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NORTH AND SOUTH DAKOTA HORTICULTURE

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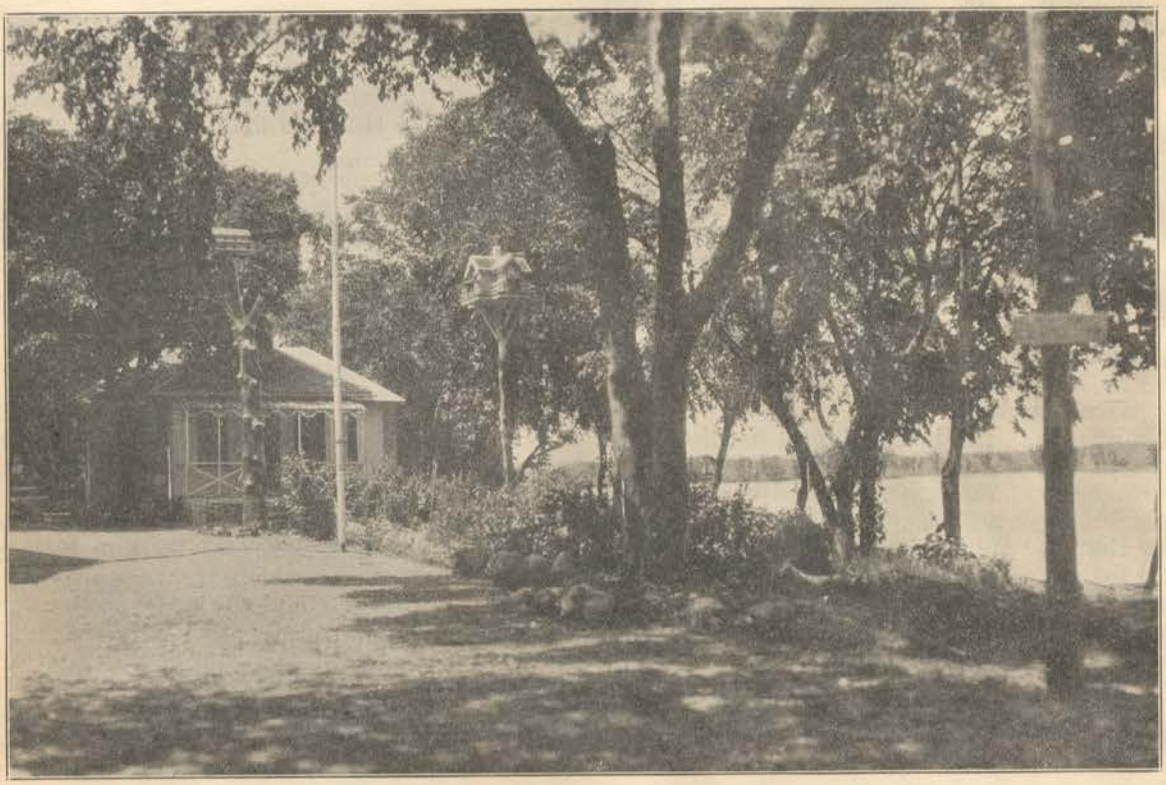

A BEAUTY SPOT ON ONE OF OUR MANY LAKES

THE CONTROL OF TULIP FIRE

(Experimental Farms Note)

William Newton, Dominion Laboratory of Plant Pathology, Saanichton, British Columbia

The most common disease of tulips in British Columbia is the so called "Fire" disease, caused by the fungus, **Botrytis tulipae.** This disease has been investigated by the Dominion Laboratory of Plant Pathology, Saanichton, B. C., and a number of factors were found to be involved in the control, including the selection and management of the soil, rotation, dips, the removal of "rogues," spraying and the selection of suitable curing sheds for the bulbs. The choice of soil is very important. Tulips prefer a friable, well-drained soil, not too rich in organic matter. The amount of "Fire" is invariably high after a winter of severe frost. Besides deep planting, the Washington State, and Holland tulip growers find that it pays to mulch as an additional protection against winter injury. The ideal mulch is one composed of marsh reeds. Ordinary wheat and oat straw is inclined to rot and rotting vegetable matter of any kind supports the growth of the fungus that causes the disease. A sphagnum peat mulch has been used successfully by some growers in British Columbia.

Tulips should not be grown for more than three years on the same soil and the crops that follow must not support the growth of the fungus. Following tulips, the commercial growers have found that it pays to plough under deeply a green manure crop, and rye and vetch or either alone meet the requirements of most soils. Green manure crops are very essential, for tulip soils must retain plenty of moisture throughout the year. Soils that dry out badly cannot be corrected with barnyard manure, for experience has proven that organic manures favor the spread of the "Fire" disease.

Before planting, the bulbs should be dipped in a corrosive sublimate (mercuric chloride) solution, 4 ounces to 25 gallons. Formalin and other disinfectants have been used, but our experiments indicate that the sublimate is the most economical and satisfactory disinfectant for tulips. This disinfectant reacts with metals, so wooden utensils must be used exclusively when dipping the bulbs.

The dip treatment is of minor importance compared with the practice of removing the "rogues." As soon as the tulips appear above ground the plants should be inspected at regular intervals and the diseased ones, the "rogues," should be removed and destroyed by fire. Early in the spring, when the weather is cool, the diseased plants produce millions of spores. Usually there is only a small percentage of infected plants early in the spring. The removal of these lessens the chance of the spread of the infection by a tremendous degree.

NORTH AND SOUTH DAKOTA

HORTICULTURE

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TABLE OF CONTENTS

A new spray has been developed by the Saanichton Laboratory, called the KS-Resin spray. This has proved efficient in checking the spread of the "Fire" disease. This spray is only an additional precaution, but exact experimental evidence and the experience of leading tulip growers has proved the economy of spraying after each heavy rain particularly early in the season.

