

HARRY J. EUSTACE



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by

Harry J. Mustace,

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## **T H E   A P P L E .**

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### **Introduction.**

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The apple is the leading orchard fruit of temperate climates. From its great hardiness, easy cultivation, productiveness, its long continuance through the whole twelve months and its various uses, it ranks higher than any other fruit.

As a money making crop it is now receiving more attention than ever before for the following reasons: Since the perfection of spraying, insects and diseases can be controlled. By the use of cold storage the market period can be prolonged so fresh apples can be sold through the year and has made a foreign market possible. Progress made in the utilization of the surplus by canneries and manufacture of cider has added much to the progress. Improved methods of culture and pruning and the introduction of better varieties has doubled the bearing capacity.

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## ORIGIN.

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It has been cultivated from time immemorial. Charred remains have been found in the prehistoric lake dwellings of Switzerland. It is native to southwestern Asia and adjacent Europe. From just where we at first received the cultivated apple is unknown; but in all probability it was introduced by the Romans, to whom twenty-two varieties were known in Pliny's time and afterward the stock of varieties greatly increased at the Norman conquest.

The tree has a very remote origin. According to an ancient tradition, Adam was choked with an apple offered him by the fair hand of Eve. Sceptics will probably doubt this but they will credit those ancient Greek and Roman naturalists who describe the apple tree and its fruit with great accuracy.

Theophrastus, Heroditus and Columella all make mention of the apple tree. Pliny says that the Greeks called them "Medica" from the country where they first originated. He describes them as a fruit with a delicate, tender skin, easily pared off. He says of the crab apples or "Wildings" that they are small and sharply sour for which peculiarity they receive many curses. Columella, a practical husbandman who lived and wrote long before Pliny, not only described the





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apple tree but also the process of grafting and gave several different methods which he says were handed down from the "olden time".

Apple trees were brought into America very early. In 1629 by the order of the "Governor and company of Massachusetts Bay in New England" apple seeds were brought from England into the Colonies and Governor's Island was granted to Governor Winthrop in 1632 on condition that he should plant a vineyard and an orchard.

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### BOTANY.

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The botanical position of the cultivated apple may be stated as follows:-

Order; Rosacea; Sub-order; Pomeae; Genus; Pyrus.

The apple has come from two original stems. All of our common apples are modifications of *Pyrus Malus*, a low, round-headed tree with thick and fuzzy, irregularly dentate, short stemmed leaves and fairly compact clusters of wooly stemmed flowers. The crab apples are derived from *Pyrus baccata*, commonly known as the Siberian Crab. It is of smoother and more wiry growth, with narrower and thinner essentially glabrous long-stemmed leaves and more often clusters of glab-



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rous-stemmed flowers. The fruit is small and hard and the calyx lobes fall at maturity, leaving this cup or basin of the fruit smooth and plain. Hybrids between these species have produced such varieties as the Transcendent and Hyslop crabs. The race is known as *P. prunifolia*. Two native species of interest to the fruit grower are *P. Ioensis* and *P. coronaria*. The former is the prairie states crab and is of some promise. In growth, leaves and flowers it resembles the *P. Malus* somewhat. The fruit is spherical or spherical-oblong, short-stemmed, very hard, and remains green-colored. *Pyrus coronaria*, the fruit of the eastern states crab is flattened endwise and is long stemmed. The leaves are deep cut and often three-lobed. There are no improved varieties of this species and no authentic hybrids between it and the common apples. *Pyrus Ioensis* has produced a number of valuable hybrids with the common apple and this race is known as *P. Soulardi*. The Soulard crab is the best known of these. Its value lies only in its hardiness.

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#### PLANTING.

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Opinions differ widely as to the relative merits of fall and spring planting. Upon thoroughly drained soils fall plant-



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ing is generally preferable. The advantages are several. The trees have time to become established during the open weather of the fall and they can make a start in the spring before the ground is hard enough to allow of spring planting. This early start means not only a better start the first season, but what is more important, trees get a very <sup>early</sup> hold upon the soil, endure the droughts of midsummer much better than trees planted in the spring. More care is nearly always taken when the planting is done in the settled weather and workable soil of fall than in the days of hurry in the spring.

