

Five Acres of Forestry

by

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Outline.

Kansas farmer and forestry.

Benefits of forestry.

Where to put the forest.

Irrigation of the forest.

Selection of trees.

Selecting and planting seeds.

Depth to plant different seeds.

Seedlings, how to raise.

 how to heel in.

 how to transplant.

Cuttings, how to make.

 how to grow.

Plan of forest

Number of trees per acre.

Some forest trees.

Mixed forest, reasons for.

 value of

 plan of

Profit of a forest tree.

 Catalpa.

Five Acres of Forestry.

The average Kansas farmer is too busy to plant a few acres of forest trees. If he would stop a few minutes and figure, and look a few decades into the future and see the results, he would greatly improve his farm, and if all the farmers would have a few acres of forest, the farms of Kansas would rapidly increase in value.

A farm of 160 A should have about 5 A. of forest, and larger farms proportionate. This is the minimum limit a farmer should raise.

What benefit is a forest to the farmer?

- 1 It can be used for a wind break.
- 2 It furnishes posts and wood.
- 3 It enriches the soil.
- 4 It produces ties and timber.
- 5 It catches dirt driven by storms.
- 6 It checks winds, and land from washing.
- 7 It adds beauty to the country.

It is a good plan, if one is going to raise a forest, to plant it for a double purpose. First to raise a few acres of trees. Second to secure a wind break or prevent a slough from washing.

Some farmers allow their stock to ramble among their forest trees. This is a poor plan as the cattle will destroy the tender shoots, and trample the ground so that it becomes hard and the water will run off instead of soaking into the ground. Trees require a vast amount of water and therefore none should be wasted. The trees are ruined if when young the tops are broken out. This makes crooked trees.

In the greater part of the state the forest will need irrigation ranging from a few weeks to several months. This does not add much to the

cost as we have plenty of wind. A twelve foot wheel will lift from twenty to twenty-five feet sixty-five to eighty gallons per minute. Thus in eight hours it would pump enough to supply one acre one inch of water. Five acres of well watered land is worth eighty acres of drouth stricken land.

In selecting the kind of trees to be planted, one must consider the soil on which he wishes to plant, whether it is wet or dry, flat or sloping, sand or clay, rich or poor.

The willow, cottonwood, White Elm and Swamp Oak are among the best lowland trees. The White and Bur Oaks, Black Wild Cherry, Honey Locust, Osage Orange, White, Austrian, Scotch and Bull Pines, White and Green Ash, Black Walnut, Shellbark Hickory, Pig Hickory, linden and catalpa are good trees for common soil.

If the ground is very poor it is well to mix plenty of catalpa or some such kind of tree to increase the fertility of the soil.

In selecting and planting the seeds care should be taken in securing the best seeds. These are found in middle aged trees, standing somewhat alone so they can get plenty of sun light and air. This does not necessarily make the seeds good, break a few of them open and see what percent of them is good. If gathered when the weather is dry throw some of them in water, those that sink are good seeds. Plant some in moist soil and keep warm and notice how well they sprout. Some may be tested by pouring boiling water over them or by steaming, this accelerates the sprouts.

The seeds of the cottonwood and willow lose their maturity soon after ripening in the early summer. Those that ripen in the Fall are also delicate keepers, such as acorns and nuts, and should be planted in the fall or stratified in damp soil and kept in a cool place through the Winter, then plant them in the Spring. In planting them in the Fall they are liable to be

It should be noted that the seeds which have the white oil of the

distroyed by small animals and frost which heaves the nuts out of the ground. The animals may be poisoned, and put leaves or boards over the rows to keep the frost from throwing the seeds out of the ground. Plant extra seeds for misshaps.

In making the seed bed the ground should be furrowed deep and wellworked. There are different methods of planting seeds. For small and expensive seeds it is well to plant in beds with paths between and rows from six inches to one foot apart. With large and less expensive seeds it is a good plan to plant in rows far enough apart to be cultivated. The seeds should not be planted too thick as they will make spindling seedlings. If it does occur thin them out.

