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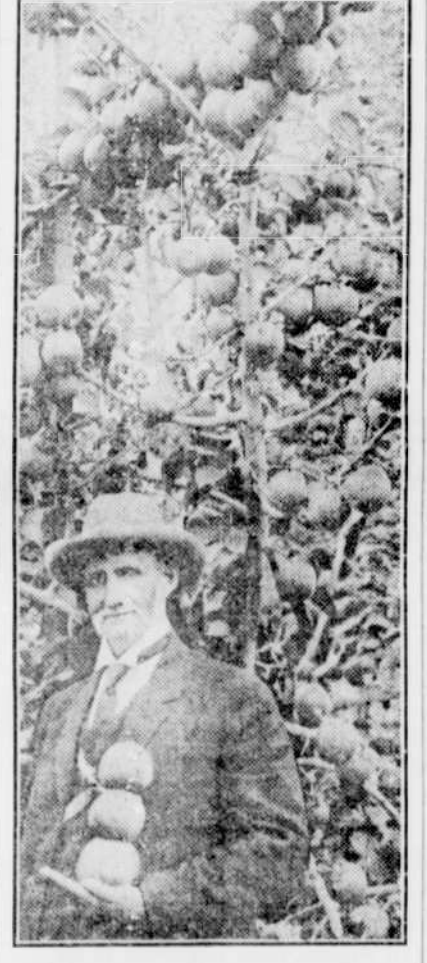
III.—DRAINING AND FERTILIZING APPLE ORCHARD.

By G. B. BRACKETT, Pomologist, Bureau of Plant Industry, United States Department of Agriculture.

All apple orchard lands should be thoroughly surface drained and underdrained. No orchard can endure for a great length of time with stagnant water either on the surface or within the soil. All surplus water from excessive rainfall or from other causes should be promptly removed by either surface or subdrainage.

If the natural formation of the land does not afford such prompt drainage it must be provided artificially. Surface ditches or furrows between the rows of trees may afford temporary drainage, but they are objectionable on other accounts that will be apparent, for an orchard thus drained will be difficult to get over in its necessary care and in gathering and handling the fruit. Underdrainage is far better on these accounts. Besides, it is much more thorough, especially if accomplished by means of well laid tile.

Temporary Drainage.
A thorough breaking up of the subsoil will afford temporary drainage in a stiff clay soil, but in a few years the soil will again become compacted, when it will require restirring. But in



all cases the planter must be the judge of the special drainage requirements of his soil and location.

The soil constituting the proposed orchard site should be carefully studied, and if found to be lacking in the essential elements of fertility necessary to maintain a fairly vigorous wood growth fertilizers should be added before plowing that they may become thoroughly incorporated with the soil in preparing the land for planting.

Well Rotted Manure.
Scientists and practical orchardists are generally agreed on the great value of well rotted barnyard manure for an apple orchard. It supplies not only humus, but it contains a large per cent of other necessary nutritive elements for maintaining health, vigor and fruitfulness of tree and for the development of the proper qualities for a fine fruit product. But as the stock of this sort of manure is not always sufficient for the general demand other agents have to be resorted to, and next in value and in a concentrated form are unleached wood ashes, which will supply to a great extent the elements necessary to plant growth. It is maintained by some authorities that one ton of unleached wood ashes contains as much plant nutriment as five tons of ordinary barnyard manure; therefore, whenever obtainable, ashes should be used in preference to any other fertilizer.

Manufactured Fertilizers.
There are many kinds of manufactured fertilizers, some of which are valuable only for special soils or special crops. It is difficult to determine what fertilizer it is best to use without knowing what elements are lacking in the soil. The three elements most commonly needed by soils are nitrogen, potash and phosphoric acid, and chemical fertilizers that contain the largest percentages of these substances in available form will be the most valuable.

A fertilizer containing 1 1/2 to 2 per cent of nitrogen, 7 to 9 per cent of available phosphoric acid and 10 to 12 per cent of potash will give excellent results when applied to orchard land

In quantity ranging from 400 to 600 pounds per acre.

Western prairie lands are generally sufficiently fertile for an orchard growth and need no enriching until the trees begin to show signs of weakness in vigor from crop bearing, and even then they may be invigorated by the use of crops of red or crimson clover grown among the trees, allowing the crop to fall and decay upon the ground each year. By this treatment a large amount of decaying vegetable matter rich in plant food will accumulate upon the land, forming a moist protection from the hot summer sun and preventing deep freezing during the winter, a condition conducive to the health and vigor of the trees. All lands lacking in humus can have this element restored to a great extent by such treatment, and orchards which have been sown with red clover maintain greater longevity, fruitfulness and excellence in fruit product, besides dispensing with the costly necessity of using special fertilizers.

As to the indications when a bearing orchard needs stimulating the eminent pomologist, Dr. Warder, once said, "When the growth of the terminal branches falls to make an annual extension of at least one foot in length the tree should be stimulated by manuring the land and giving it thorough cultivation."

The principal requirement in preparing land for planting an orchard is deep tillage, and the more thoroughly this work is done the more certain is success. The preparation had best be done late in the fall, so that the land will be ready for early spring planting or for fall planting if preferred. Many successful orchardists, especially in the western states, plow the ground in "lands" so as to make an open land furrow where each row of trees is to be set and then, after the trees are planted, backfurrow the ground so as to make lands with tree rows in the center.