If favorable storage conditions are available it pays to lift the bulbs early, shortly after the foliage dies. The fungus that causes the disease continues to develop after the foliage dies. Hence, if the bulbs are lifted early, the late development of the fungus, the formation of black, hard, seed-like bodies, may be arrested. When the bulbs are lifted early, cool, well ventilated curing sheds are indispensable. The atmosphere of the curing shed must not be too dry. Under ideal curing shed conditions, the outer brown skin of the tulips continues to thicken and forms a efficient protective layer against soil infection when the bulbs

(Continued to page 132)

GROWTH AND DEVELOPMENT OF LANDSCAPE GARDENING IN SOUTH DAKOTA

Purley L. Keene

The growth, development and interest which has been shown in landscape gardening in South Dakota during the past is not a great deal different than it has been in every other state or section of the country. The early pioneers, as they come into a new section, study and make use of the native fruits. They introduce new fruits and new vegetables into the section. Some of these find conditions favorable for their growth, others find certain limiting factors that check their growth to such an extent that the pioneers found it necessary to discontinue their cultivation. A few of the pioneers most interested in Horticulture have crossed some of the introduced varieties and species with the native fruits, thus securing new varieties which are better in quality than our native fruits and hardier than the introduced ones. Our Experiment Stations in the Central Northwest, South Dakota, North Dakota, Minnesota, Wisconsin and Iowa, have done special work in developing fruits and vegetables which are hardy and good in quality.

The pioneers in this section of the country realized very early in the history of the country the need of more tree growth, especially in the form of shelter belts about farmstead sites. The United States Department of Agriculture, realizing that more definite information was needed in regard to the hardiness of the various kinds of trees and shrubs, appropriated funds for testing the hardiness of the different kinds of trees, for testing various cultivation practices and planting distances. For a number of years a shelter belt project was carried on at State College, Brookings, South Dakota. The present college grove is the remanis of this test. A number of tree claims were established over the state under this project. Some of these tree claims are still in existence but may of them due to improper choice of species or the selection of short lived species, or perhaps due to lack of care during recent years, have passed by the wayside. Perhaps lack of moisture and open winters with little snow has been an important factor in the deterioration and decay of these old tree claims.

The state of South Dakota, realizing the importance of the shelter belt, established a Tree Bounty law in 1917. They failed, however, to provide for any means of its execution. Hence the law was modified in 1919 and appeared as Article I of Chapter 8 (Forestry) of Part 156 (Agriculture under Political Regulation), on page 2717 of Volume 2 of the South Dakota Revised Code of 1919. The purpose of this Tree Bounty law was to encourage the planting of shelter belts. The law has been revised since it was enacted and the revised law will be found in the compiled laws of 1929 on page 2538.

The fact that the makers of this law included apple, plum, pear, cherry, and other similar varieties of fruits indicated that they were thinking of the value of fruit trees to the farm as well as shelter belt trees. The fact that they also included the caragana, artemisia, buckthorn, spirea, common lilac, and other similar varieties of shrubs would indicate that they were also thinking of the value of shrubs about our farmsteads. The fact that they suggested that these shrubs should be planted in rows thirty feet apart and one foot apart in the row would indicate that they were thinking more of the value of these shrubs as a shelter belt or snow trap rather than as ornamental shrubs about the farm home. They also suggest that lilac, snowball, and other shrubs of similar variety may be planted in rows twenty feet apart and five feet apart in the row. This last clause would indicate that they were thinking of the ornamental value of these shrubs.

As time went on the early settlers of the state acquired more wealth and consequently more time to think of other things than just their living. Their thoughts naturally turned to the ornamental side of horticulture as well as its practical side. This is more or less true in all localities. South Dakota, being a newer state than some of our neighboring states to the east, perhaps did not develop the thought of landscape gardening or ornamental horticulture quite as soon or quite as rapidly as did Minnesota, Wisconsin, and Iowa. The states in the Great Plains Region, including North and South Dakota, Nebraska and Kansas, were handicapped more than the states to the east of them due to the more severe climate, a smaller amount of rainfall, more open winters, and a greater drying effect from the westerly Chinook winds which seldom reach Minnesota and Iowa with the severity that they do the Dakotas, Nebraska, and Kansas. As the shelter belts or tree claims, as they were frequently called, grew in size and age some of the trees began to show their individual form and beauty, people naturally noticed them and were attracted by their beauty. They began to plant trees and shrubs not only for the protection they afforded to their buildings and stock, to their farmstead site, but also because they added interest and value to the landscape and increased the beauty of the landscape and made living con-

ditions more pleasant. The tree claims and shelter belts dotted the plains here and there, breaking up to a certain extent the flat prairie lines.

In the earlier development of our state most of our plant materials were secured from our neighboring states, largely to our east, and in many cases trees and shrubs there are not adapted to our locality. As a result they passed out early in their life. This had a tendency to discourage pioneers from planting more trees and shrubs but in time nurseries were started within our borders which made it a point to grow plant materials which were hardy and which would make satisfactory growth over a long period of years. More information was gathered as to which kinds were best adapted to the climate and which kinds should probably not be planted. There is, however, planty of room for further testing of varieties and kinds of fruits, vegetables, trees, shrubs and flowers which can be grown in the various sections of our state. Many home owners are planting shrubs and trees and flowers which they have secured from the eastern states with the idea of testing their hardiness. They are willing to devote a certain amount of money, labor and energy in trying to grow something which they are not sure is hardy. Some of them are even crossing and hybridizing in an attempt to secure hardy kinds. Our Experiment Station at Brookings has introduced many new kinds in the past and is still doing extensive breeding work. While the breeding of new varieties of fruits and vegetables and the testing of varieties has not been completed, and probably never will be, sufficient knowledge of hardy varieties has been gained to enable the people of South Dakota to make a reasonably safe choice of plants. The same holds true with our shelter belt trees. The Federal Experiment Stations at Mandan, North Dakota, and at Halsey, Nebraska, have done considerable work with shelter belt trees so that we now know the hardiness and limitations of most of the more commonly grown trees. The same might be said of ornamental trees, shrubs and flowers and yet from the ornamental side we may sacfifice a certain amount of hardiness in order to be able to grow for even a short period of time certain kinds of ornamental plants. It is true that our choice of ornamental plant materials is much more limited in this section than it is to our east.

