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THESIS.

THE PEACH IN CENTRAL MICHIGAN. J. S. MITCHELL, Class of '95.

Scattered about over Central Hichigan, are thousands of acres, capable of producing peaches of excellent quality. There are many farmers who are now following general farming with meagre returns, Whose facilities are such that a large profit might be made from a small well cultivated orchard.

With the increasing demand for fruit there is a bright outlook for peach growing in Central Hichigan. It is true that a full crop cannot be secured every year, but the proceeds from one full crop will amply reward the grower for an accassional failure. While it may cost more to produce a basket of peaches in central Michigan than in some more favorable locality; it must be remembered that the expenses of transportation often amounts to more than the producer originally received for the fruit. Thus the local grower is able to successfully compete with more favorable localities.

What are the qualifications necessary for successful peach growing? The man. The grower must be a man who is not discouraged by one unsuccessful attempt but one whom failure only suprs on to greater efforts. He must be a man who will study his busin ness; he must take an interest in his work.



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The Location.

In this climate the situation for a peach orchard must be such as will give good air drainage. This may be obtained either on a hill-side or on an elavate ridge, sloping off to a large area of lower land, will drain off the cold air which is heavier and thus do much to guard against late Spring frosts. It is surprising to notice what a difference of temperature will be produced by an elavation of but a few feet.

In some localities where the conditions are favorable the next lower level will often be as suitable as the more elevated ones. Some think that a West or Northwest slope is much better than other, since on these slopes the buds are not started by a warm spell in early Spring, afterward to be nipped by a frost. While this slope may be more desirable, a slope in any other direction will often give good results.

The soil will often have much to do with the location. For instance a sand or gravelly loam with good air drainage which has but a slight elevation will give better results than a well elevated hillside, the soil of which is an impervious clay. The peach seems to be at home in a sand, gravel, or sandy loam although certain varieties as the Hill's Chili often do well on a clay loam.

The market. When commercial orchards are contemplated, it is well to look to the market facilities. If local markets are to be supplied, a long distance from market will be found to be indesirable. If on the other hand the grower contemplates shipping the 102933

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In our severe climate, perhapes, one of the most important questions that confronts the peach grower, is what varieties shall I plant? It is a live question sinc. each grower must to a large extent, settle **h**t by actual trial for his own location and soil.

During the past 30 years much has been done to secure hardier varieties. This work has been rewarded with success. The peach, originally a semi-tropical fruit has by the selection of chance seedlings and by careful culture, come to be one of our hardy fruits.

The extremes of temperature that peach buds will stand has been a matter of some dispute. Mr. J. H. Hale of Conn. a few years ago raised a good crop, the buds being exposed to a temper-") ature of 180 below zero. At other times the buds have all been killed by a temperature of 180 above zero. The general opinion of growers has been that 150 to 180 would be a fatal is determined largely by the condition: in which the buds enter the winter. Buds entering the winter in a firm well ripened condition will be uninjured by a temperature that would kill the entire tree, if of a soft watery growth.

This Spring tests were made of the buds in the College orchard to determine the per cent of buds killed by the severe winter. Comparisons were made by testing 100 buds of each variety. two

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buds being taken from a twig, the twigs being chosen from different parts of the tree. In most cases two trees of each variety were selected, 50 buds from each being taken. Of the trees select ed some has borne fruit the previous season, while there was a marked difference in the difference in the age of the trees for which allowance must be made.

In the following table is shown the percentage of the uninjured buds of the varieties examined. Alexander------5%

Alexander47%	Old Mexan by
Amsden325	Brunson10%
Barnard, E 63%	Crosby96
Earnard, L43%	Crawford, E
Cornet57%	Crowford, L26/2
Conkling585	Golddrop28%
Dennis84%	Hale61
Diamond825	Hills Chili90%
Ellison625	Jagues56%
Early Rivers24%	Lovetts White78%
Early Louise75%	Lewis78%
Engles Manmath30	Mt. Rose36%
Switzerland64%	Stanleys late655
Snow's Orange50%	stump30%
Salway16	Wilder36%
Susquehanna60%	Wager65%
Smack525	Wheatland51%
	John16(5

Of the above list, Snow's Orange, Gold drop, Jaques, Early & Late Barnards, Hale, Wager, Brunson, Switzerland, Hill's Chili, Lewis, Stanley's late and Smack, together with early Michigan furnish the bulk of the Michigan crop. While the Susquehanna, Old Mixon, Early & Late Crawford, Mt. Rose and Stump are old standard varieties which are now being driven out of the new and hardier varieties.