The depth seeds should be planted varies, but as a rule, deep for large seeds and shallow for small ones. Don't cover too deep. The oaks from 1 1/4 inches to 2 1/2 inches deep. Maple and ash from 3/4 inch to 1 inch deep. The Scotch Pine 1/2 inch deep. If seeds are planted in the fall they should be planted deeper. In raising plants in smaller beds, sprinkle it if dry with water in the evening, if wet with sand say 1/8 of an inch deep. A box of dry sand should be kept under shelter for this purpose. The seeds should not be planted with in 6 or 8 rods of a shelter belt, so as to allow plenty of circulation of air, and sunlight. In raising good plants animals must be kept off and weeds and grass out of the beds.

In raising seedlings keep the weeds and grass out and soil loose. Cover in the fall with a light covering of hay and remove in April. If the plants are too thick remove some of them, don't leave the "fittest" but thin them out where they need it, and be careful not to disturb the roots of the ones that are to remain, to much. Do not throw away those that are removed. Take out of the ground with care and put them in a pail of water.

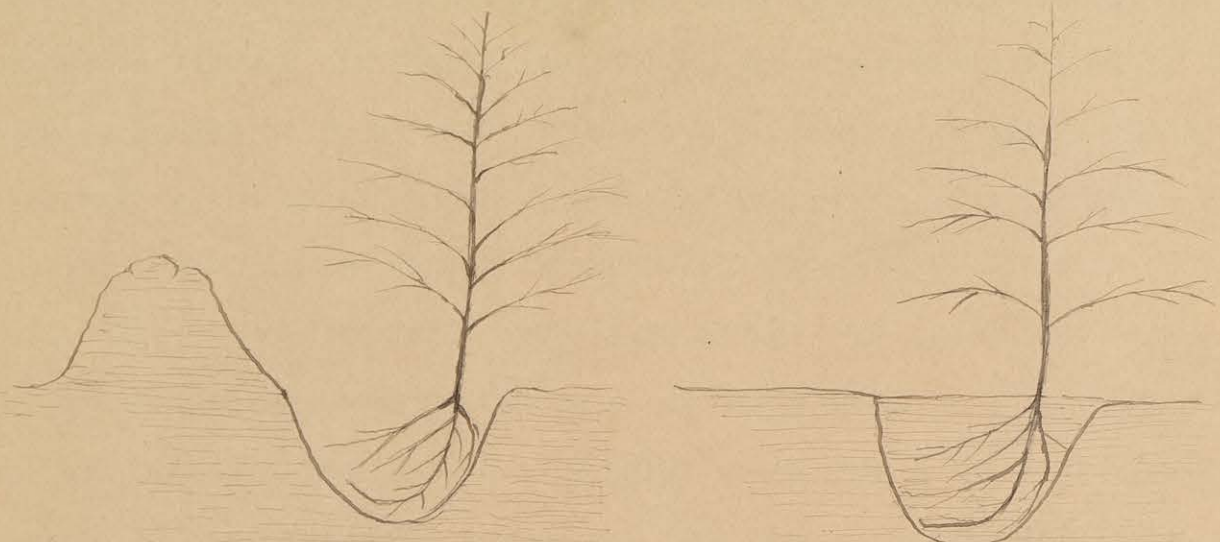


Fig. 1.

