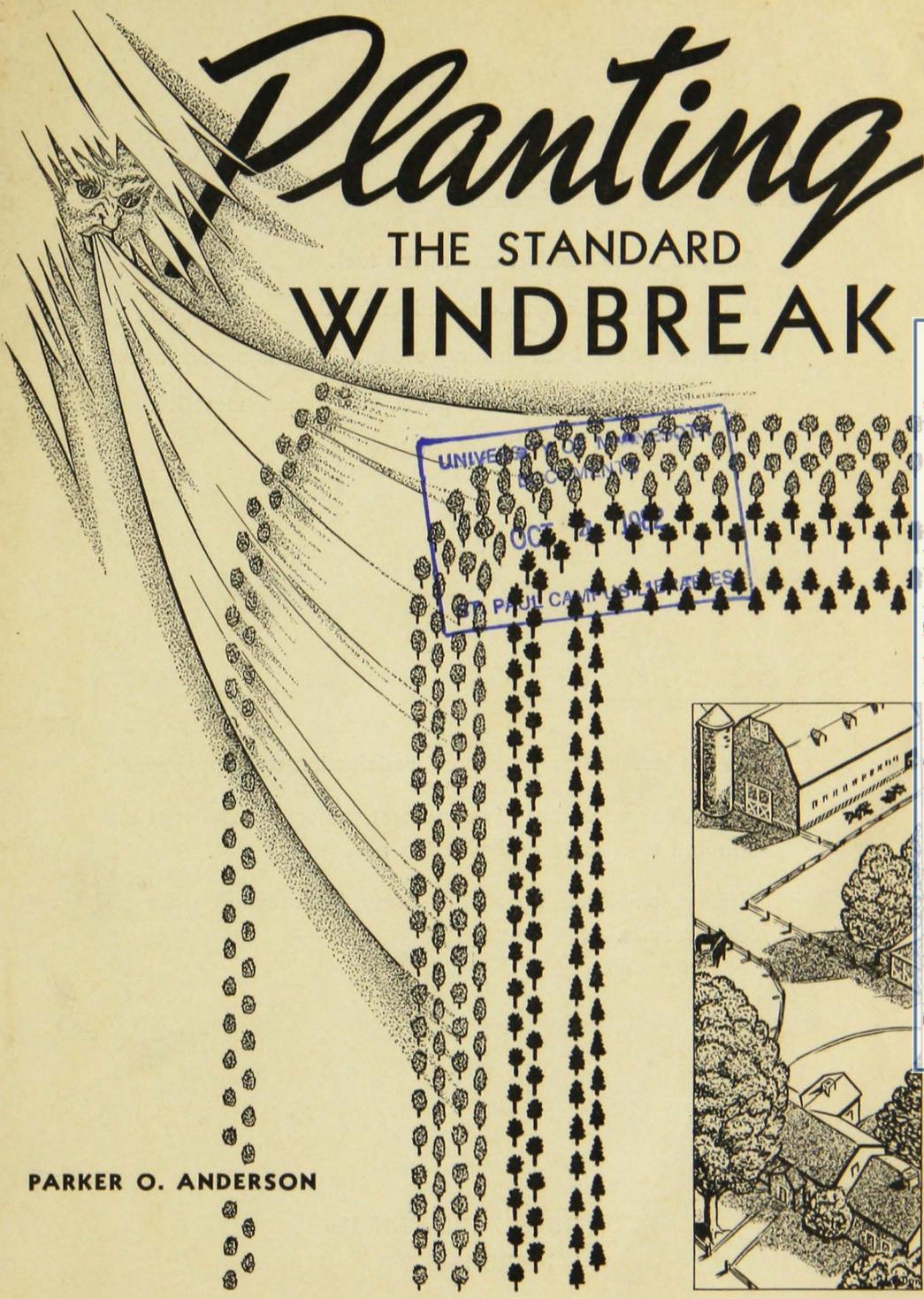


# Planting

## THE STANDARD WINDBREAK



PARKER O. ANDERSON

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## A Good Windbreak:

Adds to home comfort and saves fuel.

Protects livestock, garden, and orchard.

Prevents snow from drifting around buildings and walks.

Supplies fuel wood, fence posts, and repair material.

Enhances farm appearance and value.



## Be Sure To Have:

Correct location for year-round satisfaction and appearance.

Trees of species that give greatest protection and that are adapted to climate and planting site.

Mainly long-lived trees with some fast-growing trees for early results.



## Planting the Standard Windbreak

**T**HE value of a good windbreak can not be computed in dollars and cents. Besides affording protection against wind and snow, a well-planned windbreak helps to beautify the farmstead. If properly managed, it will also furnish fuel wood, fence posts, repair material, and in time may supply lumber to sell to local wood-using industries.

A windbreak protects walks and drives from drifting snow. Snow near a windbreak melts slowly and has a chance to soak into the ground, thus conserving moisture that later is needed for garden plantings.

Fuel consumption is less for buildings that are protected from the wind. Snowstorms raging at 30 miles an hour outside a good windbreak can be reduced to five or six miles inside the planting. Besides cutting fuel costs, the windbreak adds immeasurably to the comfort of the farm family and of the livestock.