Landscape men coming from our east, even Minnesota and Iowa, to do work in South Dakota or its neighboring prairie states have frequently recommended the use of certain plant materials which are hardy in their localities but which have proved tender in ours. The nurserymen and a few landscape gardeners who have worked in the state of South Dakota have done considerable towards the study of the hardiness of various ornamental species.

Nearly everyone appreciates the landscape, whether it is native, natural, or whether it is artificially created by man. Nearly everyone is able to recognize a well executed piece of landscape whether he understands the principles involved or not. How many times have you had an average layman not schooled in the principles of landscape gardening call your attention to the views that he has from the living rooms of the house or the grounds about his home. Salesmen attempting to sell a piece of property to a client will seldom fail to point out the desirable landscape features of that particular piece of property or the views that can be secured from the home and its grounds. It is only natural that after our farms have secured adequate shelter belt protection and our cities have lined their streets with trees that people should turn their thoughts to the planting of ornamental plants and flowers about their homes.

The Horticulture Department at State College receives numerous inquiries every year. Some of these pertain to kinds and varieties of fruits and vegetables, trees and shrubs that can be grown in the state; others will inquire about cultural practices or pest control. During recent years the percentage of letters which inquire about ornamental horticulture has increased. This shows a tendency for people to want to improve the beauty of their home grounds whether they are on the farms or in our towns and small cities.

During the past ten years we have had nearly a hundred students take courses in Elementary Landscape Gardening in the Horticulture Department at State College. A few of these students have taken it because they wanted to follow nursery and landscape gardening as a profession. Several of these young men are still following this profession. Others have taken the course because it was allied to their subject. The Elementary Landscape Gardening course is required of all agricultural students specializing in horticulture and of the agricultural engineering students. However, by far the bulk of the students have taken the course from an avocation standpoint, i. e., they are interested in the course just from a general knowledge standpoint; so that they may appreciate ornamental horticulture and landscape gardening as they go through life; so that when they have a home of their own they may be better qualified to improve it. The growth of Garden Clubs and Flower Shows is another indication of the interest which is being shown in ornamental plants.

It's not a home until it's planted.

NORTH DAKOTA HORTICULTURAL SOCIETY NEWS LETTER

A. F. Yeager
Secretary

Plant pathologists tell us that mosaic may be transmitted to tomato plants from chewing or smoking tobacco. Handling a cigarette and then the tomato plant may cause it to become diseased. Even tobacco smoke in a greenhouse where tomato plants are growing is dangerous.

In the Gardeners' Chronicle for September 10 there is a discussion on the tendency towards breeding for size in flowers. "All too often," says the writer, "size is gained at the expense of proportion, as for example, we see the gradual transformation of that lovely wild plant, 'Gladiolus primulins,' perfect in its proportion, into a monstrous-petalled bloom, decked in new and often refreshing colors it is true, but shorn of its natural grace and dignity. In a search for size, also what may be called general garden utility is often sacrificed, as with some peonies, of which the individual blooms are so large and so heavy that they must be individually stakes, even a slight shower is enough to lay them on the ground with little hope of recovery."

In this same issue of Gardeners' Chronicle is an account of the exploration of a considerable area of seashore for a certain species of wild plum. The exploring was done with an airplane. It required one hour and fifty minutes, whereas, it is estimated, it would have required two weeks by auto, boat or foot travel.

Waxed paper pots, according to Mr. R. A. McGinty, Clemson College, S. C., which are being offered for growing vegetable plants, are no better than unwaxed paper pots.

Alois Schmidt, of Ohio, in the Market Growers Journal, reports success in controlling corn ear worm, by dusting the silk with a mixture of calcium arsenate and flour. Application was made every two or three days.

A bulletin on staging horticultural shows is to be had from the Superintendent of Documents, Washington, D. C., for ten cents. Its official designation is Miscellaneous Publication No. 85.

Here is a list of what one Glad fan considers the best ten gladioli: W. H. Phipps, Mrs. Leon Douglas, Minuet, Dr. Bennett, Pfitzen's Triump, Marmora, Golden Dream, Purple Glory, Giant Nymph, Glorianna. These are all rather inexpensive.

A correspondent asks whether geraniums may be stored over winter by hanging the plant upside-down with the roots free from dirt. This will not be a satisfactory way. Plants should be set in soil, kept in subdued light and with temperature as cool as practical without freezing, and no more water than necessary to keep the plants alive.

Have any of you had any experience in storing watermelons? In answering an inquiry regarding this we made a guess that they should be kept in about the same conditions one would keep apples, that is with the temperature a few degrees above freezing.

We are asked whether tulips left for several years in their original position and which have enlarged greatly and are not blooming well should be moved? Indeed they should. They may be moved any time after the tops die in the summer. The larger bulbs probably will bloom the first year after moving, while the smaller ones if re-set in a good place may bloom within a year or two. They should be set about four inches deep.

One of our correspondents, Mr. Pfeiffer, Gordon, Nebraska, in a recent letter, suggests wrapping trees with cat-tail rushes in winter to prevent sunscald. Another suggestion is to pin down strawberry runners with honey locust thorns, so the wind will not blow them around too much.

