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Fruit Culture

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South Dakota Agricultural College

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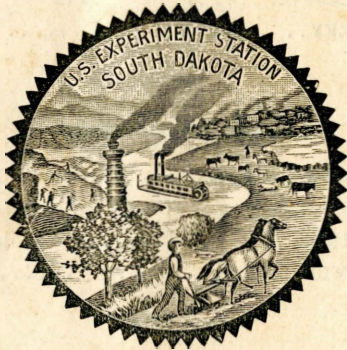
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(SO. DAK. BUL. NO. 50.)

January, 1897.

Bulletin 50.

U. S.
EXPERIMENT STATION,
SOUTH DAKOTA.



IN CONNECTION WITH THE
SOUTH DAKOTA AGRICULTURAL COLLEGE.

FRUIT CULTURE

DEPARTMENT OF HORTICULTURE.

BROOKINGS, SOUTH DAKOTA.

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Fruit Culture in South Dakota.

N. E. HANSEN.

From numerous letters received during the year by the writer, and from trips to many parts of the state, it appears that the interest in fruit culture is greatly increasing. This is encouraging in view of the fact that a large majority of farmers in this state look upon fruit culture as a very unprofitable and uncertain, if not impossible, undertaking. But from a careful study of the evidence the writer must insist upon the fact that South Dakota can easily raise, for home use and some to sell, an abundance of apples, plums and most small fruits. Enough is already definitely known to warrant making out a list of varieties safe for extended planting in most parts of the state suited to general farming, and also in those sections where irrigation is practiced. This list, although small at present, will probably be greatly extended in the near future. The large fruit crop the past year, 1896, has greatly encouraged fruit growers and many are doubtless planning to extend their plantations the coming spring. The great danger is that varieties of doubtful hardiness will be planted and that too little attention will be paid to the experience of South Dakota planters and of those in the states nearest us on the east. It will be wise for South Dakota to profit by the experience of Minnesota and northern Iowa planters and not start in where they began thirty years ago. And yet that is what some planters in this state are doing at the present time, especially those who have come from eastern or southern states more favorable to fruit culture.

In order to save needless losses in this line it has been thought best to make this bulletin something of a guide for planters, giving brief hints on best methods and varieties, and to include a few letters from leading fruit growers of the state. It is the intention to continue this work and make a full horticultural survey of the state.

APPLES.

The varieties safe to plant will vary according to the locality. Along the Missouri river, on the south border of the state, a few old orchards in fair condition are found, containing varieties of the grade of hardiness of Haas, Plumb's Cider, Fameuse, Perry Russet, Utter's Red, Willow Twig, Tallman Sweet, and even Rawle's Janet and Ben Davis. This fact is shown in the annual fruit displays at the state fair. This strip of country is only a very few miles wide, and must not be taken as a guide for the rest of the state. Some of these varieties are not standing well on the open prairie a few miles south of the river. This strip of rolling land especially favorable to orcharding can be traced along the Missouri river from the south boundary of Iowa north to Yankton.

It may safely be stated that no variety is safe to plant generally in the north half of the state that is less hardy than Duchess. And even in the south half it will be wise for beginners, who wish to plant only a few trees, to abide by this rule. The fruit list of the Minnesota State Horticultural Society, as adopted at the annual meeting in Minneapolis, in December, 1896, should be carefully studied as it is a good guide for next Spring's planting. The list is as follows:

APPLES.

Of the first degree of hardiness for planting in Minnesota are Duchess, Hibernial, Charlamoff.

Of the second degree of hardiness: Wealthy, Longfield, Tetofsky, Melinda.

Promising varieties for trial: Patten's Greening, Okabena, Peerless, Repka Malenka, Anisim, Yellow Sweet, Kaump, Gilbert, Brett, Christmas, Blushed Calville, Cross 413, White Pigeon.

CRABS AND HYBRIDS.

Best for general cultivation: Virginia, Martha, Whitney, Early Strawberry, Minnesota, Sweet Russet, Gideon's No. 6, Briar Sweet, Tonka, Powers.

For trial: Dartt, Greenwood, Pride of Minneapolis, Crampton No. 3.

Notes on above varieties: 1—Borovinka and Glass Green resemble the Duchess and are equally safe kinds. 2—Lieby (Recumbent), Juicy Burr and Romna closely resemble the Hibernial and are equally safe kinds. 3—Charlamoff: There are two distinct kinds under this name. The one here referred to

(Peterson's Charlamoff) is of spreading growth and bears roundish, conical shaped fruit. 4—The following do best top-worked: Wealthy, Longfield, Melinda. Longfield, Kaump and White Pigeon are early bearers. Melinda, Yellow Sweet, Christmas and Minnesota are tardy bearers.

It will be noticed that only three varieties of apples are recommended at present for general planting in Minnesota.

DUCHESS. This is also called Duchess of Oldenburg. The name now recognized by the American Pomological Society is Oldenburg, but it will be very difficult to do away with the name Duchess by which this variety has been universally known in the West for the past generation. Hence the name Duchess is retained by the western societies to prevent confusion. The large size and beautiful coloring of the fruit, the hardiness and productiveness of the tree make this variety very popular throughout the Northwest. Season, August and September. The cold storage houses are beginning to store it for better prices later in the season. In the severer sections of Minnesota, Duchess has not stood as well as Hibernial or Charlamoff, which are also of Russian origin. In the southern half of South Dakota, Duchess has been extensively planted and is regarded as the best of the old list. It has borne heavily and the trees are standing well in the Station orchard at Brookings, planted in 1888.

CHARLAMOFF. This is No. 262 of the Russian importation and it appears that there are two distinct kinds under the name of Charlamoff. The one here referred to is the one that has done so well in Wm. Peterson's orchard at Wauconia, 30 miles northwest of Minneapolis, where it has proven considerably hardier than Duchess. It is of spreading habit; fruit roundish conical, strongly ridged and ribbed around the cavity or stem end, coloring like Duchess, season a little later, quality much better for eating out of hand. It is rapidly gaining favor with Minnesota fruit growers. The tree is hardy at Brookings.

HIBERNAL. Among the Russian apples are several varieties that closely resemble No. 378, which is called Hibernial. Recumbent or Lieby (No. 240) is one of these. The synonymy of these varieties has not yet been determined. Their value is recognized in the notes to the Minnesota fruit list. Prof. S. B. Green, of the University of Minnesota, writes as follows: "Recumbent, also called Lieby (Russian). — Without doubt the

hardiest of the well tested varieties. The tree is very spreading in habit, and is considerably hardier than the Oldenburg. A rather early and regular bearer and productive. It seldom, if ever, blights severely, the blighting part being confined to the new growth. The fruit is large and colored much like the Oldenburg; rather sour but excellent for cooking, and not to be despised for table use, when fully ripe. Season, late autumn and early winter as far north as Minneapolis, but may be kept until March by a little extra care. Hibernial (Russian).—As it is generally grown practically the same as Recumbent.”

The Hibernial trees in the Station orchard at Brookings are models of health and vigor and bore the past season. It will be especially desirable in the northern part of the state where Duchess is not fully reliable. It is excellent for culinary purposes but is too acid for general table use.

WEALTHY. This well known, large, red, late fall and early winter apple, originated by Peter M. Gideon, of Minnesota, is still a favorite with many fruit growers in South Dakota. It has not proven sufficiently hardy for the test winters in Minnesota, but does well top-grafted on strong growing crabs. It has borne well in many places in the southern part of this state. The Minnesota list recommends top-grafting Wealthy, Longfield and Melinda on hardy stocks. Top-grafting is also called top-working. The best stocks for this purpose are probably Virginia crab and Hibernial. Hence it will be best to plant an extra number of these two varieties in orchard, to be top-grafted later with less hardy kinds. Experiments in this line are in progress at the Experiment Station at Brookings. Most fruit-growers regard top-working on extra hardy stocks as a very promising line of work.

LONGFIELD. A late fall, Russian apple of excellent quality for table use. Color, yellow, with blush. The tree is noted for its very early and profuse annual bearing. It should be top-grafted on some hardy stock for all except the southern part of the state. Wm. Somerville, of Viola, Minn., stated at the December meeting at Minneapolis: “Longfield is very prolific, keeps till December with ordinary care, is hardier than Wealthy and more productive than Duchess and is an annual bearer.” As it is less hardy than Duchess the importance of top-grafting it on

such stocks as Virginia crab and Hibernial should be emphasized.

TETOFKY. A medium sized, yellow, early August apple of Russian origin. An old variety in the Northwest and very hardy but in many localities a tardy bearer. It is more for home use than market.

MELINDA. An old variety from Vermont that has stood well for many years in northern Iowa and southern Minnesota. On its own stem it is very late in coming into bearing. But top-grafted on Siberian or other hardy stocks, it has borne earlier. Of good size, conical, yellow, sweet, late winter.

VARIETIES FOR TRIAL. Of this list, Repka Malenka, Anisim, Yellow Sweet, Christmas, Blushed Calville, Cross No. 413, and White Pigeon are Russian varieties. Patten's Greening is a seedling of Duchess from northern Iowa. Okabena, Peerless, Gilbert and Brett are Minnesota seedlings; Kaump is from Wisconsin. Several in the above list will probably soon be placed on the list recommended for general planting, but another crucial test winter, such as that of 1884-5, will be needed to definitely settle the question.

CRABS AND HYBRIDS.

Of the list given above the three best are probably Virginia, Martha and Whitney. Part of the list are local varieties that have not been widely tested. Transcendent and Hyslop have been discarded owing to severe blight. Virginia Crab is as showy as Transcendent, and larger in size, keeps better, is remarkably free from blight, and a strong grower of spreading habit. It also has a special value as a stock for top-grafting. Martha is of upright habit of growth; the fruit is large, richly colored and is a good market variety. Whitney, also called Whitney No. 20, is of very upright habit; the fruit is large, red striped, of excellent quality.