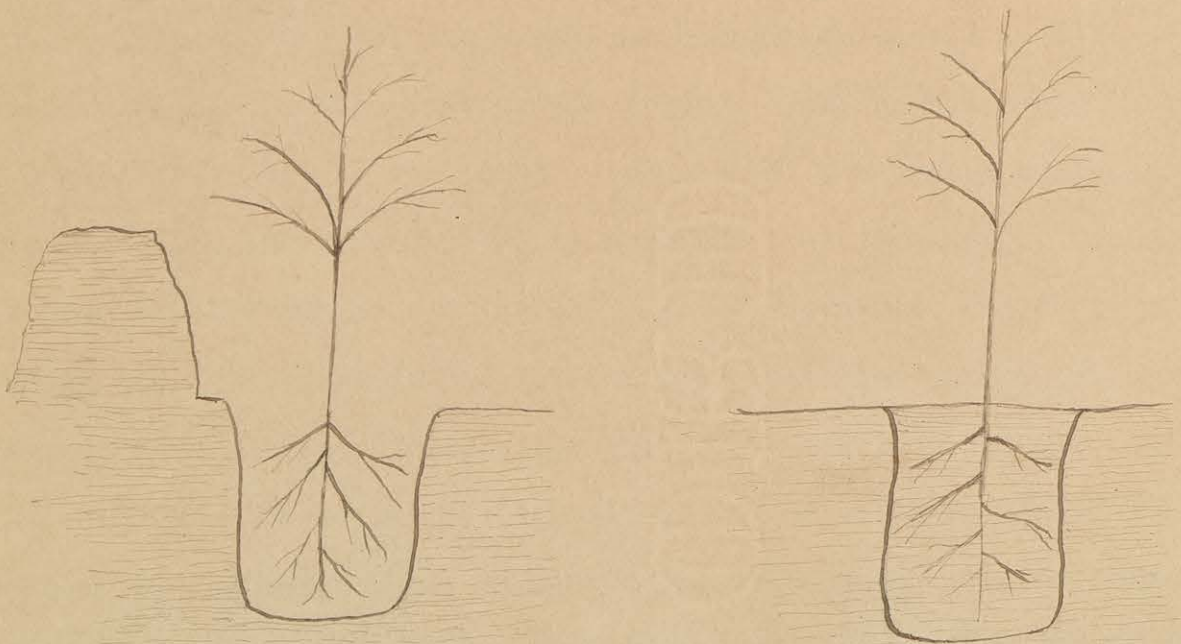
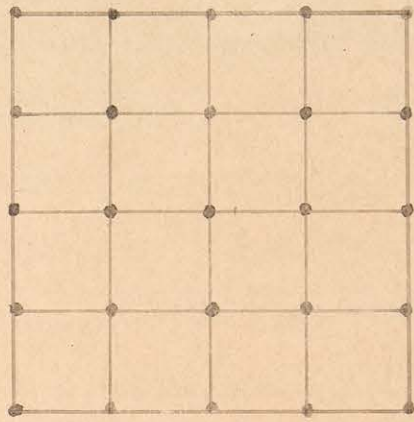


Fig. 2.

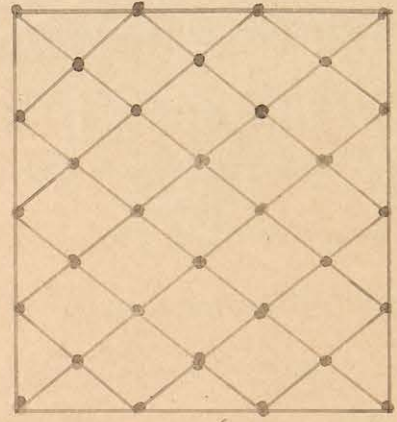
and set them out. Do not let the wind or sun strike the roots. Cultivate until the middle of July, then cease all operations so that the wood may harden for Winter. Let grass and weeds come in they will protect the plants during the Winter. If plants are not set out cover again with hay. If there is danger of frost breaking the tap roots they should be heeled in. In heeling in the trees do not expose them to the sun or wind. The trenches in which the trees are heeled vary in size according to the size of the trees. They should be in a shady place or put with their tops to the South. The end of the trench should slope at an angle of about 40 or 50 degrees with the ground. Then put in a layer of trees then a layer of dirt and so on until all the trees are heeled in. The dirt should be piled high enough in the center to shed water. Some prefer planting walnut, hickory and oak where they are to make trees, these trees have long tap roots. The trees make a better growth in their younger life if not molested.

In setting out the seedlings the ground should be in a warm moist condition. Do not plant in wet ground. Take up the trees that have been heeled in or out of the nursery row, cut off the broken roots, and trim the top to match, ^{should not be molested} the main shoot if a straight tree is wanted. Dip roots in mud before setting out, do not let the wind or sun strike the roots or let the roots dry. Use a spade for setting the plants and do not put the roots in cramped position, (See Fig.1) Give them plenty of room and let them spread out as in Fig.2. Press the soil firmly about the roots, and leave a little loose dirt on top to keep the ground from getting hard. If the trees are not too large harrow them two or three times before they come out in leaf. This will greatly check the grass and weeds and loosen the ground about the trees. Do not harrow evergreen but give them a little shade.