Livestock in protected feed lots make better use of their feed. Less of the feed consumed is needed to maintain required body temperature and more goes into milk and meat production.

Every farm should have a small orchard of some kind, particularly for home needs. Without the protection of a windbreak, fruit trees are frequently broken by wind, snow, or sleet storms. A windbreak is also needed to protect flowers, shrubs, and ornamental trees.

Many farmers today are not enjoying the fullest possible benefits from their windbreaks. Many of them have only a few rows of quick-growing, short-lived trees that do not supply the timber or fuel needs of the farm. Old plantings are often too near the main farm buildings, so snow drifts in the yard.

The windbreak plan presented in this bulletin has been used since 1926 and is the standard plan for Minnesota.

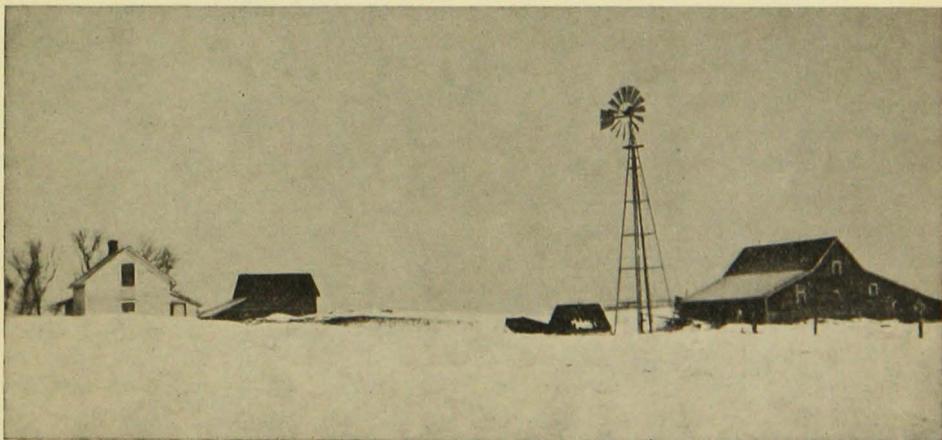


FIG. 1. A FARM IS A DREARY PLACE WITHOUT A WINDBREAK

## LOCATION OF THE WINDBREAK

To afford the greatest protection against prevailing storm winds of Minnesota, the windbreak should be on the north and west sides of the farmstead proper. For the average farm in Minnesota, such a protective planting should extend at least 400 feet on the north side and 400 feet on the west and should not be closer than 100 feet to the main buildings. Where the southwest wind is a problem, the planting on the west may be extended 100 feet or more to protect the farmstead against the dry southwest winds or snowstorms coming from that direction. Plantings should never be made on more than two sides.

The main grove should be at least 80 feet wide. Outside of this should be an open space of 40 to 60 feet, to serve as a snow trap. Beyond that should be a secondary planting of two or three rows of low-growing trees, called the snow catch.

The windbreak should be set back at least a hundred feet from the main buildings to prevent snow from piling up in the yard and to allow room for an orchard and garden between the windbreak and the house. There should also be room for a small barnyard feed lot for the cattle in the winter.

If highways or other obstructions on the west or north sides of the farmstead do not allow adopting the entire plan, adjustments will have to be made. The number of rows of trees can be reduced, or the snow trap may have to be omitted. The object is to give the best protection possible under the circumstances.

## PREPARATION OF LAND

Before planting to trees, the land should be in some cultivated crop such as corn or potatoes for at least one year. This is to provide for the proper pulverizing of the soil, killing of competing grasses and weeds, and to help conserve the moisture so necessary to successful tree growth. New or soddy ground should be broken two years in advance of planting. For land that has not recently been in a cultivated crop, the following procedure is recommended.