BROOKINGS REPORT, 1896.

The following varieties fruited the past season in the College and Experiment Station orchard at Brookings, planted in 1888.

Duchess, Getmau No. 225, Borsdorf No. 402, Aport, Ostrakoff's Glass, Patten's Greening, Patten's Duchess seedling No.

4 and Russet No. 1, Skruschapel, Large Anis 413 Dept., Hiberna No. 378, No. 382, No. 6 Vor., Charlamoff, 413 Cross, Arabka No. 257, Babuscheno, Anisovka, Red Anis No. 985, Arthur, Gen. Greig, Okabena, Portwine. Of crabs: Gideon's No. 8, 25, and 28, Excelsior, Lou, October, Lake Winter, Looker's Winter, Spitzenburg, Richland Winter Sweet, Greenwood, Martha, Virginia, Ontario, Transcendent, Hyslop, Early Strawberry, Shields.

Aport bore a good crop of large, red striped apples, season not determined, but probably late fall; tree of open, spreading habit, hardy. Hiberna is perfect in tree and a strong grower. Arthur, a north Iowa seedling, bore a good crop of apples quite small in size but evidently with keeping qualities. Patten's Greening bore a large crop and is hardy in tree; fruit large. Okabena bore a large crop and tree appears hardy. Duchess bore a large crop, tree hardy. Wealthy is hardy in tree so far, but shows some blight.

Of the crabs, Whitney is hardy in tree but a tardy bearer. Virginia did not fruit heavily this year; the tree is a very strong grower and free from blight. Its peculiarly strong forks and spreading habit make it desirable as a stock for top-grafting. Spitzenburg bore a very heavy crop and the fruit has considerable keeping capacity. Greenwood and Gideon's No. 25 bore a very heavy crop. Richland Winter Sweet and Early Strawberry blighted badly. Transcendent and Hyslop blight excessively and should be discarded.

The orchard as a whole is in a thrifty condition.

PROPAGATION OF THE APPLE.

There is considerable discussion as to the relative merits of budded, whole root grafted, and piece-root grafted apple trees. This is mostly a matter of location. In the eastern states the ordinary apple seedlings are hardy, hence trees budded at the surface of the ground on such seedlings are hardy and desirable. But in the Northwest the ordinary seedling apple is tender and will kill out the first severe winter. Hence budded trees are worthless, even though the top may be a hardy variety. It is absolutely essential to get the tender roots, upon which we are compelled to graft at present, as far below the surface as possible.

Northwestern nurserymen do this by using a long scion, *at least* six inches long, and a short root, $2\frac{1}{2}$ to $3\frac{1}{2}$ inches. In nursery the graft is set down to the top bud and, when planting out in orchard, the tree should be set about four inches deeper than it stood in nursery. This puts the tender root far beneath the surface. Another advantage is that roots will start from the scion in the nursery and in time the tree is practically on its own roots. In severe winters nurserymen sometimes experience great losses by root-killing in the nursery—the hardy scion and roots from the scion will be alive, while the tender root has perished. No objection can be raised to whole root apple trees (except the great difficulty, not to say impracticability, of planting such long grafts in nursery), *provided* that the scion is as long as on the piece root grafts,—at least six inches. But this is not the case, the scion usually being made quite short for convenience in planting, and hence the trees have the tender roots too near the surface. There is a difference in hardiness of the apple seedlings used in nursery grafting. Those grown from imported French crab seeds are too tender for use in the Northwest. Those from seeds of Duchess or other hardy varieties would generally give hardy seedlings, but are not obtainable in quantity. The best seedlings obtainable in a commercial way are those saved from cider mills in sections where only northern varieties are grown. At present this seed comes mostly from large seedling cider apple orchards in Vermont.

The method of propagation employed on the northern limits of orcharding in Russia, is to bud on seedlings of the true Siberian crabs (*Pyrus baccata* and *P. prunifolia*). This fact was noted by the writer while traveling in Russia in 1894. Prof. R. Schroeder, of the Imperial Agricultural College at Moscow, informed the writer that the results of budding standard apples on Siberian seedlings was to dwarf them somewhat in size of tree, but to make them bear at least two years earlier. We shall try to determine the value of this method at Brookings. Certainly root-killing is a great source of trouble in our far northern orchards and it may be that the seeds of the pure Siberian crabs may have greater value than has been thought hitherto.

SEEDLING APPLES.

New varieties of apples are produced by raising seeds. No variety reproduces itself from seed, hence varieties are propagated by grafting or budding. We cannot too strongly urge at this time the importance for every one who fruits the hardy varieties at the far north to save the seeds and raise some seedlings to fruiting age. This work is important as it may result in bringing forth varieties superior to any we now have. This line of work was begun at the Station in the Spring of 1896 by planting seeds of a lot of hardy varieties. For next Spring the seed of fully nine barrels of apples carefully selected from the hardiest varieties obtainable, has been saved. The list includes mostly such varieties as Hiberna, Recumbent, Anisim and many other Russians; and also of some seedlings originated in Minnesota, Iowa, Wisconsin and other states. This is a line of work which needs many workers and will surely be productive of good results. Care should be taken to plant seeds of the hardiest obtainable varieties, as hardiness is the first essential on the northern borders of apple culture.*

Experiments have also been begun at this Station in crossing the American and Russian apples and the result will be reported in due season. Several large-fruited sports of the western wild crab are also under trial for similar purposes. Possibly these latter will prove of some value for culinary purposes.

GENERAL NOTES.

The best location for an orchard is the highest land available on a north or north-east slope. The elevation, even if not more than a few feet gives air drainage which equalizes the summer temperature and lessens liability to untimely frosts. A south or south-west slope is the worst location, especially if surrounded by high windbreaks. Such orchards have fared the

* For small lots apple seed may be mixed with moist sand as soon as removed from the apple, put in box or tin can (with holes in the bottom for drainage) and buried even with the surface on the north side of a house or in the open field. If kept dry through winter the seeds should be soaked five or six days in water early in March, changing the water every day, then mix with sand and bury for freezing as before. Plant as early as possible in drills two inches deep. When one or two years old the best trees can be transplanted to permanent position.

worst in the severe winters throughout the Northwest. Free air circulation tends to prevent blight. A close shelter belt on the south and west to prevent injury from southwest winds in summer, is an advantage. On the north no shelter whatever is thought best by very many fruit growers. In very exposed localities where strong winds prevail a shelter belt may be planted heavy enough to break the force of the wind but not to prevent a free circulation of air throughout the orchard at all times. The fruit trees must be far enough away from the windbreak to prevent their being robbed of soil moisture by the latter, and to permit snow banks to form between them. Many small orchards are seen in the West with high belts of cottonwood and willow closely surrounding them; as a consequence the fruit trees are killed from a lack of the water absorbed by the windbreak.

Good fruit can be raised on any land good enough for corn. If the sub-soil is very hard clay near the surface, the holes must be dug very deep, so as to break up the hard pan which the roots cannot penetrate. Subsoiling as deeply as possible the Fall before planting is a great advantage as the loosened sub-soil then acts as a reservoir of moisture for seasons of drouth.

The general tendency is to plant as large trees as possible. This would not be objectionable provided all the roots were obtained in digging. As this is not usually the case, small trees are far preferable for general use. Two-year-old trees will usually be surer to grow than three-year trees, and will soon outgrow large trees set at the same time. The drier the season the greater is the superiority of small trees to large ones. In the Northwest trees should never be planted in the Fall. Our dry winter winds will generally make them dry enough to burn by Spring. If trees are received in the Fall they must be buried in earth, root and branch, in a well drained mellow soil, and the earth covered with two feet of manure.

Plant as early in Spring as the ground is in good condition and set trees about four inches deeper than they stood in nursery. Lean stems south-west toward the one o'clock sun to shade the stem and help prevent injury from sun-scald. Run rows north-east to south-west and plant close in the rows, about fourteen feet and the rows about twenty-four feet apart. This

arrangement makes the trees shade one another on the south-west side of the stem, which is the weakest point, and also gives needed air circulation. The trees should "break joints," so that the trees of one row are opposite the vacancies in the next row. Some of our correspondents prefer to plant trees far enough apart each way to permit growing five or six rows of corn between the rows.

In dry sections it is not advisable to grow any crop in the orchard as the trees need all the moisture. Frequently fine trees are ruined by careless cultivating, especially when trees are set close together. The damage done is far more than the value of the crop. Do not sow small grain, or seed to grass. Buckwheat the first four or five years and then seeding to red clover is regarded with favor by many. If some hoed crop is desired, early potatoes, sweet corn or squash will do, as they do not necessitate cultivating late in the season. Clean cultivation is the best mulch for young orchards. The soil needs aeration as well as moisture. A light mulch of coarse strawy manure or litter of any kind in the Fall prevents severe root killing and is a good practice especially in dry locations and in periods of drouth. Sometimes young orchards suffer severely from root-killing in hard winters with little snow following a dry Fall. That is, the trees, which are not yet well established, go into winter quarters with dry roots and freeze dry. Such trees may be saved by soaking the ground thoroughly in the Fall, and then mulching. Ordinary prairie soil is rich enough without manure for trees for the first few years; as the orchard comes into heavy bearing, manure will be needed to keep up productiveness.

Sunscald causes great loss in north-west prairie orchards. By sunscald is meant the alternate thawing and freezing of the stem on the south-west side in late Winter causing the bark to die and decay. Oftentimes the dead, blackened bark separates entirely from the stem.

Orchardists now generally recognize the cause of the trouble and prevent it by shading the stem in some way. Trees planted and kept with stem leaning toward the south-west until the branches shade the trunk are free from it. Some fruit growers set a board, or two boards nailed together trough-fashion,

on the south-west side; others use corn stalks, wire netting or lath.