In fall planting, however, it is important to insist that the trees be thoroughly well matured. The practice of some nurserymen in "stripping" trees before the growth is completed to prepare them for September delivery, results in weakening the tree. It is believed that many failures in young plantations are attributed to this cause. In buying trees it would be well to place the order in August or September with the understanding that the trees should stand in the nursery rows until the leaves begin to die and fall. In the meantime, the holes can be dug so that when the trees arrive they can go directly into their places without delay or without the expense of heeling them in. There is a tendency among nurserymen to urge fall planting, and there are many good



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orchardists who think fall planting unwise. It is true that unless conditions are right, spring planting is to be preferred.

The soil in which the trees are set should always be in a thorough state of cultivation; that is, in fine mechanical condition, fertile, free from hard or "sour" places and from weeds. It is generally best to put the land into hard crops for a season before the trees are set, although sod land, if well fitted, often gives good results when turned under and set at once to orchards.

A mistake is often made in setting apple trees too close together rather than too far apart. The trees demand plenty of room to spread out and the best results are obtained when each tree stands far enough from its neighbors to allow it to possess an individuality all its own. Another reason for wide planting,- the necessity of spraying and for this reason as well as to allow of better cultivation, the outside rows should not be set close to fences. The distance at which trees may be set depends much upon the system of pruning. If heading in is practiced vigorously and systematically, the trees may be set nearer than if allowed to take their natural form. Forty feet each way may be considered a safe distance when the trees are allowed to take their natural form.

It is generally found advisable to plow the entire field before the orchard is set, rather than to plow strips where



the trees are to go, for it will then be easier to shape the land better with reference to surface drainage and general convenience. The hole should be dug broad and ample; and the harder the soil the larger the hole should be, for in that case the loose dirt which is filled in must give the trees a start. Chop up the soil in the bottom of the hole or throw in a few shovelfuls of loose surface earth. Every care must be taken to get the soil firmed about the roots, especially under the crown or fork of the roots, in order that no air spaces may be left to dry out. Stamp the earth very firmly

about the tree before leaving it for the double purpose of retaining the moisture and holding it against the wind.

Mulches of straw or manure are sometimes advised for newly set trees. If applied to fall planted trees, care must be taken to tramp them down well or they may become a nesting place for mice, which will girdle the tree if there be heavy snows.

The trees may be trimmed before they are planted but it is preferable to do it afterward for the proper height is better estimated and the operation made much easier. When a tree is dug in the nursery, probably one-half of the entire root system is left in the ground. It is therefore evident that the top should be cut back to a corresponding amount. A tree which is allowed to carry too much wood when it is transplanted may fail outright or it may suffer seriously by the

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drougths of summer. Aim to start the top at the desired height when the tree is planted.

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CULTIVATION.

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The best tillage is that which begins early in the season and keeps the surface stirred until late summer or early fall. For the first few years it is generally advisable to turn the land rather deeply with a plow at the first spring cultivation. In all friable or loose soils, shallow cultivation is always preferable. When the land is once in good condition, but little effort and time are required to run through the orchard. Crust should never be allowed to form upon the surface and weeds should be killed before they become established.

In general, level culture is the best. This is secured by plowing one year to the trees and the next year away from them.

Never allow hay or grain to be grown in the orchard. Any hood crop may be used for seven or eight years if the orchard is well cared for. An open space of several feet should be left about the trees. Very thrifty young orchards may sometimes be thrown into bearing by seeding them down for a time, but the sod should be broken up before the trees become checked in vigor.

Nitrogen, potassium and phosphorous are the elements



demanding by the orchard land. Generally it is better to supply nitrogen by good cultivation, as a free application might do more harm than good in promoting the growth at the expense of the fruit.

Potash is the most important element to be applied directly to the orchard. Much of the store of potash in the soil is made available by thorough tillage, but in a bearing orchard it must be applied each year in a commercial form. One of the best sources is wood ashes. Forty or fifty bushels to the acre is considered to be a good dressing, if it has been kept dry.

