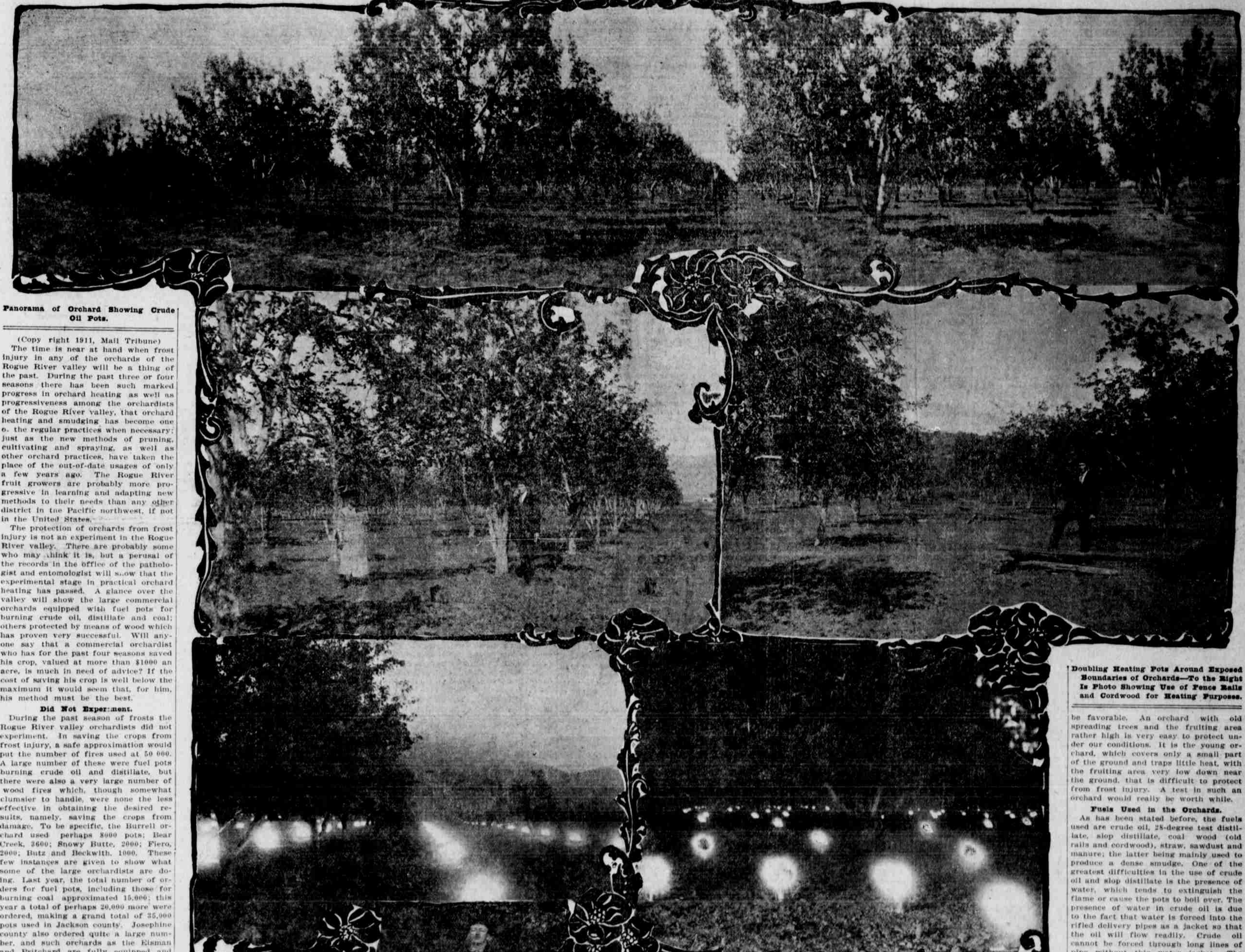


STRENUOUS BATTLE WITH FROST IS WON BY ORCHARDISTS OF THE ROGUE RIVER VALLEY

By Professor P. J. O'Gara of the U. S. Department of Agriculture, Who Directed the Fight Against the Cold Wave.

Fruit Growers Raised the Temperature in Their Groves Ten Degrees by Liberal Use of Fuel During Nights.



Panorama of Orchard Showing Crude Oil Pots.

