

GROWING AND MAINTAINING ORCHARDS

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IF a hole be dug in the hard field, the soil will show indications that it has lost much of its original humus. Few or no natural drainage channels will be found. The soil, instead of being light and loose, is sealed, and appears "harsh and dead." If seeds be planted it is soon discovered that the soil too often has not the power to force the embryo plant to the surface nor to push it to a vigorous growth and mature fruitage. The vegetative growth is too frequently dwarfed, which results in lack of power to bring all of the fruit to perfection. Half of the fruit on the tree not infrequently shows unmistakable signs of semi-starvation.

That this is the case is not strange if it is considered what has been taken from the soil in fifty years of cropping. Let it be supposed that during the 50 years there have been taken off of each acre ten crops each of oats, wheat and corn and 20 of hay. The following table shows the amount of grain and roughage removed in 50 years, and the value of the plant food approximately:

AIR-DRIED MATERIAL REMOVED IN 50 YEARS.

Per acre.	Lbs.	Cr. - 100.	Lbs.
Oats, 31¼ bush.	32	10	10,000
Straw, 1,500 lbs.	—	10	15,000
Wheat, 16 2-3 bush.	60	10	10,000
Straw, 2,000 lbs.	—	10	20,000
Corn, 40 bush.	60	10	24,000
Stalks, 10 p.c. moisture.			
4,000 lbs.	—	10	40,000
Hay, 1½ tons, 3,000 lbs.	—	20	60,000

Total 179,000
or 89½ tons.

PLANT FOOD CARRIED OFF BY 50 ROTATIONS.

	Lbs. in round thousands.	Nitrogen lbs.	Phosphoric acid lbs.	Potash lbs.
Oats, 10.	165	69	48	
Straw, 15.	69	42	265	
Wheat, 10.	138	78	49	
Straw, 20.	240	44	126	
Corn, 24.	386	137	89	
Clover, 40.	416	246	792	
Mixed hay, 60	882	246	792	

Total 2,296 732 1,929

PLANT FOOD CARRIED OFF BY 50 ROTATIONS.

No. of lbs.	Cost p. lb.	Value.
2,296 nitrogen	12½c	\$287 00
732 phos. acid.	4½c	32 94
1,929 potash.	4½c	86 80

Grand total of the value of the plant food carried off 50 years' rotation from each acre, as above, \$406.74.

In 1895, among other investigations, an attempt was made to determine the amount of plant food used by a single apple tree: 1. Plant food contained in the tree when dug up, including branches, trunk and roots; 2. plant food removed by 20 average crops of fruit; 3. plant food removed by the leaves. It was assumed that an acre would grow 35 mature trees and that all of the leaves were blown off the land, which, of course, is not a fair assumption.

The 20 estimated crops of apples removed \$147 worth of plant food. The trees contained \$70 worth of plant food, and 20 crops of leaves \$160 worth of plant food. If it is assumed that all the leaves remained on the ground, the total value of the plant food contained in the wood and removed by the apples was \$217 per acre. If one-half of the value of the plant food is in the leaves for the 20 years to be taken, the value per