Phosphoric acid may be obtained in the form of a high grade plain superphosphate, in bone compounds and Thomas slag phosphoric acid is rather less important in orchards than potash.

A sowed crop is valuable by affording a cover to the land and improving the soil when it is plowed under. The crop grown for a cover should be sown not earlier than midsummer. The most thorough tillage can then be given early in the season and the benefits of the cover can be secured for the early fall and winter.

It is not easy to say just what is the best plant for cover and green manure. Clover is a stand-by but it is often difficult to obtain a good "catch" late in the season, and to

obtain its full value it should stand upon land an entire season. Vetch answers very well and is generally considered the best all-around cover crop for this latitude. But it is killed by the winter and must be sown early in the season.

Rye is a favorite upon light soils and does well even if the land is poorly prepared. However, it contains very little fertilizing value.

The gist of all is that the orchard should be cultivated and fed. Cultivation should begin early and be continued often. It may be stopped in August if the grower thinks best, and then, if the land needs it, a green crop may be sown for turning under the next spring.

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#### PRUNING.

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If the tree has been properly pruned at transplanting, the first summer will develop the foundation of a well defined top. It is not well to start a young tree with a great number of branches, as they soon become over-crowded to the great injury of the tree with reference to fruiting.

As the trees advance with age they will become somewhat over-crowded with branches, some of which can be removed from time to time as seems necessary for the well-being of the trees; but this thinning should be done judiciously, and only a small portion removed during any one season. Yearly inspect-



ions should be made and such branches as have become destitute of fruiting spurs except at their terminal points, should be cut out in thinning and a young twig be allowed to grow up and furnish a new fruiting branch in the way of renewal. There will be no lack of young shoots for this purpose, as they will sprout from the base of the cut branch, and the strongest and best placed should be selected if it is desired to introduce a new branch.

The main object in pruning the apple is to economize all the growth to procure additional branches by arresting the extension of shoots while vegetation is active, by pinching or removing their extreme points without waste of foliage, and by rubbing off buds where shoots are not required, instead of allowing an accumulation of yearly growths to mature, then removing and throwing them forth as waste.

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#### SPRAYING.

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The spraying of apple orchards has ceased to be an experiment. The beneficial results obtained at the experiment <sup>been</sup> stations have fully corroborated in practical field work. But in order that the best results may be obtained, spraying must be done intelligently. Success is very largely a matter of detail. Little things, seemingly unimportant, all effect the results obtained. Failure may usually be attributed to





lateness of application, carelessness in applying or in preparing the material or to defective apparatus.

Spraying is plant insurance. With very few exceptions it is a preventive measure and not a cure.

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#### HARVESTING and MARKETING.

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If apples are to be stored or exported, it is generally best to pick them just as they arrive at their full size and when they have attained only a part of their full color. If over ripe or fully ripe, they must be used at once or kept in cold storage and then when they are taken out of the storage they will keep but a very short time. If put in cold storage before they are fully matured, they will keep much longer when taken out.

The proper time for picking will depend upon the condition of the fruit, the season and the climate.

Summer and autumn apples should be sorted and packed as soon as picked. Winter sorts may be piled up in the orchard under the trees for a while without danger of injury, and sorted and packed after the picking is all done.

Until within the last few years the barrel was the almost universal apple package and it is still used for handling the great bulk of the crop. Early perishable kinds have,



however, long been shipped in various packages commonly used for peaches. Recently the growers of the Pacific coast have led the way in packing winter apples in boxes. Some eastern growers are finding it to their advantage to follow this western fashion for their fancy fruit, and it seems probable that the better grades of fruit at least, will come more and more to be marketed in smaller packages. In Boston a bushel box is now popular for apples and other products. In packing apples in barrels it is customary to place the first one or two layers by hand, turning the stem ends all down. The barrel is then filled, a basketful at a time, by lowering the basket into the barrel and carefully turning out the fruit. The barrel is shaken occasionally to settle down the fruit and when the top is reached it is rounded up enough so that the head has to be pressed into place with considerable force, a long lever or special barrel press being used for the purpose.