Mrs. Carl Yahnke, of Anamoose, N. Dak., says that she has started apple trees on their own roots by bending branches to the ground and covering all except the tips with earth. Varieties differ in their ability to form roots in this manner.

The president of the Vegetable Growers Association of America, who lives in Indiana, reports that last spring he drove through to Texas with his one-ton truck to get early vegetable plants. When he passed through Oklahoma he was stopped and required to turn in his Indiana license and take out an Oklahoma license before crossing the state. Upon his complaint, the Governor of Indiana immediately issued an order that all Oklahoma trucks passing through Indiana should be treated in like manner. This incident would seem to indicate possible trouble in the future for travelers if such an attitude is accepted generally.

It looks like there would be a great shortage of Buttercup squash seed. If any of you have raised a good crop of this squash without other squash of the Hubbard type near, we would like to hear of it. Buttercup squash was sold by one of our local gardeners at four cents a pound, while his Hubbard brought only one cent.

If you raise strawberries do not neglect to cover them this fall. While most varieties will come through some winters, there is none that may not freeze out in an open winter with planty of dry cold. Also look out for the young fruit trees. Ours have already had dirt mounded around their trunks about one foot high to pre-

vent mice from eating them. If rabbits are likely to trouble, a cheap satisfactory rabbit guard is cornstalks tied around the tree, using tarred string.

Some plant explorers have just returned from South America, bringing back disease resistant potatoes, also frost resistant ones. These are to be used in future potato breeding work.

The oak tree is said to be a favorite target for lightning. This is due at least partly to the deep rooting system of the tree. Other trees that we grow that are subject to lightning damage are Elm, Ash and Poplar.

Perhaps the world's greatest individual is Mahatma Gandhi. He says that "no one on earth can subdue a man who has shed two fears: the fear of death and the fear of loss of material possessions."

Mr. R. B. Harvey, of Minnesota, reports that apple cider may be kept for a long period by freezing.

We are glad to report that Mr. Mackintosh, secretary of the Minnesota Horticultural Society, who has been ill for some months, is now back on the job.

Our good friend Mr. Simmons of South Dakota was a recent visitor. He picked up his usual generous supply of Buttercup squash to be taken back to Sioux Falls for his household use.

A recent bulletin which is very worth while to people in our state, is the bulletin No. 263 of South Dakota State College, Brookings, S. D. It is entitled "Shrubs and Climbing Vines for South Dakota," by N. E. Hansen.

"Science" reports that forests are being planted in Norway by the brick instead of by the tree. The seed bricks are made of soil, each containing three or four seeds.

The Boyce-Thompson Institute has found that the Boston Fern is less affected by gas in the air than other plants. This probably accounts for Boston Fern thriving in some houses where gas is used, while other plants fail.

Wealthy, Duchess and Pattens Greening, which were the leading varieties grown in Minnesota thirty years ago, are being little planted at present. McIntosh seems to be gaining very rapidly. In Montana, McIntosh has the lead over anything else. It is likewise leading other varieties in Wisconsin in a number of plantings. Inasmuch as some good McIntosh were recently observed in good condition at the Morden Manitoba Station and some are bearing in North Dakota, it might be well if we gave this apple a more extensive trial. At least it is more likely to succeed than the Delicious, Golden Delicious and Jonathan.

The Hemerocallais or Day Lilies are being given much attention by plant breeders. "Woolgatherer," in The Florists' Exchange suggests the following as desirable new varieties: Anna Betscher, Bay State, Donald Wyman, Golden Dream, Goldeni, Lemona, Mrs. W. H. Wyman, Apricot, and Darwinea.

While mentioning new things, I believe we have never reported the final result of an extensive trial made with new varieties or perennial asters, or the Michaelmas Daisy. We planted about twenty varieties, which all did well for one year. However, during the past two years all have been killed excepting a few old standards such as Climax and ones that are in general use. However, I believe there would be lots of room for someone in this region to work on the perennial Aster as his hobby. Some of our native asters would serve as wonderful breeding material.

One of our readers has written in asking for a formula for formaldehyde solution in which to dip squash before storing. This is given in Market Growers Journal as one gallon of formaldehyde and fifty gallons of water. The statement is made that this dip in formaldehyde left no objectionable residue. It reduced rotted squash from 49 per cent down to 4 per cent. This would seem to be an exceptionally good showing. The experiments were conducted by O. C. Boyd of the Massachusetts Agricultural College.

THE TREE SPARROW

O. A. Stevens, Fargo, N. D.

One of my first recollections of bird life in northeastern Kansas is of the juncoes (we called them "snowbirds") which came about the house sometimes in winter. Along with these slate-colored birds, often there were a few brown streaked ones. Later I learned that these were tree sparrows. They are somewhat smaller than English sparrows, streaked with gray and bright reddish brown. The wings have two prominent crossbars of white and the head is covered with the same brown. The under parts are gray except for a small spot of black in the center of the breast. They are most likely to be confused with the chipping sparrows which also have the brown cap, but no spot on the breast. The chippy has a black line through the eye and a white or grayish one just above the eye. The field sparrow is very similar in appearance but has a pinkish bill while the other two species have the upper half of the bill black and the lower half yellow. All three differ from each other in habits.

The tree sparrows are common winter birds through all the eastern states except the Gulf Coast region. In our region they winter as far north as southern Minnesota and central South Dakota. From there, southwestward to New Mexico, a western race occurs. Our birds probably belong to this western form for the most part. The tree sparrows are the earliest of the small birds (excepting the horned larks and

possibly the first of the longspurs) to appear in the spring. They arrive at Fargo quite regularly about March 18. A month later all but a few stragglers have departed northward. In the fall the tree sparrows are among the latest migrants, appearing about October 10 and remaining until the first week of November.

