ripe fruits. The size of the pit is decreasing each generation; in some the size is less than one-fourth of the original size. The usual color of the fruit is black but many good yellow-fruited seedlings have appeared. In 1938 the first breaks into red fruit were noted. All these are now in propagation.

Sioux, Tomahawk, Champa, Keyapaha, Oahe, Okreek, Teepee, Wampum, Wasta, Watauga, Weta, and Wewela have been described previously in Bulletin Nos. 224 and 309. Checkpa and Kasota, described below, are outstanding improvements.

CHECKPA bush cherry—1940. The largest and best so far. The fruit in 1939 was black, almost one inch in diameter, exact size 15/16 inches. The weight of 100 fruits was 418 grams and the percentage ratio of pit to fruit 3.92. In other words, out of 100 pounds of fruit, only 3.92 pounds would be

pit. The highest quality for this species; the sauce is excellent. This variety is named in honor of Chief Checkpa, a great Sisseton Indian chief who died in 1926 at his home at Pickerel Lake, north of Webster. He was said by all to have been the "ideal type of Indian in bravery, physique, stature and ideals."

KASOTA bush cherry—1940. The second best bush cherry of 1939. The color black. Size 15/16 inches in diameter, or nearly one inch. The weight of 100 fruits is 406 grams and the percentage ratio of pit to fruit is 5.29. The quality is very good. (Kasota is the Sioux Indian name for "a clear sky.")

SIoux sand cherry—1902. A large sand cherry selected from many thousands of seedlings. Not as large as some of the later seedlings but noteworthy for its mild flavor. The plants sent out were budded on native plum roots.

Many thousands of seedlings of the Sioux sand cherry have been grown at this Station and in Manitoba. Many are noteworthy for size and quality. The Brooks from Brooks, Alberta, is a seedling of a seedling of the Sioux.

"Sioux, the renowned South Dakota mother sand cherry, is of somewhat prostrate habit. The small fruit with small seed canned sweet, smooth and tender. From this year's test Sioux was surpassed in cooking quality by Oahe and Keyapaha." (Report from the Dominion Experiment Farm, Morden, Manitoba, August 12, 1939.)

SELECTED Sand Cherries, Nos. 1-177—1934. These selecte seedlings distributed under number from this Experiment Station are budded on native plum roots and are intended as a basis for further experiments.

The Cherry-Plums (Hybrids of the Hansen Bush Cherry)

Prunus Besseyi has been hybridized with many other species. The best result was with the Japanese plums, as noted in South Dakota Station Bulletin 224 and 309. The most widely grown of these hybrids are Sapa, Opata, and Oka. The Opata is the most popular of the green-fleshed, and Sapa is the most favored of the red-fleshed hybrids.

The other cherry-plums described in these Bulletins include: Champa, Cheresoto, Cikana, Cistena, Enopa, Etopa, Eyami, Ezaptan, Kamdesa, Mana, Okiya, Owanka, Sanoba, Sansoto, Skuya, Stanapa, Tokeya, Tom Thumb, Wachampa, Wakapa, Wohanka, and Yuxsa. These hybrids establish definitely the fact that many varieties and species hybridize with this species. Two of these hybrids, Cistena and Stanapa, are ornamental shrubs with red-purple leaves. This color comes from the male parent, the purple-leaved plum of Persia. The Cistena is popular in the nurseries owing to the rich purple-red color of the foliage. Stanapa is taller in growth but has less color.

All of these Sand Cherry hybrids are of rapid growth and usually bear fruit on one-year-old trees in the nursery. They are best transplanted as one-year-old trees; such trees usually fruit the following year. They are a hybrid of a bush and a tree, and are best grown in bush form with several stems from the ground up. If trimmed up to one stem much of the bearing wood is lost. The best fruit is borne on the young wood, so that the leading shoots should be pruned back as needed to favor the production of an abundance of new shoots.

In the processing plants Sapa and Oka find preference because of the rich red color and high quality of the preserves. The fruit that is not processed at once is kept over by the new quick freezing method and when removed is plunged at once into boiling water. This preserves the excellent flavor.

Siberian Dwarf Cherry

Prunus fruticosa, Pall.

URAL MOUNTAIN CHERRY—1938. In the Ural Mountain region of West Siberia, a dwarf red cherry is being collected in a large way under government auspices. Selection is under way at the Experiment Station at Cheliabinsk; one was brought in nearly as large as the Early Richmond Cherry. As fruited at the station in 1938 and 1939 the fruit is a red, sour cherry with clear acid flesh much like a small Early Richmond and of good quality. This is a cherry for the far North where standard sour cherries are not hardy. The plant sprouts freely.

Progress With the Golden Currant

The Golden Currant (*Ribes odoratum*, Wendl) is a handsome shrub of vigorous growth, with abundant yellow flowers appearing in early spring before the leaves. It is a choice ornamental shrub due to the rich spicy fragrance of the flowers, and smooth green leaves. The fruit is smooth and of excellent quality eaten fresh or for preserves. The color is usually a shining black, but in western South Dakota, plants with yellow fruit are found. The names given are all from the Sioux Indian language.

PAWNEE golden currant—1939. It is the fourth generation from the Crandall grown among many native South Dakota seedlings of Golden Currant. The shining black fruit is $\frac{3}{4}$ inches across, good quality. The shrub is of strong growth and a heavy bearer.

WAKAPA golden currant—1939. Grown from native golden currants gathered at Cottonwood, South Dakota. Fruit yellow, pleasant subacid, $\frac{5}{8}$ inches across. A heavy bearer.

WAPAGO golden currant—1939. The best selection so far of the golden currant as found native at Cottonwood, western South Dakota. The rich spicy fragrance of the abundant yellow flowers and the smooth green leaves, add to the value of this strong-growing drouth-resistant native shrub. A combination ornamental and fruit-bearing shrub. The fruit is $\frac{3}{4}$ of an inch across, skin shining black, pleasant acid. A heavy crop on crowded bushes in 1937, following the dry season 1936.

WATO golden currant—1939. Grown from native golden currants gathered at Deadwood, South Dakota. Fruit pleasant, mild, acid, $\frac{9}{16}$ inches across, light orange yellow, skin transparent, shining.

WOGA golden currant—1939. Descended from native golden currants gathered at Cottonwood, South Dakota. A heavy crop in 1937 of yellow shining fruit, $\frac{5}{8}$ inches across, pleasant acid.

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