This method affords a deeper tilth under the trees and at the same time surface drainage into the open land furrows midway between the rows, which will receive and, if properly graded, carry off any surplus water which may accumulate from heavy rainfalls.

Distances For Planting.

A decision as to the proper distance apart to set trees varies with different planters. Some plant 16 by 32 feet—that is, the trees sixteen feet apart in rows thirty-two feet apart. The object of this method is to obtain a crop from the trees until they begin to interfere with each other, when every alternate tree in the row is cut out, leaving the trees in the entire orchard at a distance of thirty-two feet each way. The trees to be cut out should be early bearing, short lived varieties. This system has the advantage of more fully utilizing the land for fruit production until the thinning out becomes necessary.

Other planters adopt a distance between trees of twenty, twenty-four or thirty feet apart each way, claiming that by the time the trees interfere with each other they will have finished their growth and the orchard will begin to decline. But it is generally conceded that thirty-two to forty feet is the preferred standard distance. If the distance of forty feet each way is adopted it will afford ample space between the rows for growing any crop which requires cultivation, such as corn, beans, potatoes, etc. Such cultivation is highly important and necessary for the maintenance of moisture in the soil and for the health and vigor of the trees. This distance will afford free circulation of air and abundance of sunlight, both of which are essential to the growing of well developed and highly colored fruit. Small grain should never be grown among fruit trees, especially when the orchard is young.

Best Time to Plant.

The question as to the best time to plant is governed somewhat by latitudes. In southern latitudes late fall or the early part of the winter may be safe for planting. But in most of the states early spring is considered the better time. Fall planting has the objection against it that the roots of a tree do not take hold of the ground sufficiently to supply enough moisture to maintain a healthy active circulation of the sap, which is required to prevent shriveling of the branches during winter's extreme cold and exhaustive evaporation from drying winds.

The selection of trees is a very important part of orcharding, for upon are and judgment in this matter depend largely the future profits of the investment. Strong, stocky and vigorous one or two year old trees, called "whips" by nurserymen, having well developed root systems, are preferable. Trees of this type and age are more satisfactory and profitable in time and suffer less in transplanting, cost less and are much more easily handled than older ones.

In this connection we would suggest the advisability of purchasing trees for planting from the nearest responsible nurseryman. The local nurseryman, if perfectly familiar with his business, will understand the needs and demands of his home customers and should grow the varieties best suited to his section of country. If honest he should feel himself morally if not legally responsible for the correctness of his nomenclature. By securing trees at the nearby nursery all danger from damage by long transit and the injurious effects of sunshine and frost are avoided. Besides, if the farmer makes his purchase direct from the nurseryman he will save the expense of the middleman or agent and is less liable to the mistakes and injury that may occur through repeated handling.

THE NEW MACKINAW.
Neat as a Pin Is This Spring Coat.



MODEL IN DARK WORSTED MIXTURE.

There is nothing dashing and picturesque about this new outing coat, which is conservatively severe and trim in style. It is made of dark worsted mixture in modified coat style, with a stitched belt passing through a buckle of the material. Pockets at the sides emphasize the outing character of the model.

Expensive New Cotton Fabrics.

Among the washable materials which are newly displayed French ratines are prominent. They are to be had in five colors, blue gray, brown gray, apricot, lavender and green. All are in double width goods and with an inwoven border are priced at \$3.75 a yard. The plain colors are less. Some also have a fine black stripe, almost a hair line stripe, running through them. These cost \$2.50 a yard. One of orange color and white has the effect of a shepherd's plaid. Chenille voile is another of the novelty materials, but this is not washable. It is of wool voile foundations for a chenille stripe, which is closely placed and stands up like small ridges on the goods, so that the effect is that of uncut velvet. White stripes of chenille on black and white on lavender are the only tones in which it may be procured. It is forty-five inches wide and costs \$2.95 a yard. It is particularly lovely for the early spring costume.

Good to Know.

If you have ever attempted to embroider or stencil a piece of heavy burlap you have doubtless grown angry and discouraged at the tendency of the edges to ravel.

If you had taken time to overcast all the edges this could have been prevented. But it takes time. Next time you have to work with burlap in making a cushion top or curtains simply stitch the cut edges on the sewing machine. Make the stitch long and the tension loose and then sew the edge in a wavy line, keeping close to the edge all the time. It won't fray, and it won't take long to fix it this way. The stitching won't show when the cushion is sewed up or the curtains are hemmed.

A Conservative Spring Hat.

In contrast to some of the extreme styles of the moment this attractive little hat is most admirable. Its shape



CHAPEAU WITH SCRAPPED FEATHER.

conforms with the latest style mandates, and the pose of the shaded feather is excellent. By the way, this is one of the new scraped ostrich plumes, immensely smart and expensive.

Songs For Children.

Miss Jessie L. Gaynor of Kansas City, who is a writer of children's songs, is recognized as an authority on kindergarten songs. There are said to be very few writers of songs for children, many poems being published, but few of them set to music.

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