Low headed trees are best for severe locations; in more favorable sections trees may be headed two and a half to three feet high. Tall trunks suffer more from sunscald and severe winds.

Prune very little and that in June, when wounds will heal over the same season. A little care in the early years will prevent trouble later on. If possible, do no pruning that cannot be done with a pen-knife. A man accustomed to trimming orchards in the eastern states had better keep his knife in his pocket, unless willing to adopt western methods. Young trees with main stem forked like the letter Y, must have one limb cut off to prevent splitting down later on. Large wounds should be covered with grafting wax to facilitate healing.*

MICE AND RABBITS.

Our correspondence indicates that these are often serious pests. Banking up the trunks in the fall from 12 to 15 inches with earth so as to form a mound with steep sides is a good safeguard against mice. This is easily done and also protects the roots on young trees. The mound should be leveled in the spring. To guard against rabbits it is a good practice to wash the stems in the fall with whitewash, thickened with copperas and sulphur. This wash should be renewed as often as necessary, if washed off by heavy rains. These two methods have long been used by many orchardists in the Northwest. The last few years, however, wire cloth, such as is used for screen doors, has come into favor in several large orchards. The wire cloth is cut so as to lap over and allow for several years' growth; the sheath is set into the ground about one inch, extends up the full width of the wire screening, and is fastened near top and bottom with wire. This guards against both mice and rabbits and has proven inexpensive and effective. The whitewash can be used if necessary above the wire screening on the stem

*GRAFTING WAX :—For all outdoor grafting and for covering cut surfaces the following is a good wax; it is called alcoholic plastic: One pound white resin, one ounce beef tallow, one tablespoonful of turpentine, five or six ounces of alcohol. Melt resin and tallow slowly, take from fire and when a little cooled by stirring, add the turpentine, stirring constantly. When still cooler add alcohol. If the plastic becomes too thick to work well, add more alcohol. For outdoor grafting the plastic is kept slightly warm in a small tin pan set in the top of a cone-shaped tin box with a lamp inside, thus forming a portable heater. The wax should not be warmer than can be applied with the finger.

and main limbs. G. A. Tracy, of Watertown, writes in the *Dakota Farmer*:

"For rabbits I have for the past twelve years used liver, either hog or beef. I take a piece and go through the orchard, rub it on some of the limbs and bodies of the trees, but do not put it nearer than two or three feet of the ground, for fear of the mice, for they will eat it and the bark with it if it is near the ground. I have failed yet to find a single instance where a rabbit has been nearer than four or five feet of a tree so protected. I use tar paper around the trees, or a little earth banked up around them to protect from mice. In using tar paper on small trees I put a stick on the south side to hold the paper a little away from the bark. I have used other remedies, but none suit me so well or is as quickly done as the above."

The use of tar paper in orchards is very generally condemned by fruit growers as it often proves very destructive to the bark, especially on young trees.

Commenting on the above, A. J. Philips, West Salem, Wis., Secretary of the Wisconsin Horticultural Society writes: "I am inclined to give you the benefit of my experience for the past fifteen years, which, if followed, will be useful to many of your readers. Liver, tar paper, whitewash, carbolic acid and Paris green, all fade into insignificance when compared with a good protector made of eight lath woven together with common broom wire, and placed around the trunk of the tree. The length of the lath is to be gauged by the height of the limbs of the tree. This protects against sunscald, rabbits, mice and sheep; plenty of air goes in between the lath. After seven to ten years the tree will fill it full and the bark will be smooth and green under the same, and I never yet have found a borer in a well protected tree of this kind. Banking with earth is a delusion nine times out of ten, as the grower fails to remove it and it remains and sods over with June grass, which soon takes away from the tree all the moisture that falls so that the feeding roots never find it. Protection of this kind is always on and costs half a cent per year. And a tree, when half a cent would save it, I ask, who is willing to lose it?"

If the laths have a tendency to rub the bark they may be kept in place by a bunch of hay stuffed in at the top.

Lawrence H. Hansen, of Viborg, Turner county, S. D., who cultivates corn in his orchard, writes in *Dakota Farmer*: "As I have always cut up most of the corn in the fall I would leave some of the shocks in the orchard during the winter. And although we have, until a year ago, had as many rabbits on the place as I have ever seen on any man's place, still I know I have not lost more than two trees and not one out of a hundred has ever been injured by them. I came to the conclusion, after trying it the first year, that as long as the rabbits have enough of corn to eat they will not touch the trees. And it stands to reason, for we all know that it is only when the ground is covered with snow that they are destructive to the trees and then simply for the want of something better to eat."

Mrs. Laura A. Alderman, the proprietor of the largest orchard (comprising 130 acres) in South Dakota, writes:

Replying to your inquiry as to how we deal with mice and rabbits in the orchard: Our method to abate the mice nuisance is simple but effective. A first essential is to have no litter of any kind against the base of the tree. A mat of grass, for instance, affords a fine nest for them. Let all mulch be raked at least a foot from the trunk and throw a few spadefuls of dirt around the base, mounding it up for the double purpose of protecting the collar of the tree and to protect from mice. In the fall we watch closely for the nibblings of mice on the trees and where this is discovered we put a spoonful of poisoned corn meal in their runway, being careful to have it under some little cover so that birds or chickens may not eat it. To prepare the meal, mix a pint of meal with strychnine equal in bulk to one or two grains of wheat; if dry, powder the strychnine finely and mix thoroughly; if used wet, dissolve the poison in water enough to make a stiff dough of the meal. We keep a can for this work carefully put where no careless hands will reach it; remember it is a most deadly poison. The mice should be destroyed in the fall and early winter, as, after snow comes they will do their most destructive work under cover of the snow. If this has been neglected tramp the snow firmly around the tree to prevent their reaching it.

The rabbit pest is more formidable. Mr. A. J. Phillips' plan to protect the body of each tree by a girdle of lath woven together with copper wire, the wire being left long enough to wrap around and keep the girdle in place, is warmly commended by leading orchardists, protecting from both mice and rabbits, but many trees are headed too low to protect from the ravages of rabbits by this method. The veteran J. S. Harris, of Minnesota, than whom no one in the north-west is higher authority on matters horticultural, thinks a woven wire fence around the orchard to shut out the rabbits, is the solution of the problem, and the expense of this need not preclude its adoption for the ordinary

farm orchard. One could also by this method confine the fowls in the orchard, or out, at pleasure—a decided advantage.

A good plan is to smear the trees with blood or a piece of liver, as the rabbit is a dainty little animal and will avoid all trees so treated. But our main reliance is to induce hunters to frequent the orchard, a moonlight evening being the best time to hunt rabbits; and they fall an easy prey to the ordinary box trap that almost any boy knows how to make, set with a "figure 4." We have them scattered where the rabbits frequent and set them at night, baiting with corn or a piece of cabbage, and the men bring in from one to a half dozen every night. Luckily, but few seasons are so prolific of these orchard foes or we should indeed find that eternal vigilance is the price of orchards.

LAURA A. ALDERMAN.

Hurley, South Dakota.

BORERS.

Considerable damage is sometimes done by borers, especially the flat-headed apple tree borer. Although thrifty, well established trees are not exempt, newly transplanted or sickly trees suffer most, especially on the south-west side of the stem where the bark is often first sunscalded. Indeed, one large orchardist in northern Iowa claims that sunscald is mostly, if not entirely, the work of borers. Alkaline washes are repulsive to these insects and will prevent them from laying eggs in trees protected by such washes. Prof. William Saunders writes in his work on "Insects Injurious to Fruits:" "Soft soap reduced to the consistency of a thick paint by the addition of a strong solution of washing-soda in water is perhaps as good a formula as can be suggested; this, if applied to the bark of the tree, especially about the base or collar, and also extended upward to the crotches, where the main branches have their origin, will cover the whole surface liable to attack, and, if applied during the morning of a warm day, will dry in a few hours, and form a tenacious coating, not easily dissolved by rain. The soap solution should be applied early in June, and a second time during the early part of July. * * * All trees should be carefully examined early in the fall, when the young larva, if present, may often be detected by the discoloration of the bark, which sometimes has a flattened and dried appearance, or by a slight exudation of the sap, or by the presence of the sawdust-like castings. Whenever such indications are seen, the parts should at once be cut into with a knife and the intruder destroyed."

A flexible wire can be used where the insects cannot readily be reached with a knife. Some orchardists add a little carbolic acid to the soap solution to make it more repulsive to the borers; others use strong soap suds; others rub the bark with soap during June or July, or place cakes of soap in the forks of the trees so that rains will dissolve the soap and wash it down on the trunks; still others whitewash the trunks instead of using the alkaline wash.

CLIMBING CUTWORMS.

At the Experiment Station last spring some damage was done to newly planted apple trees by climbing cutworms which destroyed the young buds and leaves at night. The ravages were stopped by smearing raupenleim on the trunk near the ground. Many of the worms were dug out of the ground near the base of the trees where they were in hiding during the day. The trees can be jarred at night and the cutworms caught upon sheets spread upon the ground. A cone-shaped piece of tin or zinc tied close around the stem, will prevent the worms from crawling up.

PLUMS.