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The Crosby, Elberta, Kalamazoo, St. John and Diamond are new varie ties that are being pushed by nurserymen, time alone will tell if they are what they are claimed to be **ar** not.

The Elberta was not included in the list as only one damaged was at hand to secure data from.

The Early Michigan, a seedling of the Hill's Chili is largely planted in some sections where it is thought to be better than the parent variety.

On June 20 another was made to the Snow the per cent of a

	full	crop	on	the	tree	at	that	date.
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 The change in the percentage in the second table from that of the first may be accounted for by the severe frosts which occured just at the time of blossoming.

When we take into consideration the fact that 150 to 180 below zero has been considered fatal to buds and remember that the extreme temperature reached past winter, was 20 below zero, the greatest fall being 50 deg. in from 12 to 15 hrs. we see that the buds came through the winter in extraordinary condition. When the choice in varieties has been made, see to it that only good stock is set. The second size of trees will be found to do as well as the first size, but second quality trees are dear at any price. Deal only with reliable nurserymen as a large percentage of tree agents roaming about the country with bright colored pictures of fruits are frauds. They will secure a job lot of trees not true to name from some unprincipled nurseryman which they can furnish to the purchaser at a slight expense and thus rob the buyer. The grower after three or four ypars of care will find that he has been duped with a monthless lot of trees.

The planting may be done in either Spring or Fall, perhapes the Spring planting is best for most growers. The order for the trees should at least be given in the Fall as the varieties wanted may not be obtainable in the Spring. As to distance there is some difference of opinion. The most successful growers believe that twenty feet each way is the best distance. This will allow room for thorough cultivation and will cause the trees to make a more rugged growth. In orchards which are closely painted in strong soil, the trees have a tendency to shoot up like a young forest reaching a height of 25 of 30 ft. It is almost impossible to prune or pick fruit from such trees in a satisfactory manner.

There is a practice of planting much closer, say 12 by 16 feet and then cutting out every other tree when the trees commence to crowd each other. By this method three or four crops may be

obtained before the thinning is required. The objection against this practice is, there are but few men who have the stamina to thin out at the proper time. It looks to them destructive to cut down thrifty trees. Besides this it must necessarily take a large amount of plant food from the soil to produce the trees which are thinned out.

Perhapes the one thing in raising fruit which is most often 7 neglected cultivation. The proper tillage of the soil consumes t the moisture and makes available more plant food. These two subatances, moisture and food are the ones most oftem exhausted. The want of moisture checks the growth of wood and prevents the proper delelopement of the fruit. It was the want of water that caused the death of trees during the past Spring.after they had started to leave out. The loam soil on the surface of any well cultivated field acts as a mulch in breakingthe capillarity thus preventing the escape of all moisture raised up by the capillarity of a lower level. A lack of moisture prevents the plant food of the soil from being made available to the roots of the tree.

The cultivation for a new orchard should be commenced before the orchard is planted. The plowing should be deep enough to break up the crust which so often forms just below the usual depth of plowing. This will permit the roots of the tree to penetrate the soil to a greater depth thus falliating the evils of a drough. For the first two.years some head crop as corn or beans may be

planted. If corn is used it will aid in shading the trunks of the young trees. By this method the trees will receive thorough tillage without expense while it would be stopped in season to allow the wood to become thoroughly ripened. In the early plant of the season the soil should be worked to a depth of 3 or 4 in. as the season advances this depth shold be lessened. Later shallow cultivation should be made especially after each rain and during a drouth once every week oe ten days. The continued **asti**_ action of the moisture working up from below tends to form capillarity to the surface and allow its escape unless the surface is kept stirred so as to form a dust mulch.

After the first two seasons it is well to give up the entire strength of the soil to the trees. Thorough and frequent tillage should be given until the middle of July or August, according to the season and other conditions. It is best to commence **hs** the growth of wood is made during the first half of the season and to stop in time for the wood to get thoroughly ripened for the winter Sod should rarely if ever be allowed in a peach orchard. It furnishes a breeding ground for insect pests and affords thousands of little tubes to lift the water out of the soil.

All the nitrogen needed by the trees can be furnished by sowing rye before the last cultivation in the fall and turning this under in carly Spring. The ingreddents in the soil most heavily drawn upon when the orchard comes into bearing, are potassium and

phosphoric acid. These two substances must be furnished to the trees in sufficient quantities the potash may be furnished in the form of ashes or the German patabh salts and the phosphoric acid in the form of ground bone.

It has been my good fortune to see cultivated and unclitivated trees growing side by side. The latter were about two thirds the size of the former, while at the end of a drouth the leaves on the uncultivated trees were of a yellowish hue, one-half having fallen from the trees. The little fruit that remained on the trees was so small and withered as to be almost worthless. On the cultivated trees the leaves were of a dark green color and the fruit was well deteloped. The uncultivated had produced but litt tle fruit'since the orchard began to hear, while the cultivated trees had bourn several good crops.