The summer home of the tree sparrows is the belt of dwarf timber extending from northern Quebec along the south shore of Hudson's Bay and northwestward to Alaska. On the west coast of Alaska, just above the Arctic Circle, Grinnell found them abundant in the patches of low alder and willow. He noted the first ones on May 21, and the last on September 17. They are therefore about a month on the journey from that locality to ours. Near the coast of northwestern Canada, 150 miles farther north, Macfarlane found them abundant in 1862. The nests are placed in the grass or in low trees or bushes and are built of grasses, fine rootlets and hair or feathers. The eggs are said to be more greenish than those of chipping sparrow and are evenly marked with very fine spots of brown.

The food of the tree sparrows, while they are in their winter quarters, consists largely of seeds of weeds such as pigweed, lambsquarters, ragweed and pigeongrass. One of the most quoted statements in reference to the value of birds is the estimate by Mr. F. E. L. Beal, then in the Biological Survey, that the tree sparrows occurring in the state of Iowa would destroy 875 tons of weed seeds during the winter. We have not as good information about their food during summer, but presume that insects make up a considerable part of it, especially for the young birds.

During the winter and in migration these birds are in flocks in bushes or tall weeds. The song is of a shrill warbling sort and not loud. By many people it is not considered much of a song, but to us it is very welcome as one of the first signs of spring. At several bird banding stations in the eastern states, the birds are found to return to the same winter quarters year after year.

These three similar sparrows are not difficult to recognize if one keeps in mind the differences in habit. The tree sarrows are seen in flocks early in spring and late in fall or wintering a little further south. After they have departed northward the chipping sparrows arrive and the pairs are quite at home in the cities as well as in the woods. The field sparrows are fairly common in summer along the Missouri River, but elsewhere are rare birds in North Dakota. Farther south they are common and are found where there is grassland and patches of brush. Their song is something of a whistle which carries to a considerable distance.

GROWING TREES FROM SEEDS

F. E. Cobb, State Forester, Bottineau, N. D.

(Paper given before North and South Dakota Horticultural Societies, July 13, 1932.)

In my inspections of trees in these western states I have often been asked in an incredulous manner, "Do trees grow from seeds?" I do not know how else they expected them to grow. Every year we also receive inquiries in regard to the "bugs" on the ash trees. These, of course, are the staminate or male blossoms which cling tightly to the stems, later to fall off.

It is becoming to be a generally accepted fact that selection of tree seeds is as important, at least as to climatic ranges, as other seeds. Inasmuch as most trees have wind borne pollen, there is a continual crossing of strains and often natural hybrids produced as the Northwest poplars and other poplars in this state. Tree seed breeding is comparatively new and but a few experiment stations in the country are working along this line. The difficulties are naturally great, as often the flowers are borne high up in the trees, which makes the necessary hand crossing and bagging quite a difficult job.

Growing trees from seed in North Dakota is common, though sometimes very uncertain. Our late frosts in the spring and high winds often so greatly reduce the seed crop as to make it negligible. Last fall there was practically no ash or boxelder seed any place in either of the Dakotas, or the prairie sections of Canada, due to the late spring freeze.

In this section it is only about once in five years that the American elm produces quantities of seed. Only at longer intervals can seed be obtained from the imported Chinese elms growing here. Elms blossom before the leaves come out and are very commonly frosted, as it takes but a light freeze to injure them. The native burr oak is another tree that is subject to frosts and winds when blossoming. In the seven years I have been here, but one good crop of acorns have been borne. Often, too, the crop comes when the snowshoe rabbits are the thickest and they are soon eaten.

Boxelder and green ash are generally an assured crop, as well as the caragana and Russian olive, the introduced trees.

Basswood, which is native in the eastern part of the state as far northwest as Benson County, is more difficult to grow from seed. In the fall the hard nutlets hanging by a stem from a wing are not mature. The germ must have a year at least on the ground among the leaves and damp mold to ripen. In planting them it is, therefore, necessary to wait until the second spring for their germination. The first few years they grow exceedingly slow. After that they make more rapid growth.

Hackberry grows the farthest northwest—about thirty miles south of Bottineau—in the sand dunes along the Mouse River. To date we have not been able to collect seed from them. It is a graceful tree of the Elm family, of which most of you are familiar.

In the nursery you will notice a small transplant bed of burr oak seedlings. These are five years old and are on the average about six inches tall.

Of the introduced trees, Caragana or Siberian pea tree is the most common and desirable to plant for hedges and windbreaks. The seeds ripen the last of July. In this northern part of the state it is not practical to plant them at once, as it is further south, as they do not make enough growth to harden for the winter. They germinate readily in moist seasons.

Russian olive, another introduced tree, grows very readily from seed and makes a fine ornamental as well as windbreak tree. It is not entirely hardy in this northern part of the state, though it is entirely so in the southern part and in South Dakota.

Chinese elm varies a great deal in hardiness, depending upon the strain planted. Here trees planted in 1918, after growing to be fifteen feet tall, killed out entirely in 1928 after a hard spring freeze. The trees were beginning to leaf out. Hardy strains are very desirable for ornamental and street trees, as well as for windbreak purposes. They are brittle, however, and are inclined to break during heavy winds. Our native elm does the same, however.

We are growing hundreds of thousands of evergreens from seed, as you will note in the nursery. Those that we consider the most promising for North Dakota conditions are Colorado and Black Hills spruce, white spruce, western yellow or bull pine and the common juniper or red cedar. We have not had such favorable success with Scotch pine, Jack pine, Douglas fir, or Arbor vitae. They are, however, hardy in parts of the state and South Dakota. We transplant all conifers in the nursery before shipping to farmers for windbreaks.

Black walnuts have been reported growing and bearing in most parts of the state, though we have had no success with them here. We are, however planting them whenever seed is available, hoping we will finally get some started. Manchurian Chinese walnuts, of which we have a few on trial, seem hardy after several winters and one transplanting.