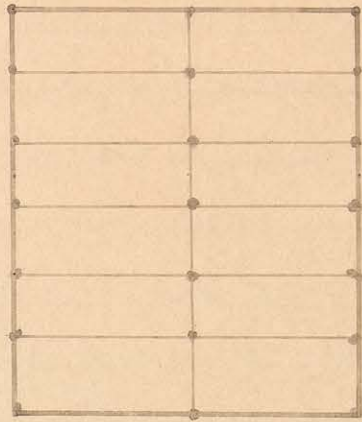
The Willow and cottonwood may be grown from cuttings, by taking



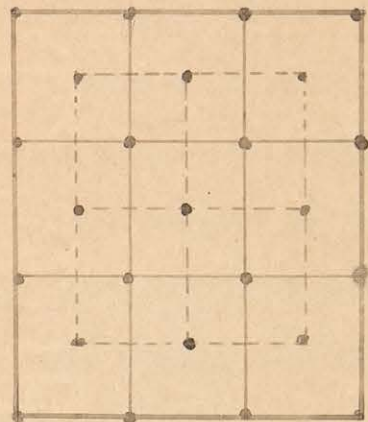
a



b



c



d

Fig. 3.

mature one year old branches and cutting into pieces 8 to 10 inches long. Then keep them in a cool place over Winter and set them out in the Spring. Plow an 8 inch furrow and set them along the land side and cover with dirt and pack it well about them and leave a little of the stalk stick out of the ground, and a little loose dirt on top. They may be thrown in the bottom of an 8 or 10 inch furrow and plowed in under. The cutting roots spread more than to the seedling roots, but the trees do not seem to do so well.

In putting out forestry there are several plans for setting out trees. The square method is used a great deal (Fig 3-a) the trees are set on the corners of a square. The triangle method (Fig.3-b) this method alternates the trees in the rows. The rectangular method (Fig.3-c) the trees are much thicker one way than the other. The double square method (Fig 3-d) is another very good method. There is also what is called the hit and miss method, but this is not a very good method unless in swampy or stony ground where cultivation is not necessary or can not be cultivated. Even then the trees will make a better stalk if planted certain intervals apart, while the other way gaps are liable to be left which will cause the trees to bend in that direction or a tendency to branch which is not desirable. If seeds have been planted where the forest is to stand, there will be rows in but one direction. As a rule in thinning out take out the poorest and leave the best unless the latter are too thick then some of them must be removed.

The number of trees that can be set on an acre of ground different distances apart is as follows.

6x6 inches	154240.	2 x 1 ft.	21780.
12 x 12 inches	43560.	2 x 2 ft	10890.
18 x 18 inches	19360.	2 x 4 ft	5445.
3 x 2ft	7260.	10 x 1 ft	14356.

3 x 3 ft	4840.	10 x 10 ft	435.
3 1/2 x 3 1/2 ft	3781	12 x 12 ft	302.
3 x 4 ft	3630	15 x 15 ft	200.
4 x 4 ft	2720.	16 x 16	170.
5 x 5 ft	1742.	18 x 18 ft	135.
6 x 1 ft	17260.	20 x 20 ft	110.
6 x 6 ft	1240.	22 x 22 ft	90.
8 x 1 ft	15445	25 x 25 ft	70.
8 x 5	1000.	30 x 30 ft	50.

Some of the most valuable forest trees in Kansas are the White Oak, Bur Oak, Black Walnut, Shellbark Hickory, Pig Hickory, White Pine, Scotch Pine, Austrian Pine, Bull Pine, Honey Locust, Osage Orange, White Ash, Green Ash, catalpa, Soft Maple, Box Elder, cottonwood, White Willow, linden and Russian Mulberry. The oak can be raised readily from seed. The acorns should be gathered as soon as dropped and planted at once or kept in damp sand in a cool place. If the acorn is allowed to dry out, it will not germinate. Plant if kept over, in the Spring, they may either be sown broad cast or in rows, the latter is preferable. Cover the seeds from 1 1/4 to 2 1/2 inches deep. They may be set out in the forest when 2 or 3 years old. It grows best if planted about 8 feet apart and upright growing trees planted in between, such as linden, cottonwood and catalpa, but must be removed as soon as oaks need the room. It is said that the oak lives about 200 years and that it increases about one cubic foot every year after it is 25 years old. It does not slacken growth with age.

The White Oak and Bur Oak are the two best oaks for Kansas the Bur Oak will grow on drier ground than the White Oak. The Bur Oak is the stronger and courser of the two and is used where strength and durability

is needed also is White Oak, White Oak is used extensively for finishing purposes, fence-post and rail-road ties.