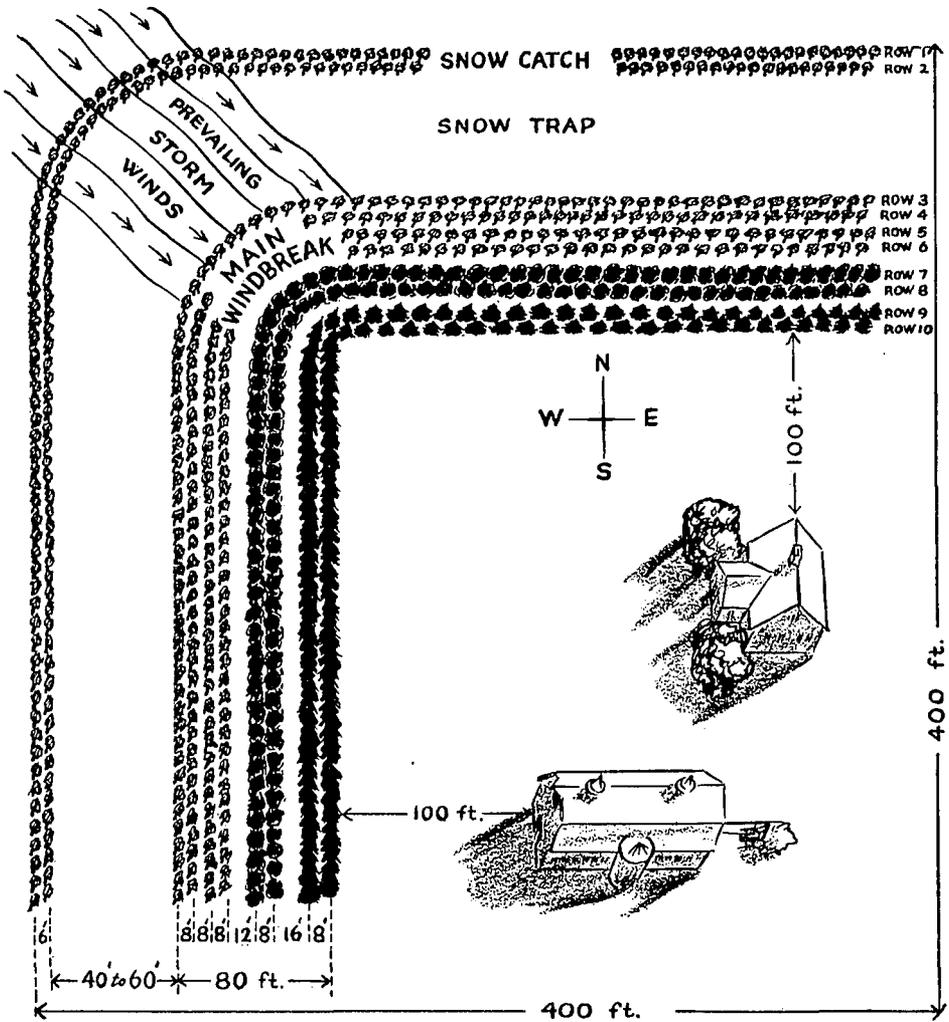
Two years before the trees are to be planted, plow the ground (except in very sandy soil) deep in the fall or spring. Then disk and harrow it during the summer to keep it free from grass and weeds. This amounts to clean summer fallow. This practice has been found the best means of conserving soil moisture so essential for young trees the first year.

One year before the trees are to be planted, plow the ground deep again in the fall and allow it to remain rough over winter. This aids in catching winter snows, which provide needed moisture in the spring.

In the spring the land should be disked and harrowed thoroughly and worked until the soil is mellow. The ground is now in a most favorable condition to receive the trees and assure growth.

## WHAT TO PLANT

Choose trees that have proved hardy in your locality and that are most desirable for the uses required on your farm. The species given in this bulletin have been found the most prac-



- Rows 1 and 2. Caragana, Russian olive, buffalo berry, low willows, wild plum, chokecherry, pincherry, common lilac, or Tartarian honeysuckle
- Rows 3 and 5. Canadian poplar, Norway poplar, northwest poplar, willow, box elder, cottonwood
- Rows 4 and 6. Green ash, elm, hackberry, maple, locust (walnut, butternut, and black cherry in southeastern and south central Minnesota)
- Rows 7 and 8. Western yellow pine, jack pine, Norway pine, Scotch pine, white pine
- Rows 9 and 10. Colorado blue spruce, Black Hills spruce, white spruce, Norway spruce

FIG. 2. PLANTING PLAN

tical and successful and are recommended for the standard Minnesota windbreak.

Figure 2 shows the snow catch and the snow trap outside the main windbreak. A snow catch consists of two rows of low trees or tall shrubs whose purpose it is to catch or retard the snow, causing it to pile up in the snow trap area between it and the main windbreak. Without a snow catch and snow trap, snow will pile up in the main grove and break limbs of taller trees and break down young growing trees or smother them.

**Snow catch.**—Rows 1 and 2 of the snow catch should be planted to low shrub-like trees such as Caragana, Russian olive, diamond willow, golden willow, or low-growing native hardy willows. Buffalo berry, wild fruit trees, Tartarian honeysuckle, and common lilac may also be used successfully. All these species have been found hardy and desirable in every way for snow-catch purposes. They do not grow tall, but grow dense from the ground up. If tall willows are used, they should be trimmed to a lower height so that they will grow as dense as possible. The trees in the snow catch should be planted from four to six feet

apart in the rows, and the rows four to eight feet apart, depending upon the species used.

**Snow trap.**—Snow piles back in proportion to the height and density of the trees in the snow catch, varying from 5 to 15 times the height, depending upon the species and wind conditions. For the trees recommended for the snow catch, a 60-foot snow trap will give the best results. In summer the open area may be used for calf pasture, alfalfa, sweet clover, potatoes, corn, or a farm garden.

**Main windbreak.**—The main windbreak should be 80 feet wide and should consist of eight rows of trees. There should be two rows of fast-growing, short-lived, broad-leaved trees, two rows of long-lived, broad-leaved trees, and four rows of hardy conifers. Such a combination insures the best year-round protection. The fast-growing trees not only afford protection earlier, but also serve as a nurse crop for the longer-lived, more permanent and valuable trees.

Rows 3 and 5 should consist of such fast-growing trees as box elder, cottonwood, Norway poplar, northwest poplar, Canadian poplar, or hardy willows. These trees should all be planted six



FIG. 3. NOTE HOW THE ROW OF SNOWCATCH TREES AT EXTREME RIGHT HELD THE DRIFTS

feet apart in the rows, and the rows spaced eight feet apart. All trees in the grove should be alternated or staggered to break the wind (see Fig. 4).