(Copy right 1911, Mail Tribune)

The time is near at hand when frost injury in any of the orchards of the Rogue River valley will be a thing of the past. During the past three or four seasons there has been such marked progress in orchard heating as well as progressiveness among the orchardists of the Rogue River valley, that orchard heating and smudging has become one of the regular practices when necessary; just as the new methods of pruning, cultivating and spraying, as well as other orchard practices, have taken the place of the out-of-date usages of only a few years ago. The Rogue River fruit growers are probably more progressive in learning and adapting new methods to their needs than any other district in the Pacific northwest, if not in the United States.

The protection of orchards from frost injury is not an experiment in the Rogue River valley. There are probably some who may think it is, but a perusal of the records in the office of the pathologist and entomologist will show that the experimental stage in practical orchard heating has passed. A glance over the valley will show the large commercial orchards equipped with fuel pots for burning crude oil, distillate and coal; others protected by means of wood which has proven very successful. Will anyone say that a commercial orchardist who has for the past four seasons saved his crop, valued at more than \$1000 an acre, is much in need of advice? If the cost of saving his crop is well below the maximum it would seem that, for him, his method must be the best.

Did Not Experiment.

During the past season of frosts the Rogue River valley orchardists did not experiment. In saving the crops from frost injury, a safe approximation would put the number of fires used at 50,000. A large number of these were fuel pots burning crude oil and distillate, but there were also a very large number of wood fires which, though somewhat clumbersome to handle, were none the less effective in obtaining the desired results, namely, saving the crops from damage. To be specific, the Burrell orchard used perhaps 3000 pots; Bear Creek, 3500; Snowy Butte, 2500; Fiero, 2000; Butz and Beckwith, 1500. These few instances are given to show what some of the large orchardists are doing. Last year, the total number of orders for fuel pots, including those for burning coal approximated 15,000; this year a total of perhaps 20,000 more were ordered, making a grand total of 35,000 pots used in Jackson county. Josephine county also ordered quite a large number, and such orchards as the Risman and Pritchard are fully equipped and have been for the past two or three seasons.

Types of Patent Pots Used in Valley.

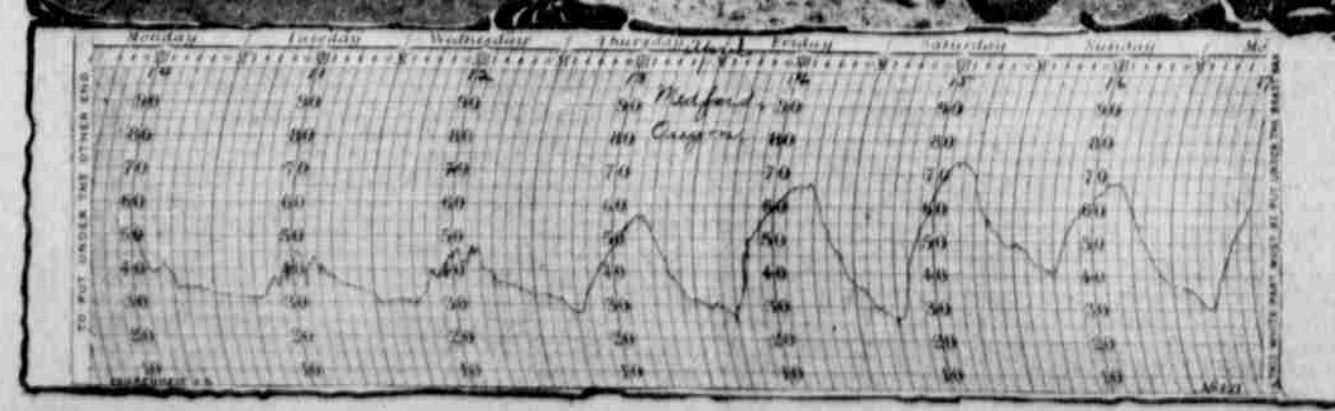
In a commercial way, the types of pots used were the Fresno, Bolton, and Hamilton. The Troutman pot was satisfactorily used only in an experimental plot and was demonstrated by an agent of the company manufacturing it. The Ideal coal pot was in use during last season's frost period, so that it has been in the valley two seasons. It is not the object of this article to discuss the relative merits of the different types of pots. The writer, however, has contended that the simplest type, which, of course will be the least expensive, is the one which will grow in favor with the fruit growers. As has been stated in previous articles, the hard pall type is just as efficient as the Fresno pot, with its row of holes near the upper rim. The Bolton pot has one disadvantage with respect to the arrester, or partial cover, which is placed over the mouth of the pot. No doubt in burning 28-degree test distillate, this type of pot will work very nicely, but with crude oil or slop distillate the heavy coating of soot will tend to clog the openings, and in the course of a night's use will have a marked effect in reducing the efficiency of the pot. It may even clog so much as to put out the flame. However, this pot used open and without arrester may be equal to the Fresno or hard pall type, and has proven so in actual test; since burned that way it is practically the same as the other two types. The Hamilton heater is so arranged as to increase or decrease the burning surface so as to