The walnut like the oaks must have their seed planted before they thoroughly dry out. They should be planted where the tree is to permanently stand, as disturbing its tap root retards the growth of the tree. No other tree will grow in the shade of the walnut. It grows to a height of about 70 feet and from 3 to 4 feet in diameter, they are often taller and thicker. It begins to bear at from 8 to 10 years of age and increases in fertility with age. The sap wood decays readily when exposed to the weather, but the heart wood remains sound for years. When properly seasoned it is strong, tough, and not liable to split or warp and never is attacked by worms. It has a fine grain and admits a high polish. Posts made of Black Walnut last from 20 to 25 years.

The hickory like the preceding seeds must not be allowed to dry out. The tap root must not be injured, unless in the Shellbark nuts are wanted instead of a quicker growing tree.

The Shellbark and Pig Hickory seem to do the best in Kansas. The wood is used where strength is needed such as axle-trees and the like.

The pine is a slow growing tree but is one of the most valuable commercial trees, they attain large size, and no branches interfere with the trunk, there being no branches except at the top if properly grown.

The pine seed should be planted in small beds where they may be shaded when small, and when a foot or so high should be planted in permanent places 8 feet apart and other trees between them.

The White Pine is not of much use until large enough to make a saw log. It is used for lumber and fuel. The price of White Pine is advancing rapidly as the Northern forests are being cleared and burned out.

The Austrian Pine is used for turpentine, timber, fuel and wind breaks.

The Scotch Pine is said to be the best all around tree and is generally the best grower.

The Bull Pine is a native of the Black Hills and so is adapted to a dry climate such as the Western part of Kansas, and can stand much drier climate than the other pines.

The Honey Locust seeds should be soaked in water 150°F temperature before planting. If planted in the fall they come up succeeding years thus causing trouble. Some of the Honey Locust are thornless. The trees do not do well if planted too close together and if too far apart they will ruin their trunks by branching. The trees resist drouth and are medium growers. The wood is known for its durability. Some trees that were measured when ten years old showed they were 84 1/2 ft. high 10 inches in diameter at the ground, 8 inches 5 ft. from the ground and 10 ft. from the ground 5 inches average.

The Osage Orange is one of our best trees although it is never so large a tree as the oak or cottonwood, it makes up for what it lacks in size in its quality. In raising the Osage Orange plant in rows six feet apart one way and about 2 or 3 ft. the other. In trimming out the brush in certain rows and leave others clear for roads, and do all the trimming while the wood is green and with a keen ax. It has two bad objections one on account of its splitting and the other on account of the thorns, but the durability of the wood redeems it, it is strong, admits a high polish and is readily grown from its sprouts.

The Green Ash, White Ash, Soft Maple, and Box Elder all should be planted in the fall or shortly after seeds mature, they should not be kept

till Spring unless kept in damp and cool sand. The Green Ash and White Ash do well in Kansas. They are not so much inclined to branch as some of the other trees are. The Soft Maple is a rapid grower but the tops are liable to be broken by the wind. It's wood is not of much use. It is used for fuel. The Box Elder is a fair forest tree, it is inclined to branch low.

The seeds of the Hardy Catalpa should be sown about 25 seeds to the foot in shallow drills about one inch deep. They should be planted in spring in good warm weather not too early nor too late. Heel the plants in over winter and set them in permanent places the following Spring. They can be set in 8 ft. rows, then corn can be planted between the rows, this is an easy way to keep out the weeds and the corn will pay the expense, it also will protect the trees from the sun. If the trees are cut to the ground the second year they will send up shoots that will make better trees than the old stock.

It takes from 10 to 12 years to make a post but after the first one is cut the sprout will make a post every five years. Pruning is very important in the Catalpa grove, as on this good timber depends, as the Catalpa branches do not fall readily, thus forming places for insects and fungi to gather.

The Russian Mulberry can be propagated by planting the seeds as soon as ripe. The seeds soon germinate and the seedlings make a growth from one to two feet the first season. The trees should be cut back the first or second year and a single shoot allowed to grow. They have been known to grow 8 feet high and an inch or more in diameter in one season. They must be planted close or else they will spread, but do not plant too thick. If too thick they will need severe pruning. These trees sometimes reach a diameter of 10 inches four feet from the ground at 15 years old. The trees

make durable posts and good fuel.