Rows 4 and 6 should consist of hardy, more permanent, long-lived trees such as ash, elm, hackberry, and soft maple. In south central and south-eastern Minnesota, walnut, butternut, and black cherry may be planted.

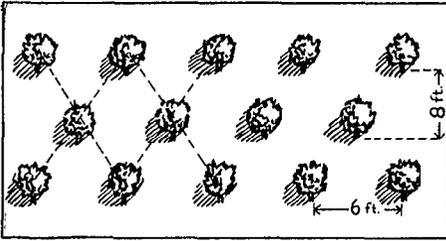


FIG. 4. PROPER ALIGNMENT OF TREES

These longer-lived trees will not only make a more permanent windbreak, but will provide repair materials, fence posts, fuel, and even lumber for the market (see Fig. 5). These trees should also be spaced six feet apart in the rows, and the rows eight feet apart.

When Rows 4 and 6 begin to get crowded and are able to furnish the protection required, Rows 3 and 5 may be cut out and used for fuel. This will leave 16 feet between Rows 4 and 6.

Leave a space of 12 feet between the last row of hardwood trees of Row 6

and the first row of pine, Row 7. When hardwoods grow too close to pines, they are apt to sideshade them. This often results in deforming the pines or leaving open spots in the rows.

Rows 7 and 8 should consist of hardy pines such as western yellow pine, jack pine, Norway pine, or Scotch pine, depending upon the soil and climatic conditions. The species are named in the order of preference. The pine trees should also be planted six feet apart in the rows, and the rows eight feet apart. These trees should also be alternated or staggered.

A space of 16 feet should be left between the last row of pine and the first row of spruce. Spruce is quite tolerant of shade; it grows dense and spreads out. Therefore if it is too close to the pine trees, they also are likely to be damaged or deformed by sideshading. The spruce, Rows 9 and 10 (consisting of Colorado, Black Hills, or white spruce), should be planted six feet apart in the rows, and the rows six feet apart, to make as impenetrable a wind and snow barrier as possible in the shortest possible time.

Spruce has dense foliage from the ground up, 12 months of the year, and is therefore the best tree for the inside row to prevent snow and dust from filtering through. The location of the spruce on the inside where it can be