The culture of the wild plums of the Northwest is one of the most profitable branches of fruit growing; and South Dakota fruit growers will do well to turn their attention more in this direction than they have in the past. The market is never overstocked with good plums. Even wild plums, picked up indiscriminately in the plum thickets found in many sections of the state, bring fair prices, while the improved varieties such as DeSoto, Wyant, Rollingstone, Wolf and Forest Garden bring much better prices that amply repay the grower. The rapid development of our native plums during the past quarter of a century forms an interesting chapter in the history of our prairie horticulture. It brings out prominently the fact that in the native plum of the Northwest, known botanically as *Prunus Americana*, we have a species with great possibilities for development, and that during the next thirty years we will very likely

obtain varieties fully equal in size and quality to the choicest European and Japanese plums.*

At the state fair at Sioux Falls one of the leading fruit growers stated that he had sold several hundred bushels of wild plums of the crop of 1895 at very remunerative prices. The ease with which good plums are grown and high prices obtained, has caused many to plant largely of the varieties generally recommended by the horticultural societies of the Northwest. And in many cases only failure has resulted. This has caused many pessimistic prognostications as to the horticultural future of the state. The cause is easily understood and easily remedied. The foundation has been neglected. That is, the root or stock upon which the tree was budded or grafted was tender and killed out the first hard winter, leaving the tree to die. In the nursery the stocks generally used for budding and grafting the plum are Myrobolan, Peach, St. Julien, Marianna, and *Prunus Americana*. Myrobolan and St. Julien are wild European plums annually imported in immense quantities from France, and extensively used in nurseries east and south. Our hardy native varieties budded on these stocks make fine trees for the nursery, but the union is not a good one and the roots will kill the first hard winter, leaving the hardy top to die. Hence such trees are absolutely worthless for South Dakota.

The Marianna is a native of Texas, and botanically is said to be a hybrid between some southern plum and the Myrobolan. It has come into great prominence in southern nurseries in the

*This work of development will be done partly by repeated seedling reproduction from the choicest native varieties we now have, and partly, perhaps, by hybridizing with the best European and Japanese plums. This work has already been started at the Station by saving a large quantity of pits from the first and second premium plums from the 1895 state fairs of Iowa and South Dakota. Many pits were obtained at the same time from the hardiest and best Russian, West European and Japanese plums. Many more pits were saved in 1896. The resulting seedlings will very likely give a goodly number of desirable varieties, especially as the fruit was grown in mixed orchards of choice varieties, and will furnish good material for work in crossing and hybridizing. The Station at this time urges upon the farmers of the state to be on the lookout for choice varieties in the wild plum thickets. Somewhere in the state there must be growing a wild plum tree with fruit larger and better than all the others in the state. That is the tree the Station desires to obtain for propagation. At present we are on the track of several such trees in various parts of the state, but are by no means satisfied that we have found the right one. Hence the co-operation of farmers and of all who grow fruit, is invited and urged. Specimens of the fruit can be sent at small expense by mail, in order to determine the relative size as compared with varieties already growing on the Station grounds.

past few years as a plum stock owing largely to the fact that it grows readily from cuttings. All American and European plums appear to unite readily with it and make fine trees in the nursery. With the present experience we are not prepared to condemn absolutely this stock, but certainly regard it as very unsafe to use even in the southern part of the state.

The peach is popular as a stock further south, but is only valuable for the southern wild plums of the Wild Goose type. As all these are tender in this state, we certainly advise against the use of trees on peach stock.

The apricot has been used by some nurserymen; also some of the Chickasaw plums of the far south, but all such trees are also unsafe for planting at the north.

The only reliable stock for our hardy northern native plum is the northern native plum itself (*Prunus Americana*). Some object to the sprouting tendency, but the sprouts are easily kept down by cultivation. As the orchard comes into heavy bearing the vitality of the tree will go to forming fruit and the sprouts will cease to be troublesome. The pits to be planted for growing stocks for budding and grafting should be grown from large fruited trees and not picked up indiscriminately in the woods. To describe fully the method of budding and grafting would make too long a story for the space available at this time. Suffice it to say that our choice native varieties, such as Wyant, DeSoto, Wolf, Rollingstone, Stoddard, Hawkeye, Rockford and Forest Garden, if budded or grafted on this stock, will make long lived, hardy and fruitful trees, which will be a source of profit and satisfaction to the owner.

This is only a partial list and might be considerably extended. The main problem now is to reduce the list to the best few. Each plum grower has his favorite and the fruit tables of our state fairs teem with many varieties. However, those mentioned are all desirable and worthy of our attention. Of these, the Wyant, Rockford and Stoddard are natives of northern Iowa, Wolf of southern Iowa, Hawkeye and Forest Garden of west central Iowa; DeSoto of western Wisconsin; and Rollingstone of Minnesota. Who will be first to bring out the future South Dakota plum to distance all these in size, quality and fruitfulness? Here is truly a promising field for fruit growers, old and young.

It may be that our native sand cherry (*Prunus pumila*) will

prove a desirable dwarf stock for the native plum. It has a dwarfing tendency as to size of tree, but causes earlier bearing. A recent extended experiment at the Iowa Agr. Exp. Station* shows that the sand cherry is a promising stock for the plum, but it is too early to make definite statements as to longevity of tree, and continued productiveness. This line of experimentation has been begun at the South Dakota Station.

Trees of the desirable native varieties can often be obtained on their own roots. Such trees are very valuable as the root is then equally as hardy as the top, and all suckers from them will bear the same fruit as the original tree. These suckers or root-sprouts should be carefully taken up early in the spring with a crosspiece of the main root from which they grew. If poorly rooted they should be grown in nursery row for a year or two to get a better system of roots. The question is often asked: "Are the suckers from my plum orchard of choice varieties of any value for planting?" If the trees are on their own roots the sprouts will of course bear the same fruit as the tree from which they grow. If the trees are budded or grafted, the value of the suckers depends upon whether they originate above or below the graft or bud. If from above, the sprouts will of course be of the same variety as the top; if from below, their value is uncertain as they will then be the seedling of unknown value. This explains why plum trees of choice but tender varieties which have killed to the ground in a severe winter will often sprout up and bear different fruit.

In planting a native plum orchard be sure to plant several varieties intermingled. It is a great mistake to plant an orchard of one variety only, as fertilization of the blossoms is best effected in a mixed plantation. Indeed, many of our native plums are notoriously unfruitful when planted in a block by themselves. Mixed orchards insure heavy crops.

Plant on any land good enough for corn; rather high land on north slope is best to help guard against untimely frosts. Plant ten feet apart in rows north and south and rows eighteen feet apart east and west. This provides for needed air circulation as well as fertilization of blossoms. Give good culture the first four or five years, after which they may be mulched sufficiently to keep down weeds. Head very low—not higher than two feet;

Iowa Exp. Sta. Bul. No. 22, p. 852, and Bul. No. 28, p. 229, J. L. Budd, N. E. Hansen.

high, exposed trunks are liable to disease. Trim very little, even less than with the apple, and at the same time. Protection is beneficial to give shelter from winds often prevalent at the time of blossoming.

THE STATION PLUM ORCHARD.

The Station plum orchard at Brookings yielded a heavy crop in 1896. The trees were planted in 1888. The newer varieties are of too recent planting to bear fruit. The following varieties bore the best crops. All are on native plum roots.

DESOTO. Crop very large; fruit smaller than Wolf. Tree productive and hardy. One of the oldest varieties, and still regarded as one of the best. Origin, western Wisconsin.

WYANT. Crop very large. Fruit large and best in quality. Tree hardy and very productive. Origin, northern Iowa.

WOLF. Crop very large. Fruit large and of excellent quality. Tree hardy and very productive. Origin, southern Iowa.

FOREST GARDEN. Crop large. Early, of good size and fair quality. Tree hardy and very productive. Its tendency to split down in the forks under heavy bearing is an objection. Origin, west central Iowa.

ROLLINGSTONE. Crop very large. Fruit of excellent quality, smaller than DeSoto. A native of Minnesota.

ROCKFORD. Crop very large. Fruit excellent in quality; size not up to Wolf or DeSoto. Origin, northern Iowa.

HARRISON'S PEACH. This plum is only a moderate bearer, but the fruit is large and of best quality. As large as Wolf but more oblong.

BURBANK. A Japanese variety, top-grafted in the spring of 1894 on native plum of bearing age, has made a strong growth and bore a few specimens the past season. The writer has no hope of raising Burbank or any other Japanese plums in a commercial way, but intends to use the pollen on native plums and on the sand cherry, also to top-graft in a small way on native varieties.

No varieties of the Wild Goose type, such as Wild Goose, Milton, and Charles Downing, have proved hardy here. Nor are any of the Miner type desirable. The Miner itself is too late in season; the tree is a strong grower but is unproductive and not sufficiently hardy.

OTHER FRUITS.

CHERRIES. Cherries are as yet in the experimental stage. The writer is not prepared from the evidence at hand to recommend any list of cultivated cherries for general planting in this state. The general experience is unfavorable. In the southern part of the state several of the older varieties, such as Early Richmond, have fruited well at times, but this experience is not reliable as a guide for the northern part. Some of the Russian varieties from the Iowa Agricultural College are standing well and have fruited at Brookings but no definite report can be given at present. Cherries are entirely omitted from the Minnesota fruit list. One great difficulty with cherry culture is the tender imported Mahaleb and Mazzard stocks upon which we are compelled to bud and graft at present. This causes trouble from root-killing in severe winters. A hardy stock may be found in the Wild Red cherry (*Prunus Pennsylvanica*), a native of this state, but further experience is needed and the plants are not obtainable in commercial quantities. For the present, root-grafting at the collar on Mazzard seedlings, using a long scion, five or six inches, is best, as it puts the tender root further beneath the surface and the tree has a chance to emit roots from the scion, and these roots will soon sprout. If these trees are set deep in the orchard, from four to six inches deeper than in the nursery, they will in time be practically on their own roots, and if the variety is hardy, the sprouts from the roots emitted by the scion will be valuable for planting.

In time we will probably insist on planting the hardy varieties on their own roots to avoid trouble from root-killing. Knowing that cherry trees are grown on their own roots in the province of Vladimir, east of Moscow, Russia, the writer imported nearly forty pounds of cherry pits of the Vladimir type from Moscow in the fall of 1896. These cherries come very nearly true to seed and are of good size and quality. The pits are now stratified in sand and will be planted in the Spring. Time will be necessary to determine their value.