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#### DISEASES and INSECTS.

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##### Bitter Rot; Ripe Rot (*Gleosporium fructigenum*, Berk.)

It appears as brown spots which become larger with the growth of the fruits. These spots bear light colored postules which turn to black. The spots are firm and have a very bitter taste. These rots make rapid progress in stored fruits.



Remedy is four applications of Bordeaux mixture.

Rust (*Gymnosporangium* Link) A disease in which circular orange colored spots about one-fourth of an inch in diameter appear on the leaves in June. Also produces yellow spots on the fruit about the same time.

Remedy. Rust is hard to combat. Spraying does not check it to any great extent. Red cedar trees harbor one stage of the fungus which is the chief cause of the rust; it is therefore good policy to destroy all red cedars in the vicinity of the orchard.

Scab. (*Fusiciladium dendriticum*. Fekl.) The worst disease with which apple growers have to contend. It is caused by a fungus which attacks the skin of both foliage and fruit. On the fruit the spots have a dark velvety-green surface but afterward they become nearly or quite black. Where the spots are large the fruit may become one-sided or otherwise distorted and often it cracks open.

On the leaves the fungus has the appearance of a dark mould. It is found in spots on both the upper and under surfaces. The disease may cause the leaves to be much crumpled and finally show brown, dead tissue which breaks away, leaving the foliage torn and ragged, or the entire leaf may drop off. Remedy - The scab may generally be controlled by three applications of Bordeaux mixture if made at the proper time and very thoroughly. The first application should be made after



the buds break but before the blossoms open; the second just after the blossoms fall; and the third from ten to fourteen days after the second.

Canker Worms. There are two species that are especially troublesome. These are the Spring Canker Worm (*Paleacrita vernata*, Peck) and the Fall Canker Worm (*Amsopteryx pometaria*, Harr.) The life histories of the two species are very similar. When first hatched the caterpillars of both species are very small and of a light green color. They devour the leaves rapidly. When mature, they are about an inch long and vary in color from light green to darker shades. When ready to pupate they go into the ground where the cocoon is spun and the chrysalis formed. The adults of both species are moths. The males are winged, the females wingless.

Remedy. The females may be trapped while trying to ascend the tree. The caterpillars may be successfully combated by spraying with Paris green or some arsenical insecticide.

Codling Moth. The insect that causes wormy apples. An early brood appears about the time the apple blossoms. The eggs are laid on the side of the fruit or in the blow end. Larva complete their growth in the apple, come out and let themselves down by a thread and land on the rough bark of the tree where they will spin cocoons and the moth comes out.

Remedy. Spray with Paris green or put bands around the tree to catch them.





Plant Lice. The most troublesome species is a little green louse that attacks the leaves and buds in the spring. Is found in great numbers on the under side of the leaves, sucking the sap from the tissues, causing the leaves to curl. Remedy. Since they are sucking insects they must be killed by contact poison. They must be struck directly with a spray of whale oil soap and water as they do not move about.

Wolly Louse of the Apple. Are found on both the roots and young branches causing gall-like swellings. Most serious damage is done to young trees.

Remedy. When occurring on the roots, apply tobacco dust about the infested parts. If the branches are attacked, spraying with whale oil soap or kerosene emulsion will kill them.

Scale Insects. Two species are common in apple orchards, the Oyster-shell Bark Louse (*Mytelaspis pomorum*, Bouche) and the San Jose Scale (*Aspidiotus perniciosus*, Comst.) These insects are especially injurious to young trees. The eggs hatch in the spring, from late April or early May until June, according to the season. The young lice soon settle down and insert their sharp, thread-like mouth parts into the tender bark from which they suck the sap. The scales of the males of both species are more delicate, nearly white, and larger and more slender than those of the female. The adult males are two-winged insects.



**Remedy.** For the Oyster-shell Bark Louse spray as soon as the eggs hatch, with whale oil soap or kerosene emulsion.

For the San Jose Scale, where it has once become firmly established a thorough treatment with whale oil soap has killed it. The most effective known method of treatment is fumigation with hydrocyanic acid gas.

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