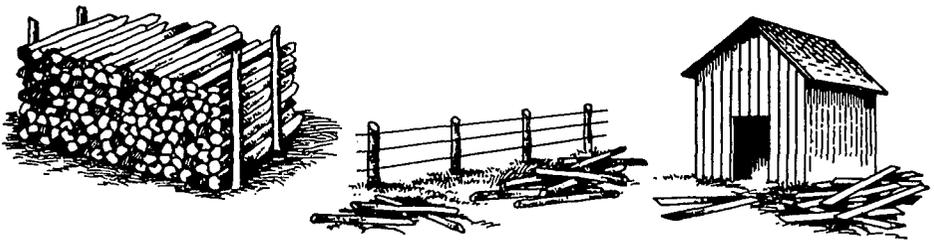


FIG. 5. USE HOME-GROWN TIMBER FOR FUEL WOOD, FENCE POSTS, AND TIMBER

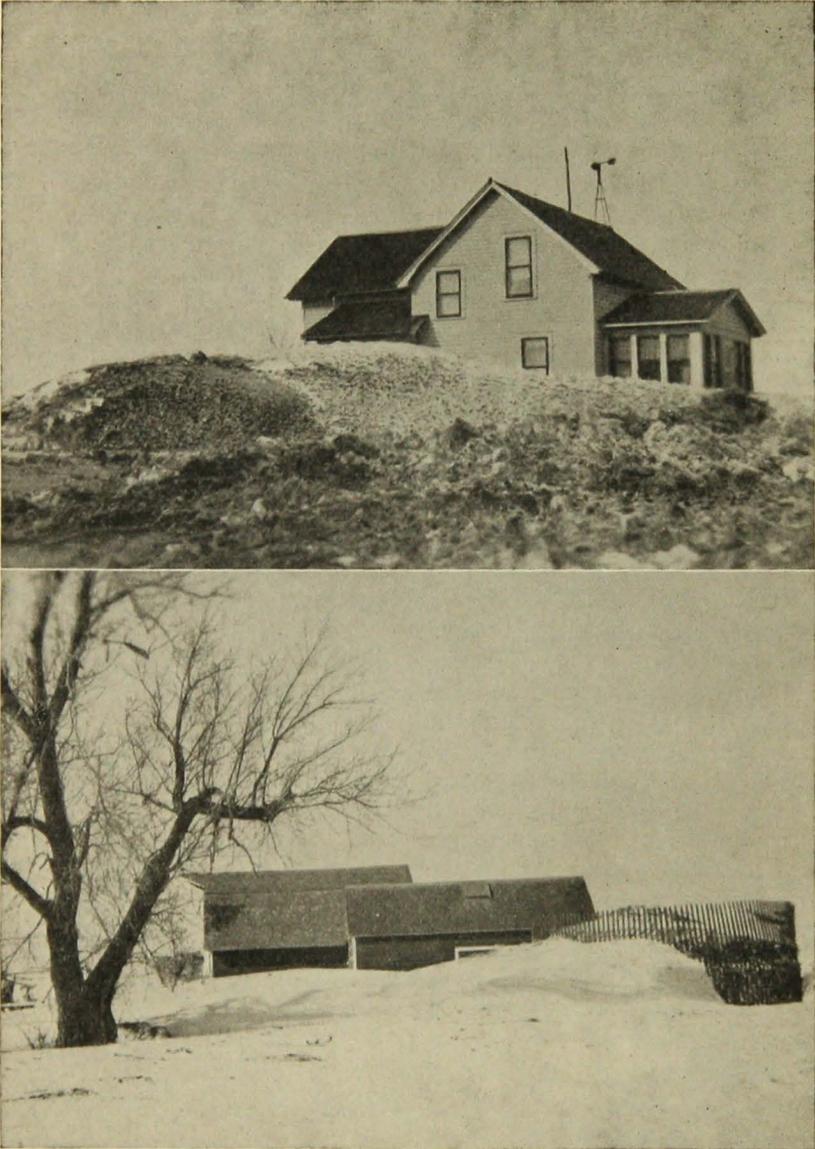


FIG. 6. "IT NEVER SNOWS BUT IT DRIFTS" WHEN WINDBREAK PROTECTION IS LACKING

This house and barn are both on the same Minnesota prairie farm. Believe it or not, the snow had already settled about one third before the pictures were taken.

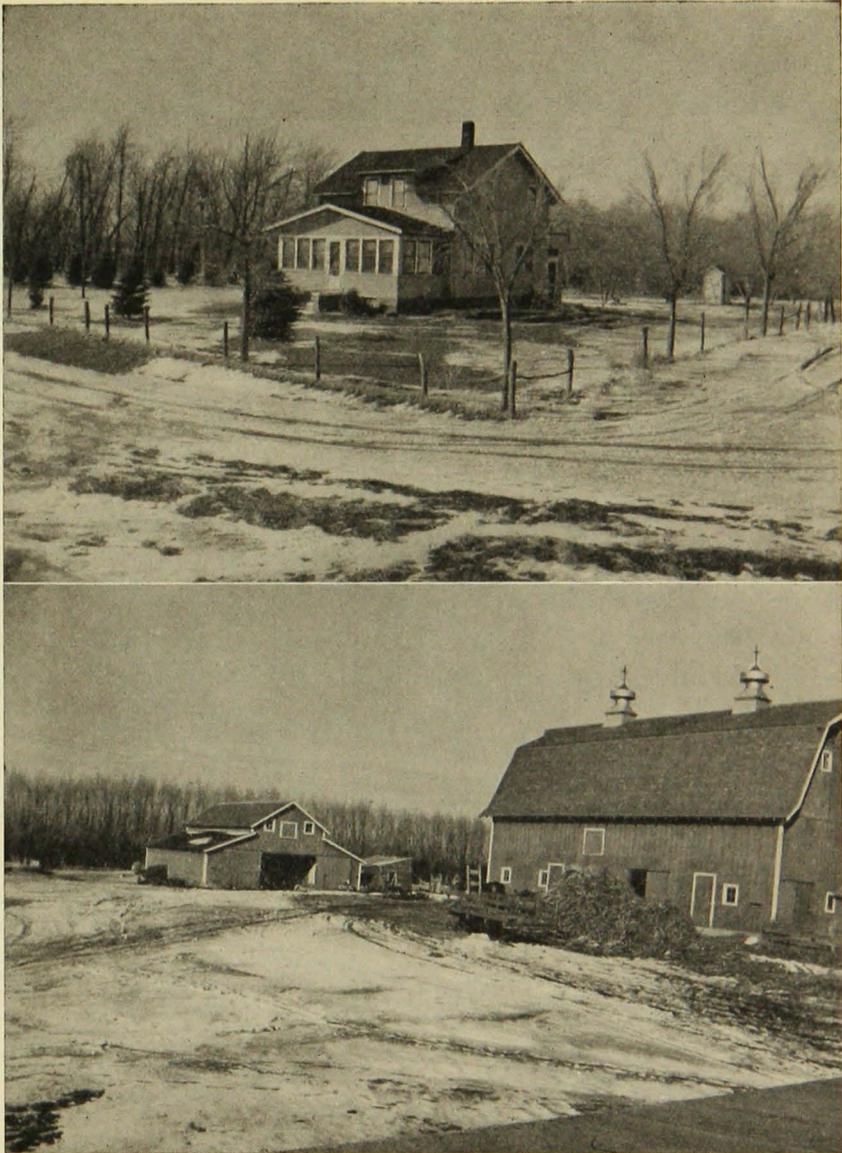


FIG. 7. "IT'S MORE LIKE A HOME WHEN IT'S PLANTED" IS SHOWN BY THESE PICTURES OF A WELL-PROTECTED MINNESOTA FARMSTEAD

Note absence of drifts around buildings and on walks and driveways, as well as the more cheerful, attractive appearance trees give the farm.

seen adds also to home beautification. Because spruce and pine have foliage all the year round, they afford greater protection in winter when the protection is needed.