A dwarf cherry, presumably of this type but more southern in origin, is grown among the Russian Mennonites in Cottonwood county, south-western Minnesota. Some trees of this variety were planted at the Station last spring. Possibly it may be found in some of the Russian settlements in South Dakota.

No definite statement can at present be made as to cherry culture, except to exercise caution and to await further developments. The prospects are that in time cherry culture will be extended considerably north of its present limit.

GRAPES. In favorable locations the Worden, Concord and Moore's Early, and in unfavorable locations, Janesville, are among the best varieties. All should be laid down in the fall and covered with earth with a mulch of coarse manure over the earth covering. Considerable trouble has been experienced in some parts of the state from root-killing. This can probably be obviated by grafting on wild grape roots.

SMALL FRUITS. Of red raspberries, the Turner, Marlboro, Cuthbert; and of black raspberries, Older, Nemeha and Ohio are among the best varieties. All should be laid down in autumn and covered with earth for winter protection for best results.

The experience with blackberries appears to be very limited. Winter protection the same as for raspberries is essential. Ancient Briton has been found to be the best variety for this purpose by growers a little further east. Further trials are needed.

Currants and gooseberries are easily grown and are perfectly hardy without winter protection. Of currants, Red Dutch, Victoria and White Grape are three of the best varieties. Of gooseberries, Houghton and Downing are best for general planting of all the well-tested varieties.

Strawberries are easily grown. If the home garden can be irrigated it will insure a good crop in dry seasons. Warfield and Crescent fertilized with alternate rows of Beder Wood are among the best of the well-tested varieties for commercial planting.

NATIVE FRUITS. Of fruits native to this state the dwarf Juneberry, sand cherry, buffalo berry, gooseberry and several others have attracted favorable attention and are cultivated to some extent in many parts of the state. It is a fact that in the wild fruits of South Dakota we have the foundation for a great list of hardy and choice fruits. The native cherries, plums, grapes, currants, gooseberries, strawberries, raspberries, Juneberries, etc., can doubtless be bred up to equal in size and quality the cultivated varieties. The wild fruits are already superior in hardiness as the summers and winters of many centuries

have fully acclimated them and weeded out individuals of insufficient vigor. This work of plant breeding is slow work and should be hastened whenever possible by crossing with cultivated varieties. This breaks up the fixity of type by introducing new elements of variation. But pure seedling reproduction should not be neglected as crossing and hybridizing do not always introduce desirable variations and sometimes cause a lessened degree of hardiness. Experiments along both lines have been begun at the Station, but a series of years will be necessary to give definite results.

Reports from Fruit Growers.

In recognition of the fact that South Dakota is a state of large size and that local conditions modify the fruit list to a considerable extent, it has been deemed best to include in this bulletin some reports of experience in fruit culture from various parts of the state. The reports were made in reply to letters of inquiry, and the Station assumes no responsibility for the opinions advanced or for the recommendations made. The experiences in some cases are of too recent date to serve as a safe guide, but the reports all deserve to be placed on permanent record as a valuable contribution to the horticultural history of the state. Fruit growers throughout the state are requested to send to the Station reports of their experience to be used in the preparation of a second bulletin.

REPORT FROM TURNER COUNTY.

4,000 Bushels of Apples in 1896 in the Alderman Orchard.

Replying to your inquiry of late date, asking for facts about fruit growing in South Dakota gleaned from our experience, I fear it will be disappointing, as we have not kept exact data, and, except for the first few years, have done little experimenting. Having to pioneer our own way in that early day, back in the 70's, we tested many varieties of the apple, grape, plum and the smaller fruits, with the result that we learned a good deal of what NOT to plant. First and foremost, the most costly lesson learned was to let alone that large class of semi-hardy apples, such as Haas, Plumb's Cider, Fameuse, Walbridge, Red Astrachan, Ben Davis, etc., etc. It is, however, a lesson that most planters insist on learning for themselves; and, so long as the people refuse to use the same quality of sense in the matter of tree planting that they do in other business transactions, so long as they are the willing victims of the itinerant tree vender with his unbounded confidence in his own ignorance, just so long will they add their testimony on the negative side, on the question of Dakota's adaptability to fruit raising. More than 4,000 bushels of apples of the finest quality, cherry trees liberally loaded with fruit, and all the small fruits in abundance, raised on the Alderman fruit farm in the season of 1896, furnish an object lesson in the affirmative that cannot be successfully denied.

Our object in experimenting was to find a few good sorts that would warrant our planting extensively for a commercial orchard; and, having found them, we have done little for the cause of horticulture since,

I fear. Having settled on the Wealthy, Duchess and Whitney No. 20; and, for crab varieties, Briar Sweet, Virginia, Minnesota, Early Strawberry, Orange, Chickasaw and a few Hyslop and Transcendent, we planted with all the enthusiasm of inexperience, until the major part of a quarter section was covered. Since then we have had little time to conquer new worlds, having abundant scope for our energies in keeping this particular part of the world conquered that we had covered. We have, however, no reason to regret that we put our faith in the sorts named, although the Wealthy has been a shy bearer up to date, especially on upland in dry years, as it, more than any other of our varieties, is susceptible to drouth. But it is a peerless apple and in the southern half of the state should be in every orchard.

An apple that is deserving of more than a passing notice is Patten's Greening, and more especially as it is by far the best keeper among the good apples that we have fruited. The warm winter of 1895-6 allowed many of the half dead sorts in our experimental ground to bear their fruit, seemingly to emphasize their unfitness for Dakota planting. The Haas bore well, and indeed, in the extreme southern part of the state where the influence of the great river makes possible the growing of many sorts of apples and other fruits not adapted to less humid parts of the state, the Haas is a profitable apple to plant.

Having planted one hundred trees of the Fameuse some fifteen years ago, we this year harvested several bushels of fruit from the relics of our misplaced confidence. Even a lone Ben Davis set a solitary apple, that never reached maturity, on a side shoot from the dead parent tree, and many Walbridge fruited moderately well on the north side. And speaking of this north side fruiting brings me to the weakest spot in our fruit tree raising, viz: The injury done to the south-west side of the trunk by the sun. The north side is always heaviest with fruit, which tends to lean the tree in that direction, still further exposing it to injury. Our remedy is to lean the tree to the south-west in planting, but nature tends to counteract that. But low heading we also practice, which seems most effective. But in a small orchard I should nail together two thin boards, trough-fashion, and fasten on south and west of the tree trunk. The Virginia crab seems to be the only tree entirely proof against this injury and top-grafting on Virginia crab stock may solve the problem of a long-lived tree for our north-western prairie land. But given the Virginia trunk, denuded of the low spreading branches of the Virginia top, which protect it, and it may not stand the test.

But to return to the orchard of which you ask. We commenced planting about eighteen years ago such varieties of fruit as were promising new sorts then. Rollin's Russet, Rollin's Prolific and Elgin Beauty were prominent among them. Their dead and dying stumps now refuse to furnish shade in the cow pasture. Our next venture was half successful; there are many fine Briar Sweet; a plat of Whitney with scarce a missing tree; and several Chickasaw crabs that have not yet borne themselves to death, although they lead all others in fruit-

ing. This variety fruits in the nursery and in the orchard, annually and persistently. Had I room for just two apple trees, one would be a Duchess, the other a Chickasaw crab.

Fine specimens of Wealthy, Duchess, and Virginia crab are also in this older orchard; but wide gaps are not infrequent, showing where the semi-hardy varieties of Illinois, Iowa, and the middle western states, went down. We perhaps never did a wiser thing than to dig out, root and branch, several hundred Walbridge a few years after planting, as fine a looking young orchard as one could find in any country, but the years have emphasized the wisdom of that heroic method of disposing of them. Not a single Walbridge up to date has returned an equivalent in fruit for the cost of caring for it.

By this time we had learned the lesson that all who succeed here must learn. Plant only the few tried and tested old sorts for your main orchard, and do your experimenting in a small way. Of the last hundred acres of orchard planted by us, I can still verify what I wrote of it several years ago, viz: That in a trip through Michigan and the northern middle states I saw no orchard showing a less per cent of dead wood.

As to fruit produced the orchard has not met our expectations. It had reached the 1,000-bushel mark in the season of 1892; then came those years of drouth when the failure of the apple orchards of the entire northern states was unprecedented. The trees were never so full of promise as in the spring of '94, when a furious little hail storm scarcely wider than the orchard in extent, stripped them of their buds on north and west. Enough were left, however, to make a good crop, and then came the night of May 17th, memorable among fruit growers. The season had been extremely early, and all fruits were well advanced; apples, plums, cherries, grapes, all were frozen solid, except in a few sheltered nooks. A similar disaster, differing only in degree, but of so frequent occurrence as to be practically as fatal to fruit, marked the succeeding May; but little promise had been given that it would be a fruit year. These years each gave us a few hundred bushels of apples on trees that were sheltered, but yet had "atmospheric drainage." As a fruit grower I have learned to dread "lovely spring weather" and to welcome a cold and backward March and April.

We now have more than seven thousand trees in orchard, about two-thirds of them having fruited. We find that of the standards the Duchess heads the list for early and continuous bearing, with the Whitney a good second, while with the Wealthy it is a feast or famine. I must not fail to warn all orchardists in our dry climate against seeding down orchards to any of the grasses, but especially to blue grass, as it appropriates to its own use the moisture vital to the life of the tree. Beautiful the velvety lawn undoubtedly is, but it has no more place in your orchard than in a corn field. We have seeded much to red clover but on the high ground we still cultivate with a disc in the early summer and look with a good deal of complacency on the after growth of weeds that cover the ground to catch and hold the winter

snow. We only wish that the older plat of orchard that is "nicely seeded down" was in as good condition, though it looks vastly prettier. A little poisoned meal will do for the mice; put it under grass or litter where they frequent. Eternal vigilance, supplemented by a dog and gun, seems to be the only rabbit exterminator.