The cottonwood seeds should be sown as soon as ripe on moist sandy soil; If the cotton is liable to be troublesome plant trees from cuttings of ripe wood or staminate flowered trees. The cottonwood tree is best adapted to wet land where it grows rapidly but grows very well on high ground. It can be used to stop land from washing or hold creek banks. On upland the trees are of shorter lives and smaller in size. A good average of 24 year old trees growing on fair soil show a height of 70 feet, base diameter 23 inches, 10 ft, 21 inches 20 ft. 19 inches 30 ft 12 1/2 inches. The wood is not of much use only to make crates and boxes and is used however for fuel.

It is not a good plan in setting out forest trees to have them all of one kind. There are several reasons for this. a. If insects attack one tree they will spread to all the trees in the grove. b. If they are light needing trees they will crowd each other too much. c. A farmer as a rule needs a variety of wood on the farm. d. If slow growing trees are wanted quick growing trees may be planted between them, and thus bring an income from the land instead of keeping it unnecessarily idle. In a mixed forest set the trees out densely for safety and mutual protection, and thin out the trees as it becomes necessary.

Some of the plans for mixed forests.

In this plot the trees are 3 feet apart each way 4840 trees to the acre. The oaks and walnuts are 12 feet one way 24 feet the other.

The Russian Mulberry and the Hardy Catalpa are to be the first to be removed.

m a m l m a m l m a l m.
 c m c h c m c h c m c h.
 m l m o m l m a m l m o.
 c h c m c h c m c h c m.
 m e m l m e m l m e m l.
 c m c h c m c h c m c h.
 m l m w m l m a m l m w.
 c h c m c h c m c h c m.
 m a m l m a m l m a m l.
 c m c h c m c h c m c h.
 m l m o m l m a m l m o.
 c h c m c h c m c h c m.

The trees and number of trees in the plot are as foollow.

- m- Russian Mulberry 1815 trees to the acre.
- c- Hardy Catalpa 1220 trees to the acre.
- h- Hickory 650 trees to the acre.
- l- Black Locust. 650 trees to the acre.
- A- W. and G. Ash 308 trees to the acre.
- o- Bur Oak 75 trees to the acre.
- w- Black Walnut 75 trees to the acre.
- e- Scotch Pine 152 trees to the acre.

In the following two plots the trees are set 4 feet apart each way.

m e m e m e.
 a p a p a p.
 m e m e m e.
 a p a p a p.

m - Soft Maple 680 trees to the acre.

- e - Honey Locust 680 trees to the acre.
- a - Green Ash 680 trees to the acre.
- p - Austrian Pine 680 trees to the acre.

c l c l c.

w m w m w.

c l c l c.

w m w m w.

- c - Hardy Catalpa 680 trees to the acre.
- l - Black Locust 680 trees to the acre.
- m - Russian Mulberry 680 trees to the acre.
- w - Black Walnut 680 trees to the acre.

When set out in the square form it is easily figured how much the trees will cost if the price of trees are known.

In setting out trees a person should be economical and set the higher costing trees far enough apart so they will not have to be removed to give room.

As a rule the trees can be raised the first year as cheaply as corn and with less expense the second year sometimes none is required, the trees shading the ground preventing the growth of weeds.

The trimming of trees cost but little when the trees are small, they are easily and rapidly trimmed with a sharp pruning knife. This is done in winter, so as a rule can call this an odd job doing it when ever he has a little spare time, but always with great care.

No one should be allowed to trim the trees but an experienced hand, as poor pruning is a great drawback to the forest.

After the trees have attained a few years growth, their thinning and trimming will but in a few cases pay for the work, with the wood from their branches. When the trees are ten or twelve years old and a general thinning is given the profit begins to show itself. To illustrate take an acre of catalpa of which there are to be removed 3630 catalpa leaving the remainder of the trees 6 feet apart these will make perhaps 3000 posts valued at 10 cents apiece giving 300 dollars or an average between 25 and 30 dollars a year, besides having a valuable forest left to grow.

The Yaggy forest consists of catalpa trees, the foreman has given following data for the first 10 years after planting.

Rent of land 10 years 2 dollars per acre	\$20.
Cost of raising plants from seeds	\$3.60.
Cost of Planting	\$3.20.
Cost of cultivating first year	\$1.50.
Cost of cutting back and sprouting	\$2.20.
Cost of cultivating third year	\$1.20.
Cost of marketing crop	\$20.00
Total expense	\$51.70.
Gross value of crop	\$267.15.
Net value of crop	\$215.45.

Deducting 6% compound interest leaves \$197.55 per A. or \$19.55 per acre per year of clear money.