The close spacing of all the trees, as given, forces them to grow upward faster so that they shade the ground quickly and kill off competing weeds and vegetation, besides giving the best year-round protection against winds. Also because of this close spacing, the annual leaf litter forms a mulch, which helps to retain soil moisture and prevents grass and other undergrowth from coming up.

### SOURCES OF PLANTING MATERIAL

#### Transplants May Be Used

One- to three-year-old seedling hardwood trees that have naturally reseeded on or near your own farm can be transplanted successfully with a little care. The only expense is the labor and transportation. In transplanting, select only hardy trees that have well-formed crowns and vigorous well-developed root systems. Beware of "tree peddlers" who are selling wild stock that they have dug up in timber areas up north.

#### Raise Trees from Seed

Seed from selected native hardwood trees may be gathered at the regular seeding periods. The source of seed is very important. Minnesota climate is quite severe, so only seed from the better-established, well-formed, hardy trees should be chosen. Trees, like other plants, have a strong tendency to carry on qualities and peculiarities that they have developed through years

of exposure to climatic and soil conditions.

Seed so gathered may be sown in drills in a prepared farm garden nursery. Properly cultivated and protected for a year or two, these home-raised small hardwoods may be transplanted to their permanent locations. A large number of farm-home nurseries and 4-H nurseries have been established to meet individual farm requirements. In this way the farm needs as far as hardwoods are concerned can be cared for with little or no expenditure.

#### Cuttings

Cuttings are simply pieces of branches from healthy trees which if properly cut and planted in the soil will develop and grow into trees. They are easily made from willows, cottonwoods, and most poplars. Cuttings may be made in the fall when trees are dormant, or, better yet, in the spring before growth starts.

#### Nursery Stock

If you are buying your seedling trees from a nursery, it is best to deal with a nursery as near your farm as possible, or at least with nurseries within your own state. In that way you will get the trees best suited to your soil and climatic conditions. Shipping costs will also be less. It is an advantage for several farmers to "pool" their orders to cut costs.

### POINTERS ON PLANTING

#### Early Planting Best

Early spring, just as soon as the frost is out of the ground, is the best time for planting windbreaks. The

ground is then moist and the sun is mild so that the trees have a chance to become established before summer drouths and before weeds interfere with their growth.

### Place Orders Early

Place your order early in the winter. This will give nurseries a chance to offer a greater selection and better service. It will also assure early arrival in the spring, when the ground is in a good, mellow condition, and at a time when planting will not interfere with the other spring work.

### Replacements

Windbreak success is assured only if a well-planted grove is brought to mature size. Dead trees cut down the efficiency of the windbreak. It is highly improbable that all of the trees planted will survive. In ordering and buying trees, it is wise to get 10 per cent more trees than the plan calls for. These extras can be planted in the garden and used when and where needed for replacements. If they are not needed for replacements, they can eventually be used for improving the farm-home grounds.

### Small Trees Desirable

Only trees with good sturdy root development should be planted. A well-developed root system is more important than a big top. Trees with large tops and insufficient root systems are likely to die of starvation, because the tops demand more food and water than the root system can supply. For this reason, evergreen transplants of about four years of age, not more than 10 or 14 inches high (depending on the species) are most desirable, partic-

ularly those that have well-developed root systems. Four-year-old good conifer stock is known as 2-2 stock which means the trees have been grown two years in a seedbed and two years in a transplant bed. Trees of this size are also easier and less expensive to ship than larger trees, cheaper to plant, and much easier to handle.

Hardwood trees of about two years of age are large enough to give very satisfactory results. For some species, such as willow, cottonwood, and poplar, cuttings are practical and desirable and can easily be made from the farmer's own trees.

### Handling Trees Upon Arrival

Call for trees at the express office as soon as they arrive. Some fresh water should be poured into the package immediately, before leaving town. Nearly all trees come with their roots wrapped in moist moss to prevent them from becoming dry while in transit. The trees should not be left in the package too long or they will dry out, heat, mold, or otherwise become seriously damaged.

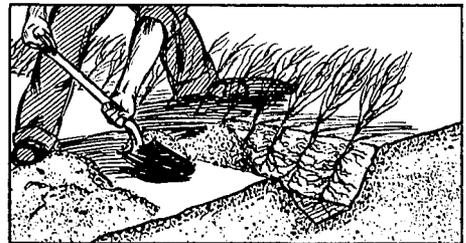


FIG. 8. HEELING-IN TREES

Arriving home, "heel-in" the trees in a trench, preferably in a cool, shady place. Make the trench deep enough and long enough to take the entire root system and a part of the lower stems.

The trench should be dug fairly narrow, so one can straddle it easily. The ends and one side should be cut straight, with one side sloping (see Fig. 8). The trees should be placed in the trench side by side, or in small bunches, and the dirt thoroughly packed around the roots. Soil removed from the trench can be used to pack around the roots. Trees may be left heeled-in for a week or ten days if the job has been well done.

When removing the trees for actual planting, only as many as can be carried in a pail or as can be planted in an hour or so should be removed from the trench at a time. The remaining trees should be covered again with dirt. Under no circumstances should the trees be allowed to become dry.

### PLANTING CUTTINGS

Cuttings from 12 to 16 inches long and from a half to three quarters of an inch in diameter are most successful. The cuttings should be made from the younger and better-developed portions of healthy trees.