The directions, how to care for an orchard, are of the simplest: Keep grass and litter away from the trees: corn is allowable as a crop for a few years but never small grain, except buckwheat. Cultivate as you would corn but not later than the first days of July, to enable the wood to ripen before winter. Have a loving regard for your trees, look them over for insect pests, etc., not even a cottonwood will thrive under an organized system of neglect. Prune but little, and that little in the spring or in June, and while the twig to be removed is still a twig.

My article is far too long already and I will merely touch on the subject of small fruits. The last few seasons have been disastrous to the strawberry beds, thus emphasizing the need of irrigation. Said I to the oldest and most successful grower of small fruits in Minnesota last spring: "After all that you can say for the new strawberries, we have found nothing so satisfactory for a bed as the Crescent fertilized by the Wilson." "You never will," he promptly replied. No one claims it to be the best flavored, but it is a good berry, enormously prolific, and adapts itself to most soils.

The currant and gooseberry are so easily grown as to scarcely need mention. The currant needs shelter from strong winds or its pendulous fruit will be whipped off to some extent. Dust with white hellebore if the currant worm appears.

Finally, remember that the secret of success in fruit farming, as in all farming lies in *thorough cultivation*.

Laura A. Alderman.

Hurley, S. D., Dec. 4th, 1896.

REPORT FROM LAKE COUNTY.

Yours of Nov. 16th was duly received. When I first began to plant fruit trees here twelve years ago, I did not have much faith in apples, consequently I started only a few of the best known varieties: Duchess, Wealthy, Tetofsky and the Antonovka; of crabs, the Transcendent, Martha and Whitney No. 20. Since then new and old varieties have been added every year.

Of the first planting, which were all started from root-grafts, all are yet growing, except a couple of Duchess. The Transcendent has borne the most fruit, and Martha the most blossoms but least fruit, although the trees are thrifty. The standards are just beginning to bear; the Wealthy has made the best growth, and is, I think, the most promising. All have so far been free from blight, which I believe to be due to the clean cultivation they have always had. I made a mis-

take in setting the grafts too shallow; the scion had no chance to strike roots.

Of the later plantings Hibernial and Patten's Greening of the apples, and of crabs the Virginia, and Briar Sweet, seem the most promising. The Hibernial family ripens wood and foliage earliest in the fall; they will no doubt stand better here than the Duchess. Longfield and Melinda have also done well so far. For vigor of growth and early bearing nothing equals the Virginia crab.

Some of the older settlers around Lake Madison planted orchards seventeen years ago, and where the ground has been kept from going back to sod the trees have, in most cases, borne several good crops and are yet in fair condition. The blight is everywhere present and is doing considerable damage, but sunscald has killed more bearing trees than blight, cold or drouth. This should not be so, as it is easily prevented by heading the trees low or shading the body from the hot rays of the sun. Among the large apples in those orchards the Wealthy stands remarkably well, and the fruit it produces in this part of the state is rarely equaled. This fall I saw young Wealthies bending under the load of large perfect fruit, better than Duchess, in Lake and Minnehaha counties. The Haas has done well on Lake Madison. Of one hundred trees set in one orchard (including several varieties) seventeen years ago and soon left to take care of themselves, only two Minnesota and a few Wealthy are now alive. The Minnesota has borne fine crops of excellent little apples; it seems very free from blight. The Transcendent and Orange crabs are too much subject to blight to be worth planting.

The first orchards were generally planted in the warmest, best sheltered sites, and were soon overgrown with roses and grass, and then the large trees brought from the east had a tall bare body that never got any protection from the hot rays of the sun. Although the first plantings are by no means a failure, we may reasonably expect much better results from the later plantings, when we set low headed trees of the best adapted varieties on the highest ground and apply clean cultivation, which in this locality has proved a good preventive of injury by drouth.

The hardiest native plums are right at home with us; the best varieties never failed to bear a good crop except in 1895, but to grow them successfully good cultivation is even more necessary than for the apples. The worst enemy to the plum tree here appears to be the web worm (*Lyde spoliata*) which, if unchecked, often devours every leaf on some trees. It has cost me less than a cent per tree to rid them of this insect by removing the web as soon as it appears. The following varieties have fruited here: DeSoto, Wolf, Forest Garden, Iowa, Early Red (Russian), Cheney, Rockford, Rollingstone, Knudson's Peach, Homestead, Marble, City, Meadow, Bean, Wyant, Hawkeye, Ocheeda, New Ulm, Old Gold, Caroline, Harrison's Peach, Penning's Peach, Stoddard, Dr. Dennis, Van Deman, Champion and Comfort; the last thirteen for the first time last season. Wolf is a little earlier

and averages larger than De Soto, but of only medium quality, tree one of the best and a sure bearer. De Soto too late in some seasons. Forest Garden is not sufficiently hardy, and the oldest trees are failing. The Early Red will not pay to plant. Wolf trees by their side and of same age bore $1\frac{1}{2}$ bushels of fruit while the Early Red did not mature a single perfect specimen last season. Wyant very productive, large and fine, also perfectly hardy. Ocheeda promises well, also Dr. Dennis. Stoddard shows signs of weakness in tree. Comfort pretty late, and Champion too late. New Ulm is perfectly hardy and wonderfully productive of fruit as large as Stoddard, Cheney or Hawkeye, of fine appearance and good quality. Cheney very large and best for canning, but too much subject to the Plumpocket fungus. Rockford is very free from it but the only scabby plum in the list; but it does not show much when ripe and is one of the very best medium early varieties. I have a seedling that was ripe here the 6th of August, two weeks earlier than Forest Garden. I would recommend Wolf, Rockford, Wyant, New Ulm, also Cheney as it often bears a good crop of large fruit. Old Gold is the finest yellow variety I have seen; size medium, quality fair.

Cherries I have tried in a small way; of six varieties sent by Prof. Budd the Bessarabian appears to be the best and may bear some fruit, but the trees are not sound. Eleven years ago I got the Ostheim from Minnesota; they are now nearly dead and have not been profitable. The Wragg on own roots seems the most promising of the lot. One seedling of the South Dakota sand cherry bears fruit of fair to nearly good quality.

Currants have done well here. Victoria and White Grape are good; Prince Albert is the latest in season.

Gooseberries are more variable. Houghton is as good as any. Industry proved a failure and the Red Jacket promises to fail.

Strawberries can be successfully raised only by irrigation. Crescent and Beder Wood are as good as any I have tried.

Some years ago I had fifteen varieties of grapes growing; nearly all fruited; now all are grubbed out as they did not pay for the work.

I also had the job of grubbing out an acre of black raspberries after bearing one crop,—cane rust the cause. Red raspberries stand better; Turner will do to plant for home use, where snow will drift in and cover them in winter.

A. NORBY.

Madison, S. D., Dec. 1, 1896.

REPORT FROM McCOOK COUNTY.

Yours of the 7th received. I fear there is but little, if anything, in my experience here in growing fruits that you can use to help others, because, 1st, the situation of my orchard is on the shady side of a natural timber gulch, having nothing in common with the orchard

sites of our prairie farmers, and 2nd, but few of my trees have come into bearing long enough to judge of their value.

In the spring of 1886 I planted one hundred trees from the Jewell nursery, mostly Duchess and Wealthy with a few of my favorite non-blighting crabs: also about seventy-five Russian apple, pear, cherry and plum trees from the Iowa Agricultural College, leaving the selection of varieties entirely to Prof. Budd. The following spring I received about sixty more Russians from Prof. Budd, and planted them with the others. The only thing of value I can recall in the first year's history after planting is that every tree that lived through the first season but failed to make a vigorous growth I sawed off close to the ground the following spring and let it come up again from the root, thus securing a good stem and a good growth afterwards. All of the new stems came from the graft but one. You ask about blight. I have had no blight whatever.

Four years ago we got a few Duchess and Wealthy apples. The next year we had all we could use at home of Duchess, Wealthy, Titovka, Antonovka, Large Anis, and a few of the other Russians. The next year a hail storm in May destroyed a crop of fruit all over the orchard, and this year we lost almost everything up there by the extraordinary successive frosts of the latter part of May.

The general condition of the orchard is good and whenever we have a good fruit year I expect to be able to report on quite a number of varieties of apples and pears. Cherries and plums of the Russian sorts are all failures in this orchard. Pears are all right in tree. Am only waiting to see what the fruit is to be. Of the Russian apples that have fruited, I think most of the Titovka (Titus). The Antonovka is a good tree, and the fruit is large and handsome, but with me it is only an early fall apple, but a trifle later than the Duchess. Possibly on a heavy soil with a right elevation and exposure it may be later.

My plat of the orchard and list of varieties were burned with my house in March, 1893.

I have a great many good native plums, but nothing better than the DeSoto *for profit*.

My little vineyard has about twenty varieties. Concord, Delaware, Worden and Janesville have given the most fruit.

Red and White Dutch, Victoria and Prince Albert currants and Houghton gooseberries have been steadily profitable in all these ten years.

Our native sand cherry is all right if one will pay enough attention to it to weed out the poorest sorts and propagate from the best intelligently.

Yours Truly,

OLIVER GIBBS, JR.

Ramsey, S. D., Nov. 12, 1895.

Under date of Oct. 4, 1896, Mr. Gibbs reports a good crop of fruit and expresses his desire to have the lost varieties identified as soon as practicable. Of the many new Russian varieties

Mr. Gibbs was able to identify with certainty only the Antovka, Titus and Yellow Transparent.

REPORT FROM CLAY COUNTY.