It has been urged that the buds could be retarded so as to escape the Spring frosts by mulching. Bailey of Cornell in B 11 59 conslusively disproves this theory. He found that mulching has no effect in retarding buds except in plants where the stems and buds themselves are covered by the mulch.

At the time of planting the tree should be pruned back to the whip 2 1/2 to 3 fect long, in this way the roots will have time to start befroe any demand for sap is made by the tree. The one great fault of nearly all ameteurs in setting young trees is to leave too much in porportion to the root surface.

In pruning usually one of the three following methods is followed: The spreading form, heading in or natural head.

First by thinning out the lateral branches the principle growth is faced into the ends of the branches, producing a spreading with well open head. Second, by heading in previous years growth of wood is cut back from 1/3 to 1/2 producing a thick compact head. Lastly the natural head is produced by cutting out those limbs which crosse each other thus leaving the peach to its natural method of growth. Of these three methods it may be said that each of them has its advantage. The sprawling method is probably the least used of the three. It gives good color to the fruit and is used nost on light soils.

The cutting back method is gaining favor. It gives a rugged tree which occuries less space and will carry a larger load wothout injury. By its judicious use the fruit can be to a large extent in pruning late in the Spring, the heading in being dome while the tree is in blossom. It is used on both light and heavy soils; on light soil it tends to make the **bree** more thrifty since it increases the amount of root surface in **ppp**portion to the top; on heavy soils it is necessary to cut back in order to check the growth of the wood and turn the strength of the tree into producing fruit buds. The natural head is thought by many to be best on soils that produce just about a sufficient quantity of wood.

The Spring is perhaps the best time to prune. The wounds will heal over more quickly at the time of blossomong or when the leaves are just out. It also gives the workman a chance to see all dead branches and if the heading in process is used, judicious thinning can be done at this time.

The remainder of the thinning should be done the last of June, this is after the curculio has ceased its ravages and before the pits have made a demand for potash and phomphoric acid. Thinning produces a much better quality of fruit, and lessens the drain on the tree and soil.

The principle insects injurious to the preach are the curculio and the peach borer. The curculio (cana, trachelus, neuvphar) stings the young peach leaving its charactertics cresent shaped marking. Paris green, one pound to 500 gallons of water will usually check the work of this insect if it fails, jarring must be resorted to as the only sure remedy.

The peach borer (Sannina exitiose) is a wasplike moth which lays its eggs on the back of the tree near the ground, occassionly higher up on the trunk during the latter part of June. The borers when hatched bore down into the bark just below the ground where a guardy secretion will ooze out in large masses, showing the locatof the intruder. When the tree becomes thus effected the borers must be cut out with a knife or they will often girdle the entire tree. When pruning it well to remove all and keep the

trunk as smooth as possible as a number of small suckers gives the native moth an excellent place to deposite her eggs. A preventive given by Mr. Hale consists of, 2 qts. of soft soap 2 oz. of paris green 1-2 pts of cartalic acid. with enough water and line to make a thin paste. If this be put on the first of June it wil.prevent the ravages of the borers.

Among the most injurious diseases are the Yellows, brown rut and leaf curl.

The peach yellows is a disease which has no cure but the flames. If as soon as the tranches of yellows appear the tree is cut down and burned the disease may be held in check and new trees may be safely planted the following Spring where the diseased trees were taken out. The intelligent growers will study the characteristics of this disease that he may be able to detect the first traces of the disease, should it appear.

The brown rut(Honlia fructiona) is a fungus discase which is particularly liable to attack the fruit of the early varieties The fruit attacked dries up and clings to the branches. This dried fruit is covered with the spores of this disease from it readily spreads the next season. S mixture and copper sulphate will hold this disease in check.

The leaf curl(Exaoscus deformans) is another fungous discase. The leaves on becoming affected take on a whitish mealy appearance. The diseased leaves often drop early in the summer, thus

depriving the tree of its assmilators of food. Copper sulphate one part to 2000 parts of water aid in checking this disease.

Perhapes the most costly error into which inexperienced growers will most often fall is in the choice of varieties. Do not set the large tender yellow varieties where only the smaller hardier ones will grow.

It is far better to raise a good quality of the smaller varieties then it is to set only the larger ones and raise a crop once in four or five years

These remarkes apply more especially to the more exposed localities of the State; of course, in situations where the large tender varieties will endure the exposure, they will be much more prefitable. ۰.

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