It is good practice to soak the cuttings for 24 hours before planting.

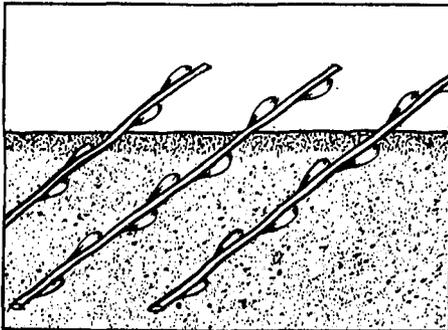


FIG. 9. PLANTING AT A 45-DEGREE ANGLE BRINGS THE SOIL IN CLOSE CONTACT WITH THE CUTTINGS

Best results are obtained when the cuttings are planted at an angle of 45 to 60 degrees, with only two buds above the ground (see Fig. 9). This is to assure the establishment of a strong root system, which is essential for good top growth. The soil should be firmly tamped around the lower end.

Another reason for planting cuttings in a slanting position is that the lower part will then always be in close contact with the soil, even after the ground settles. If cuttings are planted in an upright position, the ground settles away from them and they dry out (see Fig. 10). It is just as easy to plant them at an angle as it is to plant them upright. If the cuttings are planted properly, a growth of from two to four feet may be expected in one year.

### Handle Cuttings Carefully

Pushing the cuttings into the soil is likely to peel the bark, killing the cambium layer, or the living tissue. This results in failure to grow at the point injured. A good opening therefore should be made with a spade, the cutting carefully inserted, and the soil pressed down firmly about the lower end.

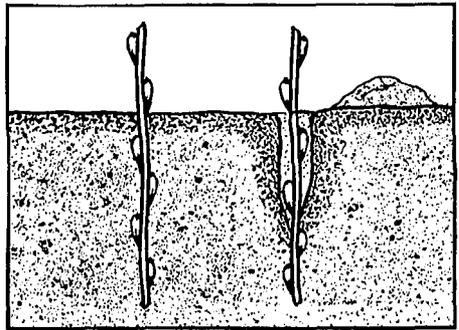


FIG. 10. IF THE CUTTINGS ARE PLANTED STRAIGHT, THE GROUND SETTLES AWAY FROM THEM

Another method is to plow a furrow, lay the cutting in the furrow, and turn the earth back on the cutting to the proper depth. The earth on the lower end should be tamped with the feet to force it in close contact with the roots. All plantings must be protected and given subsequent care if best results are to be expected.

### PLANTING SMALL TREES

During the actual planting operation, the small trees should be carried in a bucket of muddy water and taken out one at a time, but not until the hole has been freshly made. Roots of evergreens particularly should never be allowed to become dry from being exposed to sun or wind, even for a few minutes. The delicate small rootlets of evergreens are easily injured or killed upon exposure to sun or wind. Dry roots mean dead trees.

A shovel or spade is the most practical tool to use in tree planting. If the soil has been prepared properly, it will be loose and well pulverized, easily worked in.

The tree roots should be kept moist and in good condition from arrival up to planting time. During planting and handling be careful not to skin or break the branches or roots.

The hole method of planting is recommended. The hole should be deep enough and wide enough to take the entire root system without crowding it (see Figs. 12 and 13).

The tree must be held in a firm and upright position until the soil has been well tamped around the roots (see Fig. 13). Packing the soil thoroughly is necessary to exclude air spaces next to the roots. If it is not done, there will

be heavy losses during dry summer months. Usually it is not necessary to pour water into the hole after or during the planting process for small trees, particularly if the hole has been freshly dug.

The depth to plant can be determined easily by looking for the dirt ring on the lower portion of the tree. The part of the tree that was formerly in the ground will be darker than the upper stem, which was above ground. The tree should be planted the same depth as it stood in the ground before being dug. If the ground is very loose,



FIG. 11. TREES FOR PLANTING SHOULD BE CARRIED IN A PAIL HALF FULL OF MUDDY WATER

it should be planted an inch or so deeper to allow for settling of the dirt to the right depth. Above all, do not plant the tree shallow. Do not "hill up" dirt around planted trees (see Fig. 14). After the tree is planted, the ground should be level or slightly depressed so that rain will not run off (see Fig. 15). Plant carefully.

### CARE AFTER PLANTING

#### Cultivation

Frequent cultivation at proper intervals stores moisture in the soil, which helps to carry trees over dry periods

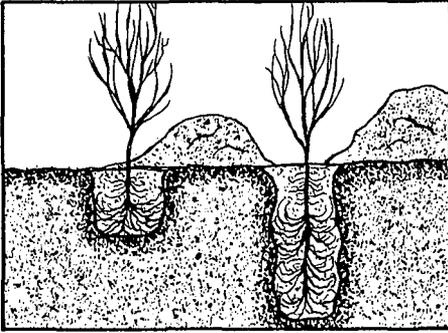


FIG. 12. LEFT, PLANTING TOO SHALLOW AND TOO NARROW; RIGHT, TOO DEEP AND TOO NARROW



FIG. 13. PLANTED PROPER DEPTH, ROOTS WELL SPREAD, SOIL TAMPED AS DIRT IS FILLED IN

that are sure to come later in the summer. A one-horse cultivator and a hoe are the best tools for cultivating a young plantation. Cultivation should not be deep or too close to the trees, or the roots immediately below the surface will be cut off or disturbed.