I will try to give you something of a report on fruit culture as you request. We began here some twenty-five years ago (though we had a small orchard before that) and now have on our list 128 kinds of apples and crabs (besides some we have lost entirely and scratched the names off). About thirty on this list are not yet old enough to show what they will do. Only a very few have proved worthy of planting so far. Among the most profitable we would name the Duchess, Wealthy, Haas, Westfield Seek-no-Further, Walbridge, Utter's Red, Perry Russet. The last two inclined to be shy bearers. Fameuse, a good bearer but short lived. Ben Davis and Rawle's Janet planted twenty years ago died down after six or eight years and sprouted up; and, by leaving three or four sprouts headed very low, are now bearing well. Some of our neighbors are succeeding well with Wolf River; we have not tested it thoroughly.

Mr. Collar, on hilly land, thinks there is nothing like Yellow Transparent, while with us, on rich black loam, it is worthless from blight. Nearly all kinds blight more or less with us, especially Russians and crabs. The Hibernial is a fairly good tree, but the fruit is very poor. The Golden Russet is hardy but the top blights badly and is a shy bearer. Baldwin, and a number of new kinds, among them Peerless and Fameuse No. 1, are very promising.

Of plums we are raising mostly Miner, Forest Garden and DeSoto, though trying some thirty or more other kinds, among them the Lombard and Imperial Gage, which occasionally bear a good crop, doing best on wild plum stock. Plum trees may be planted according to varieties 12 to 20 feet each way. The Miner plum makes a very large tree.

Plum trees should be cultivated two or three years at least, and must be cultivated or mulched thoroughly, especially in dry seasons, or they will not pay. If the mulch is coarse manure, all the better for the plums. Apples may be treated much the same only very little manure should be used on rich ground, and the orchard may be seeded to clover and used for hog pasture after the trees are well started. We have used rye for hog pasture in orchard but the apples are rather small in that lot; we have sowed oats and cut for feed, and think that is better than seeding with grass.

Yours Truly,

A. CARPENTER & SONS.

Vermillion, S. D., Jan. 12, 1897.

REPORT FROM YANKTON COUNTY.

I presume you want a general outline of my experience with all fruits I have raised in the state. While in Kingsbury county I did not raise anything to speak of except plums and small fruit for the

reason that the extended drouth prevented it. I did, however, have a few Transcendent, Hyslop and Whitney that survived and bore some. For hardiness and value for that vicinity they rank in the order named. I can say that these trees stood the drouth and survived longer than the soft maple, cottonwood and box elder. Remember, I attribute our failures in fruit culture in that section (west Kingsbury county) almost entirely to drouth. In plums, I fruited the De Soto, Forest Garden, Wolf and wild seedlings. In value and productiveness they rank as named. The DeSoto, on its own roots, I consider the best all around plum for South Dakota on account of its extreme productiveness and its ability to endure drouth and cold. My De Soto trees at Esmond have not missed a crop for the last nine years with no special care, and it has been so dry that some years they did not make an annual growth to exceed two inches.

In small fruits thecurrants paid far the best and were very remunerative until about 1894 when they finally succumbed to the drouth. The strawberries, raspberries, etc., had gone before them. The currants, for productiveness and general value, ranked as follows: White Grape, Victoria, Red Dutch, White Dutch, Cherry, Versailles and Long Bunched Holland. The Black Naples did very well and bore heavily so long as we had wet seasons, but failed when it became dry.

In regard to varieties suited to this section see my catalogue which I send by this mail. The varieties I have listed I consider of value in this section and perhaps as much so as any that are easily obtainable at present. You saw the fruits that were on exhibition here at the fair and have an idea of what they are growing here. In apples the Duchess and Wealthy are about as profitable as any. It is hard to tell just what varieties are best. Mr. J. A. Pierson, of this place, has a few trees of the Jeneton, that bear immensely and are as healthy looking trees as any I know of. I know of several places where the Ben Davis is doing first-rate, and I think it is generally profitable in this section.

The Miner plum is very profitable here, but will not go much north of this. I believe clean culture is best for orchards here.

Yours Very Truly,

GEO. H. WHITING.

Yankton, S. D., Feb. 3, 1897.

REPORT FROM TURNER COUNTY.

With us the season of 1896 was a great apple year. To illustrate in part. One orchard had over 1,000 bushels of apples from about 300 trees. The Alderman orchard (of 7,000 trees or more) had over 4,000 bushels from part of the trees in bearing. One man raised fifty bushels from less than twenty small trees. Another neighbor had barrels of apples from each tree of a few good sized Wealthy. Still another had wagon loads from about a dozen large Duchess and Wealthy. But they are the only trees I know that have fifteen or more years' standing. My own orchard did well, but is too young to be fully

in bearing. And so on all along the way; where trees were old enough to bear they were literally loaded.

While small fruits in general yielded the poorest crop I have ever seen, the Russian Mulberry, however, gave a most abundant harvest. (And it is fast becoming a favorite fruit in this locality.) Our winter of 1895-96 was unusually mild, so much so that at different times some shrubberies would be almost green, whereupon they would freeze, sap would again start and freeze, till it was too much for even our hardiest gooseberries. But the Mulberry tree is the latest to leave out and the slowest to start sap; consequently it was not affected, as its sap was not lured out, as in the others. I can now comprehend why this tree, although from a warmer climate, will do so well with us.

I cannot conclude without referring to the mischief of the rabbits. Would simply state: If any man thinks more of his young apple trees than of his corn, let him give his rabbits all they want to eat. While we have so much snow this winter I feed my rabbits as attentively as any domestic animal on the place. I find it pays.

Yours Very Truly,

LAWRENCE H. HANSEN.

Viborg, South Dakota.

REPORT FROM CODINGTON COUNTY.

DEAR SIR.—In 1881-2-3 I planted about 175 apple and crab trees. Not knowing what kinds to plant or how to care for them, a good share of them died from root-freezing, top-freezing, sunscald and blight. The winter of 1884-5 was very severe and killed a good many of them. Some sprouted from the ground, lived a few years, and then died. I put no mulch at all around the trees until the summer of 1884. It is a wonder I had a single tree left. Some of the trees that sprouted and lived a short time I dug up. The roots were a complete mass of galls and knots. I did not know at that time what caused it. (See description by Prof. Otto Luggler in Minnesota State Horticultural report for 1891, p. 269.) I have seen the same on the roots of wild roses but never on vegetables. However, I have no fears of any serious trouble from that source.

Of the apple trees planted the first three years, Wealthy, Haas, Tefotsky and Maiden Blush all died from freezing, and a part of all other varieties planted, mostly from root-freezing. In 1892 the twig blight started and soon used up Dartt's Hybrid, Dartt's No. 1, Lake Winter, Orange, Hyslop and nearly all the Transcendent. Dartt's Greenwood crab is the hardiest of all; out of fifteen trees planted only three have died, caused by overbearing and dry weather; no blight. Over bearing and drouth have killed a good many of the Early Strawberry; they blight a little. Milton crab is tough and hardy, bears well every year, is free from blight; fruit of good flavor but rather small. Briar Sweet does very well of late years, the tops killed some during the hard winters, no blight. Hutchinson Sweet is quite hardy; blights a little. Whitney No. 20 sunscalds some, the hot winds of summer are pretty hard on

them; blight a little where near other blighted trees. Minnesota crab has not had a fair trial; I have one tree left which has never borne much fruit; no blight. Duchess does fairly well with good care, they sunscald quite badly and do not seem to stand drouth and hot weather as well as some others. In the spring of 1892 I planted a few Duchess, Whitney and Greenwood; they are doing very well; we had plenty of rain that summer and it gave them a good start.

In the spring of 1894 I planted 240 apple and crab trees; seventy-four of that number were small Russian trees from Prof. Budd; the balance of them from a Minnesota nursery. Of the Russian trees about six or eight have died, they had large roots and small tops. Of the nursery grown trees more than half of them are dead; they had large tops and small roots.

The past two summers have been very dry and hot for young trees, or newly planted trees I should say. Duchess and Whitney suffered most; nearly all died. Hibernial stands the best of all; out of thirty-five trees planted only three have died so far; they have stood the heat and drouth better than the Early Strawberry, Martha or Virginia. A part of the Patten's Greening, Good Peasant and Charlamoff are all right so far.

The small Russian trees I have not had long enough to determine their value.

Respectfully Yours,

G. A. TRACY.

Watertown, S. D., Dec. 30, 1895.

DEAR SIR.—I have not much to report different from last year. My fruit trees did well the past summer. Plum trees have borne a good crop. Apple trees were loaded with fruit, all they could hold up, and some of them I put props under to keep them from breaking down. Currants and gooseberries bore well. Raspberries were a failure; I neglected to cultivate them so they all ran together thick and became diseased. The latter part of summer and fall the canes had purple patches on them caused by the anthracnose or cane rust fungus, some of them nearly covered. I expect to plant a new patch next spring.

Truly Yours,

G. A. TRACY.

Watertown, S. D., Dec. 23, 1896.

It will be noticed that Mr. Tracy's first planting was just previous to the memorable crucial test winter of 1884-5 which proved so destructive to the orchards of the entire Northwest.

Mr. Tracy also gave his experience in the Watertown Kam-peskian of March 22, 1894, from which the following extracts are taken:

"There are now about forty of the first planting left. The ground was perfectly bare. What little snow fell blew away. I neglected to mulch them. If I had taken a little time and

hauled in coarse manure and put around them; I have no doubt they would nearly all be alive now. Of 25 planted since that and mulched and not cultivated at all, every one is alive and growing nicely. The Duchess is the only large apple I have. Five out of sixty planted are alive. It took them a long time to recover after freezing. They have borne some apples every year for the past four or five years. Of crab apples, we have had all we could use and some to spare for the past eight or ten years. Early Strawberry, Dartt's Greenwood, and Milton crab apple trees are loaded with fruit every year. Minnesota and Hyslop crabs are shy bearers, it is only an occasional year that they will bear any. Transcendent trees blight so badly I will cut down what I have left of them. Hutchinson Sweet, the size of Transcendent; Briar Sweet, twice the size of Transcendent—a good apple, keeps but a short time. Whitney No. 20, a good eating apple and a good bearer—size about half way between a crab and a large apple; short keeper. All the above are hardy since I gave them root protection and quit cultivating. I mulched them and did nothing more to them for four or five years, then I put on a little more. I would recommend as the best and hardiest apples to plant here the Hibernial, Duchess and Whitney. Of crab apples, Early Strawberry, Greenwood, Martha, Virginia and Briar Sweet. Plant deep and one rod apart each way. It takes but a short time for a tree to pay for itself after it gets to bearing fruit. After that there is some profit. The best location for fruit is on rolling land and on a northern slope. Have a good wind-break on the south. A single row of ash trees set three or four feet apart on the north and west is sufficient.

