SOME SOIL TREATMENTS FOR MATURE APPLE ORCHARDS

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CULTIVATION

Altho cultivation is especially beneficial in young orchards, it often produces marked results in old orchards. Orchards which have stood several years in sod, even when they have begun to decline in vigor, are often stimulated to new production by tillage. If the soil is naturally fertile and there is no special local reason for not cultivating, such as danger of washing on steep slopes, cultivation may be expected to stimulate fruiting of the trees.

Cultivation should consist in plowing either in the fall or early spring to a depth of four or five inches at the point farthest from the trees, running somewhat shallower close to the trees; or disk ing may be substituted for plowing, especially where tractors are used. Plowing should be followed by spring cultivation with disks and harrows to work the ground to a smooth, well-pulverized condition. Two or three successive cultivations sufficiently thor o to keep down weeds and maintain tilth should be given at intervals of about two weeks. Cultivation should cease some time between June 15 and July 1, depending on latitude and local conditions; after which the weeds and natural grass should be allowed to grow unchecked in order to shade the ground and form a cover crop for winter. To facilitate the securing of the crop, this wild growth should be mown just before harvest.

MULCHING

Mulching will successfully take the place of cultivation in bearing orchards, where sufficient suitable material can be brought in to make a covering deep enough to conserve soil moisture and protect the rootlets and root hairs, which work close to the surface of the soil in a mulched orchard and are endangered by intense heat in midsummer. Eight to ten inches of loose straw, waste or damaged hay, leaves, shredded corn stalks, shredded weeds, or other suitable waste materials such as shredded brush, which later will compact to a depth of one and one-half to three inches, will provide a suitable mulch. The grass and weeds already growing in a sod orchard provide some mulching material if, when mown, they are raked under the trees or allowed to lie where they fall.
In only rare cases, however, where this growth is unusually heavy, does this mulch provide sufficient covering for the purpose.

Mulching is advised where steepness of slope makes cultivation impracticable; in thin soils, where root growth is close to the surface and it would be seriously injured by cultivation; or where, for various local reasons, the grower prefers to use it instead of cultivation. If a mulching system is to be practiced, precautions against injury from mice and fire must be taken.

**FERTILIZING**

Neither cultivation nor mulching will render an orchard productive if the soil supplies an inadequate amount of plant food to the trees. It is necessary, therefore, that the fruit grower determine, without delay, whether or not his trees need plant food in order that he may obtain the desired results quickly.

It has been amply demonstrated that nitrogen is usually the controlling element in apple production. If the trees in an orchard are growing rapidly and bearing poorly, the orchard is almost certainly oversupplied with nitrogen. Steps should be taken, therefore, to check the supply by seeding the orchard to grass, thus providing an intercrop which will divert some of the nitrogen that would otherwise go to the trees. On the other hand, if the trees are growing slowly and producing small leaves which yellow or fall early, and are bearing poorly, they are almost certainly inadequately supplied with nitrogen.

A deficiency in nitrogen may be made up in several ways, among the most important of which are, first, the liberation of the unavailable nitrogen present in the organic matter of the soil thru the improvement of soil conditions by drainage and cultivation; and second, the addition of fertilizers carrying nitrogen. Stable manure supplies from 10 to 15 pounds of slowly available nitrogen per ton depending on its kind, moisture content, amount of litter present, and other conditions. Leguminous green manures supply from 8 to 11 pounds of slowly available nitrogen per ton of green crop. Dried blood supplies from 200 to 280 pounds of quickly available nitrogen per ton. Sulfate of ammonia supplies from 390 to 420 pounds of very quickly available nitrogen per ton. Nitrate of soda supplies from 300 to 320 pounds of immediately available nitrogen per ton.

Of the fertilizers above mentioned, stable manure is especially valuable in building up orchard soils depleted in organic matter and general fertility and in stimulating a rapid growth in young orchards. Leguminous green manures are most useful in orchards
where the trees are still small enough to give room for a good growth of the crop used. Like stable manure, they add organic matter to the soil and improve its general fertility.

Fig. 1.—Leguminous Green Manure in Orchard

Among the more strictly commercial fertilizers mentioned, nitrate of soda has come into the widest use for orchard purposes and has sufficiently proved its value in many experimental and commercial orchards to warrant a rather general recommendation of its use in unproductive apple orchards in this state. On this account and because of the widespread interest in its effects, somewhat detailed instructions for its use are given herewith.

**Nitrate of Soda as a Fertilizer for Apple Orchards**

**Quantity to Apply**

- Trees five to ten years old, growing well: none.
- Trees five to ten years old, growing poorly: 1/2 to 2 pounds per tree.
- Trees ten to fifteen years old, growing well: none.
- Trees ten to fifteen years old, growing poorly: 2 to 3 pounds per tree.
- Trees fifteen to twenty years old, growing well: none.
- Trees fifteen to twenty years old, growing poorly: 5 to 6 pounds per tree.
- Old trees persistently unproductive: 15 to 20 pounds per tree.
- Old trees declining in productivity: 5 to 10 pounds per tree.

The quantity should vary from year to year, depending on the response obtained, more being used if the trees show a definite but insufficient increase in productiveness, less being used if, after ob-
taining a definite increase, a falling-off accompanied by a heavy wood growth, occurs. The orchardist must determine for himself the correct balance between wood growth and fruitage and maintain that balance by withholding or increasing the nitrogen supply as the yearly crop and wood growth indicate.

Time of Application.—Experimenters are agreed that early spring applications are very much more effective than applications made at any other time. It is advised that nitrate of soda be applied when the buds begin to show green tips, usually about three or four weeks before the period of full bloom.

How to Apply.—To prepare the fertilizer for distribution, dump it, a sack at a time, into a large, shallow box with a reasonably tight bottom, such as a good wagon box, and crush the large lumps with a cement tamper, a shovel, or other handy implement. Load the nitrate into any convenient wagon for conveyance to the trees. Prepare a measure by weighing into a tin can, a bucket, or other receptacle, the required amount and mark the height or cut the can to fit the amount. Spread the nitrogen by hand over all the soil covered by and somewhat beyond the spread of the branches. It is not necessary, however, to apply it closer to the trunk than two feet. Two men, one working from either side of the wagon, will distribute the fertilizer for a large orchard very rapidly.

CAUTION.—Nitrate of soda is inflammable and should be protected from fire. It should also be kept out of reach of live stock, as its saline taste is attractive, and taken in considerable quantities its effect is poisonous.