Dirt should not be hilled up around the trees, especially around evergreens. Roots of trees, as well as the leaves, need air. Piling dirt high will encourage the growth of an extra set of surface roots, causing the lower and more important roots to cease functioning.

During the first few years, when the trees are small, corn or some other cultivated crop may be drilled in between the rows. After the corn is picked, the standing cornstalks may be left over winter to help catch and hold snow around the trees, thus preventing or reducing danger of winterkilling.

Cultivation after the middle of August is not necessary. Late cultivation tends to stimulate late fall growth at a time when the trees should be getting ready to harden up for winter. Late weeds can be pulled or hoed, or they can be left over winter. They may help to catch a blanket of snow, offering additional winter protection.

Cultivation and protection after planting must be continued until the trees are large enough to care for themselves. Cultivation should be continued each year, as long as is physically possible, or at least until the trees are high enough to shade and protect all of the ground. Otherwise grass and weeds will come in to crowd and retard tree growth.

### Mulching

Mulching should not be done unless it is absolutely impossible to cultivate. Mulching tends to encourage surface roots, because moisture is held close to the surface and the roots are not forced to go down into the ground for needed moisture and food. Surface roots thus developed are more susceptible to seasonal changes, to drouth, and to winterkilling.

The area around the trees should be kept black by keeping it free from weeds and grass. The best mulch is the dirt mulch obtained by regular cultivation. If mulching is necessary, only clean straw or hay should be used. Do not use raw manure as the ammonia contained in it tends to burn and harm roots. Where soil is heavy and hard to work, well-decomposed manure

placed around the base of trees in the fall and worked into the ground in the spring is beneficial.

### Pruning

Do not prune windbreak trees. The denser the planting, the better the windbreak. Pruning the trees makes a sieve for the snow and wind to filter through. It also lets light in on the ground, which encourages the growth of grass and weeds and allows surface soil moisture to dry out. Instead of pruning limbs when the trees are young, individual trees may be thinned out later, but only when crowding makes it necessary. Density of leaf surface as well as the number of stems in the grove are factors in wind-protection efficiency. Pruning and thinning are problems to be considered only after a number of years, when health, efficiency, and growth are fully established.

### Protection

To establish a windbreak takes patience and continued interest on the part of the home owner. Short-cuts end in failure. If you have planted trees that were known to be hardy and that are suitable to your locality, you can, with proper care, expect success.

Protect the plantings from fire, and

put up good fences to keep all farm animals out. When evergreens are small, even chickens will injure them by scratching around the base and exposing the roots to dry winds and sun.

Watch plantings for evidences of diseases and insect attacks. When disease or insect injury is noted, act immediately. Send specimens to the Entomology Department, or to the Extension Forester, Agricultural Extension Division, University of Minnesota, for identification and for control measures. Nearly all leaf-eating insects can be controlled by spraying with arsenic solutions, the same as other farm insects and pests.

If a straw or hay mulch is put on for winter protection, it should be done in the fall, after the ground is frozen, to discourage field mice and other rodents from making winter homes there.

Watering may be necessary at intervals during periods of continued drouth, but in normal years little else is needed but timely cultivation to keep weeds and grass under control.

Water draining from manure piles and hog lots should not be allowed to wash around planted trees. This point alone causes many losses. Diversion ditches should be constructed to control this problem.

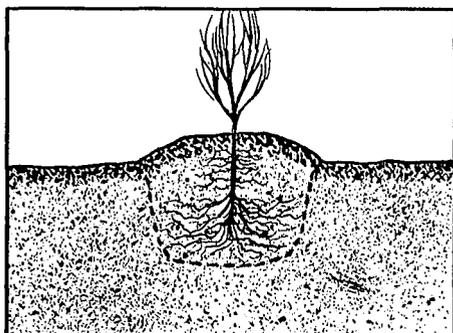


FIG. 14. DIRT HILLED UP TOO HIGH

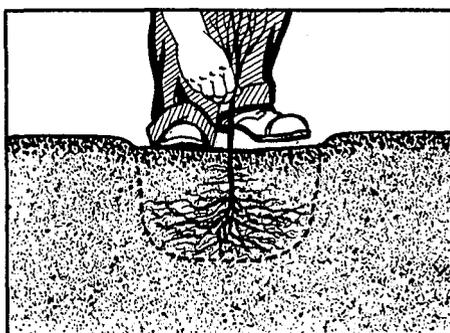


FIG. 15. A GOOD PLANTING

## Start Your Windbreak Now

No home is truly a home until it is planted. Association with growing things makes for better living; a farm is more than buildings, cattle, and crops. Through well-planned protective plantings, pride in the home and its surroundings may be kindled in the hearts of our children. With little expense, the dream for beauty and comfort may easily be realized.

The Minnesota standard windbreak is sketched below. With this picture in mind, start your windbreak now. The standard windbreak offers to rural Minnesota all the hopes for fullest farmstead protection and beauty of landscape.



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### UNIVERSITY FARM, ST. PAUL, MINNESOTA

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