The best plum trees for this climate are the native ones cultivated and improved. There are some very good varieties; the DeSoto is the best, but rather late for this country. Some years it fails to get ripe. Wolf is also late. Forest Garden is a good plum and early. There are other varieties that are good—the Rollingstone and Weaver—both hardy and will grow in any location. They want rich ground.

Plums are easier to raise than apples; no blight or sunscald will hurt them and mice will not injure them. Rabbits will sometimes bite off the small limbs, but never injure the body of the trees. I think the best distance apart to set plum trees is

two rows, ten feet apart and eight feet apart in the rows, then have a space of twenty feet, then plant two more rows the same and so on. In that way it gives room to drive a team through. Then mulch and cover the ground completely over, thick enough to keep down all grass and weeds, and don't cultivate at all but keep down all sprouts. The plum tree wants rich, moist land to do its best.

Grapes I have not tested. Of black raspberries I have tried quite a number of varieties. None would stand the winter without covering. When covered they pay well for the labor. Of red raspberries the Turner I think is the only variety that will stand our winters without covering, and they will kill back some, especially if they are allowed to grow thick together. They will then winter-kill quite badly. They have done well with me. The bearing season lasts from four to six weeks. We have a small patch of about one-sixteenth of an acre. We have all we can use on the table during fruiting season; can and preserve lots of them; and sell from eighteen to twenty dollars' worth each year. The best method is to plant in rows six feet apart and three feet apart in rows. Cover the ground with coarse manure, thick enough to prevent all grass and weeds from growing. Keep suckers down the same as weeds.

With strawberries I have not had very good success. They need more care than the average farmer will give. There are more chances of failure than with other fruits. That has been my experience. Of gooseberries, Houghton is hardiest. Downing is more of an upright grower but sometimes winter-kills. Currants are the hardiest and most easily grown of all. There is not one garden in a hundred but what might have all the currants the family could use, but not one in a hundred has them growing. White Grape, Red Dutch for early, and Victoria a little later in season, are the best varieties for this country. Fay's Prolific and Cherry are not worth raising—not productive. If those two were the only kinds I had raised I would say currants were a failure and not worth raising. I have quite a patch of currant bushes. They bear well every year—some years better than others. I have picked from one bush seven and one half quarts and many bushes went from five to six. The bushes were set out in 1883 and '84. They show no signs of decay or old age; are good, thrifty bushes. I don't know how

many we picked last year. We used all we could and I carried to town and sold 150 quarts at 10 cents—\$15.00. Currants, gooseberries and raspberries, when planted in small quantities, I would mulch instead of cultivating. There are but few that will cultivate enough to hold moisture; mulching is better, and less work. * * * It is not advisable to go in too heavy on one thing, but plant an assortment of each variety of fruit that will grow here. Enough for family use and some to spare will be much better than buying for your own use.

Exercise good judgment in buying nursery stock. If you do not you will say in a year or two that there is no use in trying to raise fruit in South Dakota.”

REPORT FROM THE BLACK HILLS.

As requested by you I will try and give you briefly my experience in fruit growing in western South Dakota. In the spring of 1881 I commenced planting some fruit of different kinds. I shipped my plants by mail and at the same time I planted a few hundred apple root grafts; but this was not satisfactory. I lost nearly all of my planting.

Next year I shipped my plants and root grafts by express, but still had very poor success. That which I made grow was nearly all dead the next spring. I tried again next year with nearly the same success. During this time I paid 18 cents per pound in express from Bloomington, Illinois, to Rapid City. So this made it very expensive. I paid \$165 express on one box of trees and plants in the spring of 1883, and they were nearly all dead when I received it. In the spring of 1884 I shipped by freight to Pierre and then by team freight to the Hills, and this time I got the stock through in better shape and made a good part of it grow. But then came another backset: A large part of the stock and plants I had bought and planted were not true to name, and this left me very much in the dark again. However, I will not draw on your patience by telling you all my ups and downs—more downs than ups—but this I must say, it was nearly impossible for me to get stock true to name. Up to and including 1885 I had planted about 25,000 apple root grafts, with an assortment of other stock, and on the 5th of June of that year we had a water spout that washed out nearly all that I had planted. This was my fifth year and I had spent several thousand dollars. Nevertheless I was encouraged by having succeeded with a few apples and crabs and some small fruit; so in 1886 I planted 50,000 apple root grafts with an assortment of other stock. I planted of the tried kinds and experimented with more every year, so I have tried nearly all the apples I have heard of. I have worked more with the apple than with any other fruit, and have now of late years been ex-

perimenting with western fruit, such as is grown in Idaho, Oregon and California.

I can now say that I have succeeded far beyond my expectations. I have about eleven thousand apple trees in orchard. About one-half of these had apples on last year—most of them only a few apples, but some of the older trees had as much as one and one-half barrels to the tree. I raised last year over 1,100 bushels of apples, and we had the least rain of any year in twenty. I fruited last year the following kinds out of forty-two varieties of standard apples in my orchards; I have placed them with relation to their hardiness and value: Duchess of Oldenburg, Tetofsky, Wealthy, Rawle's Janet, Price's Sweet, Whitney No. 20, Haas, Mann, Walbridge, Baldwin, Ben Davis, Longfield, Iowa Beauty, Arthur, Pewaukee, Red Astrachan. These are all standards, except Whitney No. 20, which is a hybrid. All the crab apples do well except the Transcendent.

CHERRIES.—I have five hundred cherry trees in orchard, mostly Early Richmond, some English Morello and Black Tartarian. Early Richmond is the most profitable with me. The birds do not bother them so much as they do the Black Tartarian. I had last year forty-five bushels of cherries. They were fine and sold for good prices, as there were no other cherries on the market when mine got ripe. I can recommend the Early Richmond.

PLUMS.—Lombard is the finest that I have succeeded in fruiting, but it is not exactly hardy—there is very much loss in getting the trees established. DeSoto is an early and abundant bearer and perfectly hardy. I can recommend the DeSoto for this part of the state. There may be others which do better in other parts of the state.

PRUNES.—The Golden Prune, a native of California is the only prune I have succeeded with, and they have fruit buds set, so I look forward to the raising of some prunes this coming summer. They are perfectly hardy with me.

GRAPES.—Concord is the only grape I can recommend, and here with us the season is rather short or nights are rather cold, so it is rather hard to have them mature. I have had only two full crops in five years. I have one acre in grapes. I had 10,000 pounds in one crop and 11,000 in the other.

PEARS.—I have fruited the Bartlett and Flemish Beauty; they are both good here. Bartlett pears weighed 14 to 16 ounces last year. I am now extending my orchard with both of these varieties.

PEACHES.—I raised two bushels of very fine peaches this last season, but they need protection for winter. I have now a peach from Idaho. It is claimed to have stood 23° below zero. It has stood this winter here so far all right.

APRICOTS.—I have not succeeded with any of the eastern apricots, but I have one from Washington that I have good hopes of. It is not in bearing yet, but is doing well.

GOOSEBERRIES.—Houghton is the berry for all purposes.

CURRENTS.—I have the Red Dutch, White Grape and Fay's Prolific. I like best the two first named.

STRAWBERRIES.—I have not done very much with them, as I have no irrigation when it comes a dry season, but when we have rain or irrigation strawberries are a big crop here. Capt. Jack and Crescent are the best here.

GENERAL NOTES.—The causes of failure in raising fruit are: First, planting trees and plants not adapted to your locality; second, shallow plowing and poor cultivation; third, failure of protecting against stock and rabbits.

Essentials to success in raising fruit in South Dakota are: First, get trees and plants adapted to your locality; get trees as near home as possible; do not send east for them; avoid the lake region, as a tree adapted to that moist region will not succeed in the dry air of South Dakota, with a very few exceptions.

Second, plow **VERY DEEP**—the deeper the better. Mark off your ground, then plow a wide and deep dead furrow where you want your rows. Plow several times until you have it as deep as you can get it. Then dig holes and plant trees, so that when the ground is nearly leveled your trees will stand two inches deeper than they were in the nursery. Then cultivate thoroughly every year. Keep stock and rabbits out, and you will soon have a bearing orchard. This dead furrow will be the same as a reservoir in storing moisture for dry seasons.

FRUIT CULTURE IN THE BLACK HILLS.—In general there has been very little interest taken in fruit, as nearly all have believed that we could not raise fruit in this high and dry altitude; but many are changing their views from the results of the last few years. There are several small orchards set out and where they have had proper care they have done well. I fully believe that South Dakota will be a good apple country. Not only are we able to raise a good apple, but the winter apples will be good keepers. I have twenty-five barrels of winter apples on hand; there is not a speck to be found on them yet, but they are very hard. So I believe they will keep sound until April.

I will now close my letter by saying if you want fruit, plant what your nearest nurseryman raises; not what he ships in, but that which you see growing in his nursery. Go there and look it over. See what is doing best. You cannot learn too much. With proper care you will succeed in raising fine fruit.

Yours Truly,

C. THOMSON.

Rapid City, Pennington Co., S. D., Jan. 11, 1897.