One part of our work is the cooperation with the Lake States Forest Experimental Station at St. Paul in planting trees in the Sand Dunes near Denbigh. The Board of University and School Lands has set aside a section for our use three miles east of Riga on U. S. highway No. 2 about twelve miles west of Towner. One quarter of this was bought and presented to the U. S. Government, on which they have built buildings and begun the work. Signs are on this highway designating when you come to the Denbigh Dunes Forest Experiment plantings. Stop in and visit them. If the experiments prove successful it is possible that about 100,000 acres of the sand dunes will be incorporated in a National Forest and eventually be planted to conifer and broadleaf trees.

OBSERVATION PITS IN DROUGHT SPOT ORCHARDS

H. R. McHarty, Dominion Laboratory of Plant Pathology, Summerland, B. C.

In the prevention and the cure of Drought Spot and Corky Core in apples, the secret lies in the continued maintenance year after year of a correct moisture in that area of the soil in which lie the greatest percentage of the roots of the tree. We now know that these disorders are caused by allowing shallow soils to get too dry or by allowing heavy and impervious soils to become water logged. In either case the effect on the tree is the same. For through these conditions, the live absorbing root tissue is killed and as a result the tree succumbs to the disease.

To get a more exact knowledge of the moisture conditions and the root distribution in the soil, the Field Laboratory of Plant Pathology at Summerland now uses observation pits in all its experimental orchards. These pits are easily constructed and are entirely practical for use by the grower.

The pits consist of holes usually about four feet deep and about one foot in diameter. The upper six inches of the hole is cribbed square with 1 inch by 6 inches fluming lumber, the crib being flush with the ground surface. On this square is then fitted a strong cover, using two thicknesses of one-inch fluming lumber.

The pits are located throughout the orchard wherever changes in soil types occur. The number, therefore, in a ten acre lot varies with the soil varieties. In such a lot one might profitably have from 20 to 30 such holes. The holes are located as close to the tree as can conveniently be dug without injuring the main roots, and are placed between irrigation furrows.

Through these holes the grower can readily ascertain, both through color changes in the soil and by exact examination, the general soil moisture conditions in that area of the soil where the majority of the feeding roots lie. The holes become a guide to the grower in all his irrigation practices; they will indicate how often irrigation should be applied, and by indicating where the majority of the feeding roots lie, they will also show what portion of the soil must be given proper moisture. Further information on the installation and use of these pits may be obtained at any time from the Summerland Laboratory.

GARDENING REMINISCENCES

Thomas Hobart, Sioux Falls

Snapdragons

The Snapdragon, the Anterhinum, and generally cataloged under that name has always been to me one of the most interesting of plants. The name Snapdragon, I suppose, comes from the fact that the face of each blossom very closely imitates the pictured conception one sees of the fabled legendary dragon's head, and if the tube back of the face is pressed gently together the face opens its mouth wide and assumes a very fierce expression of countenance, so much so that I have often seen children who first see the mouth open up start back as if frightened. I can remember when I was a very small boy when I made them open their mouths I always imagined that they also had tongues that they would stick out at me in derision.

In those days fifty years or more ago the plants were more or less of scraggly growth and varied in manner of growth, some being low and spreading and others tall and upright. The flowers also varied, though mostly being of a very small size as compared with the wonderful flowers of today. At that time the flowers were seldom more than one-half inch wide by perhaps three-fourths to one inch the other way and only thinly borne along a short stem. These variations have been noted and made use of so that at the present time the family has been segregated into several different groups as to size of flowers, height, and manner of the growth of the plants themselves.

We now have the Nanus or dwarf plants, seldom growing more than eight to ten inches high with correspondingly short blossom stems that bear closely set flowers of good size and many beautiful shades and color combinations. This group is best used as a border plant in the annual part of the flower garden and the seed sown or plants set in hills about eight inches apart.

The next division is the Majus. These grow much taller than the Nanus and generally reach heights of two to three feet with the flower spike a foot or more long and densely crowded with large flowers one and a half to two inches wide in hundreds of variations of color combinations and shade variations. This type is suitable for cutting for house decoration, in fact the more they are cut the more and better flowers you will have, providing always the flower stems are cut at the right point on the stem. The correct point to sever the flower stem is just above the first two leaves above the ground, or if the flower spike is a secondary branch from a main stem, sever it just above the first two leaves away from the main stem. I will explain this more fully later.

A third, a new branch of this family, is called Maximum. This sometimes refers to the large growth of the plant as some of these may reach 5 to 6 feet in height, but it mostly refers to the giant size to which the flowers of this strain have been developed by the art of the careful hybridizer. Of course the giant type produces long graceful spikes closely set with mammoth blooms sometimes reaching the enormous width of 2½ inches and of the most interestingly beautiful forms with stems just right for cutting. These are splendid for beds and high borders. The rose, a delightful shade of rose pink, with blending tints of yellow; Canary Bird, with mammoth canary yellow flower, and Orchid, a beau tiful mauve pink, a magnificent variety with exquisitely formed blooms, are among the very finest in the whole family range.

The Monarch Snapdragons also belong to the Maximum group. These are of a new race and grow the tallest of all with flower spikes five to six feet tall with immense wax-like flowers. This type is especially suitable for planting in the shrubbery border where high winds will not blow them down or snap off the flower stems.

Practically all of the varieties can be had in separate colors in seed that will come practically true to color, and the color range is from pure snow white to deepest crimscon black, through yellows, orange, pinks and almost all combinations.

The first improvements in the family were made in the latter part of the last century. Up to that time they were only considered or grown as an outdoor garden flower. About the beginning of this century, greenhouse men commenced growing them in the winter for cut flowers, soon a winter flowering greenhouse type was brought out. These had long stems of mostly delicately tinted flowers borne closely to the flower spikes, often 12 to 18 inches long.