Night Scene in Orchard With Pots Ablaze.

regulate the amount of heat. This pot which is made in the form of a rectangular trough, is not so saving of fuel as might be supposed since there is a tendency often for the flame to burn back of the apron which hangs downward from the sliding cover, and which regulates, or is supposed to regulate, the amount of fuel burned. The Ideal coal heater is designed to hold 25 to 50 pounds of coal, and is very satisfactory so far as heating is concerned, but the fact that a great deal of time is required to lay the fires, or prepare the heaters, is somewhat against their use.

Many Heater Types.

There are a large number of heaters on the market, each one with its particular claim for efficiency; but as yet, with the fuels we have here, it is a question as to what superiority one type may have over another. So far there has been no real efficiency test made in any part of the country where heaters have been used side by side under absolutely like conditions. Manufacturers have been unwilling to make such competitive tests, and in some cases where such tests were supposed to be made, one manufacturer would not accede to the conditions imposed by the other. This has been the case in a test which was to have been carried out in this valley during the past season. A competitive test made by a dozen manufacturers would be of considerable interest



Official Government Thermograph Record During Danger Season—Showing Brief Period Thermometer Was Below Danger Mark, and Its Rapid Recovery.

Doubling Heating Pots Around Exposed Boundaries of Orchards—To the Right Is Photo Showing Use of Fence Rails and Cordwood for Heating Purposes.

be favorable. An orchard with old spreading trees and the fruiting area rather high is very easy to protect under our conditions. It is the young orchard, which covers only a small part of the ground and traps little heat, with the fruiting area very low down near the ground, that is difficult to protect from frost injury. A test in such an orchard would really be worth while.

Fuels Used in the Orchards.

As has been stated before, the fuels used are crude oil, 28-degree test distillate, slop distillate, coal wood (old rails and cordwood), straw, sawdust and manure; the latter being mainly used to produce a dense smudge. One of the greatest difficulties in the use of crude oil and slop distillate is the presence of water, which tends to extinguish the flame or cause the pots to boil over. The presence of water in crude oil is due to the fact that water is forced into the rifled delivery pipes as a jacket so that the oil will flow readily. Crude oil cannot be forced through long lines of pipe without this water jacket. The water, though small in amount, goes directly into the storage tank where, if the temperature of the oil rises, the water will sink to the bottom of the tank. It can then be drained off. Often, however, the water, which at low temperatures is very nearly the specific gravity of the oil, remains in pockets, or small globules, distributed through the oil. Outside of the fact that the crude oil often contains water, it has a very great tendency to deposit large amounts of soot on the trees as well as tending to clog certain types of pots. Besides, a very large amount of residuum is left behind so that a second or a third filling will so coat the sides and bottom of the pot that it will hold much less oil in future fillings, and therefore will burn for a much shorter period. For instance, a pot that will hold one gallon when clean will not hold more than three-fourths of a gallon after having been burned two or three times. This is a very serious defect, and one that cannot be overlooked. The crude oil from the wells of the Pacific coast is unlike that of the east or middle west, in that it has an asphaltum base. No matter what the type of pot, a heavy asphaltum oil cannot be perfectly burned; that is to say, combustion is not complete. The heavy asphaltum base requires a much larger amount of oxygen than even the best type of pot can furnish, hence the large amount of carbon residuum left on the sides of the pot. The oils of the east have a paraffin base and burn much better. At this time, however, it would seem impossible to bring this oil

To the Left Is Method of Igniting Crude Oil by Gasoline Torch—In Center Is Shown Use of Lignite Coal Heaters—To Right Is Photo of Professor O'Gara at His All Night Duty of Warning Orchardists by Telephone That Thermometer Was Nearing Danger Line.

to the fruit growers, and would tend to eliminate such heaters as prove to be inefficient. However, where only two types are used in a test which was in no way competitive, little interest naturally was shown. Furthermore, when a so-called test is made under conditions where it is almost impossible to lose out, little can be said that would

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