I was at once interested in these and I believe I was the first to grow them here though I did not grow them in the greenhouse in winter. I grew them as a summer garden flower mainly because they were so great an improvement over the ten existing types for cut flower purposes. A Mr. Ramsburg, a western florist, was among the first to develop new varieties of this winter flowering cut flower type and from him I secured, along about 1904-1905, seed of this new variety which he had named Silver Pink. I also had seed of several of the newer garden sorts. I now have before me a photograph of the four rows of these plants that extended the whole length of the block facing 23rd Street and lying between Dakota and Minnesota Avenues. By this time I had a family of my own children growing up and of course I had shown them how the dragons would open their mouths and bite their fingers and, like all children, both old and young, who see this for the first time, they all were much interested.

One day when these four rows of plants were

in full bloom, our second oldest daughter, Isora, came running into the house and wanted her mother and me to come out in the garden and see the sand eaters. This had us stumped, as we could not imagine what she had that she called a sand eater. Of course we went at once to see, and what had she done but sat down and, making the flowers open their mouths, she had filled the throats full of sand and these were her sand eaters and remained so until she left us when she was 28 years old. She would always insist, until she was several years older and learned better, that the flowers really ate the sand. I never told her the difference until she found out for herself that the wind blowing the plants shook the sand out, and so all that summer she would spend hours every day feeding her sand eaters, which, by the way, were some few special ones which she seemed to admire more than she did the others.

These truly wonderful flowers are so easily grown from seed that I have often wondered why more of them are not grown. Perhaps one reason is that most gardeners buy their plants from the greenhouse and there, unless grown very carefully and by an experienced grower, do not always give good satisfaction when planted out of doors. In buying the greenhouse grown plants, one should try to get a not too old or large plant that has been transplanted or pot-grown and that has a single stem not more than a foot high and bearing a spike of buds not yet in bloom. Set such plants out in the garden in mid-April or early May. They are very hardy and will stand a lot of cold. As soon as the first blossom opens cut the entire stem clear back to the axis of the first two leaves above the ground. This is imperative if you want good after bloom and is the secret of successful snapdragon culture, both in the greenhouse and out of doors. At the axis of the leaves two sprouts will appear at once and quickly develop into two bloom stems. As soon as the flowers on these open, these stems also should be cut clear back to the axis of the first two leaves above where these stems have branched from the main stem. This will develop four long bloom stems. These may be left to bloom fully on the plant, though it is best to remove them one at a time for use in the house always cutting clear back to just above the axis of the two first leaves on the stem as before. By this method you always develop double the number of new flower spikes that you have each time you cut them back and the stems are always long with beautiful long spikes of flowers.

To prepare the ground for sowing the seed, and also for setting the plants if you buy them, you should spade the ground as early in the spring as you possibly can, as for any successful gardening the ground should be worked for 3 to 4 weeks to get it in condition for continued best results throughout the whole summer season, for neither plants or seed of either flowers or vegetables should ever be planted in newly spaded or plowed ground for this is the cause of most complaints of poor crops.

As soon as you have your ground spaded and large clods, if any, broken up, immediately tramp closely all over the whole surface to mash it down and make it firm, then rake until the surface is fine and smooth. Allow to stand for 4 or 5 days, then rake it all over thoroughly, though do not rake more than 1½ inches deep, then if it does not rain, if you have a fine lawn sprinkler, give the whole garden a good soaking, putting the water on slowly in a mist if possible, so it will all soak away without puddling the surface. After this soaking or after a rain, if there is one, just as soon as the surface gets dry enough so that the soil does not stick to the rake teeth, rake the surface as before. This does three things. It conserves the moisture so that seed and plants will sprout and grow when you get ready to sow them. A lot of weed seed sprout and the raking kills them and you have less weeds to bother you in the summer, and last, it puts the ground in perfect condition.

If possible, repeat this whole process two or three times more if you will, you will not have a weed all summer and your plants will grow as you never had them grow before. After the first watering, before you rake the surface, find out how many square feet of surface you have and for every 100 square feet, get 8 pounds of the pulverized sheep manure that is sterilized and free from weed seed and three-fourths pound of rose growers bone meal and mix and scatter evenly over each 100 square feet of surface and then rake. This will cost about 35 cents to 40 cents for each 100 square feet of ground but will insure double or treble the crop you can grow without it.

When you are ready to sow the snapdragon seed in early May, mark off your ground in spaces 8 inches apart for the dwarf Nanus, 15 to 18 inches for the Majus varieties and 24 inches for the Maximum or taller sorts. Make a scratch three-fourths inch deep at each distance and drop in five or ten seeds, scattering a little. Cover with fine soil ½ inch deep and press down very firmly with the sole of your shoe, then scatter a fine layer of loose soil over the mark made by your shoe sole so it will not dry out too quickly. This seed will germinate in 10 days. When the seedlings are two inches high, pull all out except two in each hill, if these develop a single stem let them come into bud and one or two blossoms open, then cut back as I have just directed for the greenhouse grown plants and treat afterwards just as I have told you.

These outdoor summer plants often develop several lateral stems near the ground. In this

case treat each as you do the single stem as to cutting back when first blooms open on each. If a plant shows signs of developing these laterals all up the stem, you had better pull it up, as it will never amount to anything.

In watering these or any other garden plants, soak thoroughly once every week or ten days and as soon as dry enough, rake or hoe the entire surface to stop evaporation and you will succeed beyond belief.

SHRUBS AND FLOWERS

Mrs. J. W. Dougherty, Watertown, S. D.

(Paper given at our Horticultural Meeting)

Shrubs and Flowers can be dealt with only in a general way as other talks to follow deal more particularly with the species, characteristics and planting of each.

To enjoy either of these to the fullest extent, one must combine the two into a garden of which Dr. David Starr Jordan, for twenty-two years president of Stamford University, has said:

"Garden is a very inclusive word. Some people's gardens reveal that their owners interpret 'garden' as meaning a small plot of land devoted to plants. Garden means that, but much more as well. It is a word without limit.

"Above all, a garden should be natural. Nothing should be arranged in orderly patches but to achieve this happily careless effect there must be a certain amount of thought. If space permits, there should be a pond of water and rocks. They rank not far behind plants as raw material for a garden. The pool should not only be a fragment of scenic beauty but a home for fish as well. It is in keeping with the spirit of the garden to have wild birds free to come and go, enticed by feeding places and homes.

"A garden has a large value in vocational guidance as well as in a thousand other ways," says Dr. Jordan. "The child who has a garden in which to play has a better chance to find out what he wants to be. Then, too, association with flowers from babyhood is certain to make a better man out of a boy, or lady out of a girl."

Gardens should be natural yet all harmony and so planned as to achieve this in the space you have. In your planning you must first get the basic design, the theme idea of your landscape scheme worked out, then make a practical program for attaining it by preparing your working plan. No small portion of this working plan is the planting design. But it is a grave error to think that the planting design is the major part of designing a garden. Plants, after all, are just material. In these media you may express an idea; portray a theme, develop a composition that has life, character and personality. But as draperies, furniture, rugs and pictures are to the home, so plants are to the garden. They are the details which accent, enhance, give flame of beauty to your gardens.

In the planting design which is so important after the basic scheme is worked out there is no class of plant material more important than shrubs. High shrubs, low shrubs, scamblers or princely erect shrubs; we would almost have to give up landscape design if we could not avail ourselves of their many services.

It is the softening grace of such shrubs as spirea in variety, snowberry, hydrangea, barberry and others of like nature used about the angles and corners of the house which makes the transformation from bareness to beauty. Tall shrubs such as lilacs, honeysuckle, mock orange and many others find their place in the border plantings, while both are used in shrub backgrounds.

But these must be used in either case only after thought and consideration have been given to several important phases to be considered. Especially in your shrub backgrounds the element of textures enters. Generally fine textures should be close to the points from which the beholder will view them, coarser textures farther away. But textures are not all, by any means. There is the question of lines, and in their colors, too, shrubs help to make the garden draperies more interesting.

Another element of the planting design that is often mishandled is the spacing of shrubs, while still another angle enters in when you are considering shrubs used to produce the design envisioned in the general plan, that is, the selecting of special shrubs for special places. Shade is the most universal special condition while sandy conditions and dry slopes are other special conditions that are common.

To tie the garden together; to furnish background and blending materials; to lend their share of color in spring summer, autumn, and winter, we have our shrubs but now we must place the little tapestries of twinkling flowers that spin fantastic rosettes against the jade of our background. These may be annual or perennials or both, but as in shrubs, texture, lines, color, special plants for special conditions must be considered. But that is not all. We must arrange and select our flowers to give continuous bloom from early spring until late fall.

We should select as our dominant feature some perennial, shrub or tree which is at its highest point of maturity at the season we are planting for and group about it other plants which will support and accentuate our keynote.

Color becomes more easily understood when we employ a dominant plant as a fingerpost that we may use successfully. Naturally we use only those things which compose well with this, our larger notes.

Combinations of colors which blend or contrast, or combinations of colors of the same color

value will more readily come to mind. Snowy billows of spirea as a back ground for the powerful color of purple iris can make one corner of your garden brimming with color for several days in early spring. Shell pink tulips with plum blossoms or judas tree as the dominant note soon follow. If you are planning to use the delphinium as your dominant note for your June flowerings, we shall have blue as the basic color and may use blues, clear yellows, white and pink of the same value. In nearly every instance there will be certain popular combinations with which you are familiar which can be carried out throughout the season.

Do not hope to have all your garden in full bloom during the entire season, each group should be so arranged as to create another picture at a later period. Incidentally, by this system of planting our attention is invariably focused on those pictures which are at their best rather than on those which have passed or which are to come.

I have in a general way given some rules to follow in planning the use of shrubs and flowers in gardens.

Each garden presents its own problems and each person has his or her own peculiar likes and dislikes. So the final details will always be worked out by the individual.

PLANTING RASPBERRIES IN THE FALL

Very little fall planting of raspberries is practiced in Wisconsin but in some sections as in New England and in Canada it is coming to be preferred by many growers. R. A. Van Meter of Massachusetts in his book entitled "Bush Fruit Production," published by the Orange Judd Publishing Company, New York, says of it: "Plants set as early in the fall as dormant stock for transplanting can be obtained are off to a flying start in spring and usually make a stronger growth the first year than spring-set plants. This is the great advantage of fall planting.

"If the plants are set in spring they should be given the earliest possible start. If they become well established before the drier weather of summer starts they continue to grow vigorously and often will produce a sizeable crop the second year. But when they are planted late very few new canes will be produced the first season, especially if the summer is a dry one."

At whatever time the planting is done the stock should be as near dormant as possible when set. Shoots that have formed or even buds that have swollen are likely to be broken off and their starting in itself seriously weakens the plants. The first shoots to start on new set plants and the strongest canes to appear the first year are from leader buds near the base of the transplanted sucker. If they are broken off it takes much longer for the new plant to establish itself. —Wisconsin Horticulture.

(Continued from page 122)

are again planted. Under unfavorable storage conditions the outer brown skin becomes loose, exposing the tender flesh of the bulb to infection from **Botrytis** and other organisms. Soils that dry out before the bulbs are lifted, are likewise undesirable. The drying out prevents the development of a thick outer skin, the natural armor of the bulb against infection.