

*With my Compliments
Chiff Cordy*

HISTORY OF THE ROGUE VALLEY FRUIT INDUSTRY
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Background

Mr. J. R. Cardwell (1830-1916) left the Missouri River on the first of May, 1852 headed for Oregon. He was supplied with a fine selection of grafted fruit trees and ornamentals in a wagon load of black Illinois soil drawn by four yoke of oxen. On the banks of the Snake River on a steep hillside road the wagon turned over and dumped the entire contents into the river and it was quickly washed away. He was able to save only a single rose cutting which he later propagated. This must have been a traumatic experience for a young man of 21 years who had been a practicing dentist.

Strange as it may seem Mr. Cardwell knew that Henderson Lewelling had arrived at Milwaukee, Oregon, in the fall of 1847 and had established a nursery, yet he chose to haul a load of nursery stock across the plains. Failing this he resumed his profession as a dentist in Portland and his hobby as a horticulturist. He became one of Oregon's prominent horticulturists. He and Lewelling assisted in the formation of the Oregon Horticultural Society in 1885. He was elected its first president and served as president for twenty two years.

Mr. Lewelling had successfully brought with him a variety of grafted fruit trees planted in boxes of Iowa soil. Propagating these trees was slow as no suitable root-stock was readily available. Eighteen thousand grafted trees were produced in 1850 and one hundred thousand in 1853 by Lewelling and his partners. Other nurseries had also started production in 1852.

The first crop of apples was in 1853. These apples were taken to San Francisco and sold for \$1.00 per pound (or \$2.00 according to their version). Twenty thousand bushels of Oregon apples were sent to California in 1856 but that was about the end. California growers were alert to the profit potential and had thousands of trees of a variety of fruit shipped by boat around the horn. As these came into production, California produced all its own fruit needs with some to spare.

Early Rogue Valley Orchards

The first fruit trees in the Rogue Valley were grown from a few seeds of Black Walnut and pears which were brought across the plains in covered wagons to Ashland by the Billings family. These were planted in the Valley View area in 1854. The first Bartlett pear trees were planted by Henry Barneburg in 1855 along the Hillcrest-Phoenix road east of the Manor. In 1865 the first Anjou pear trees were planted by John Norton, brother-in-law of Henry Barneburg. These trees were planted on part of what is now the Medford Country Club. All of these trees lived for over 100 years but eventually succumbed to neglect and encroaching developments. These were only small scattered home orchards as there was no practical method of transporting the fruit until the railroad arrived in Medford in 1884.

The establishment of the first commercial fruit acreage in the Medford area dates back to 1885 when J. H. Stewart, a nurseryman from Missouri, and J. D. Whitman, a friend of Stewart, came to the valley with their families. The first commercial pear orchard was planted south of Medford in an area south and west of the intersection

of South Stage Road and the railroad. The original orchard and adjoining land, also planted to pears and apples a few years later, was acquired in 1898 by Colonel Gordon Voorheis.

From this modest start the acreage was rather rapidly expanded. In 1886 J. D. Whitman planted an additional 80 acres of apples and pears on the tract of land north of Stewart Avenue in the approximate location of the PP&L warehouses. At the same time Arthur Weeks, a son-in-law of J. H. Stewart, planted part of what is now Bear Creek Orchards. In 1888 Dillon Will, another son-in-law of J. H. Stewart, planted part of the orchard just south of Stewart Avenue. This whole tract was given to the city of Medford by Bear Creek Orchards in 1975. In 1890, Bert Whitman, son of J. H. Whitman, planted part of the Mira Vista orchard located a few miles northeast of Medford and on high sloping ground. The first car of pears and apples was shipped in 1890 by J. H. Stewart. In 1897 the Weeks & Orr Orchard, 2 miles south of Medford, had 15,000 trees bearing.

In the following years there was a very rapid expansion in the fruit acreage, not only of pears but of apples, cherries, peaches and prunes. At one time there was a substantial prune industry in the valley and four or five dryers were built to accommodate the crop. These have all disappeared.

Cherries and peaches likewise had an early start. In the 1890's about 300 acres of Bing and Lambert cherries and Early Crawford peaches were planted, especially in the hills around Ashland.

Apples enjoyed a tremendous boom, the apple acreage was considerably greater than the pear acreage in the early 1900's. The principal apple varieties planted were Newtown, Pippin, Spitzenberg, Baldwin, Jonathan and Ben Davis although many other varieties were also planted.

There was no pause in the steady planting of pears, the principal varieties being Bartlett, Anjou, Winter Nelis and Bosc. In 1897 the first Comice were planted in a row just north of Stewart Avenue on the Dillon Hill place. There are still a few of these Comice trees growing in yards along the north side of Stewart Avenue. The next few years budwood was taken from these trees and most of the early Comice trees were propagated from them. These would include the Comice blocks in the Hill orchard south of Stewart Avenue, the Hollywood orchard along the Jacksonville Highway and the Hillcrest orchard northeast of the Medford Country Club.

Reported planting dates for some early orchards are compiled below from the memories of pear pioneers. As memories are dimmed by years, we must overlook some inconsistencies. Also, it must be remembered that the larger orchards were planted over a long period of years.

<u>Name of Orchard</u>	<u>Location</u>	<u>Approximate Date Planted</u>	<u>Planted by</u>	<u>Still Growing</u>
Eden Valley	By Voorheis crossing	1885	J.H. Stewart	Yes
Bear Creek	2 mi. south of Medford	1886	Alf Weeks & Eugene Orr	Yes
J. D. Whitman	N. of Stewart Ave.	1886	J. D. Whitman	No
Hill	South of Stewart Ave.	1888	J. H. Stewart	No
Mira Vista	N.E. of Medford	1890	Bert Whitman	Yes
Pellett	West of Talent	1890's	Mark Pellett	Yes
A. D. Helms	S.E. of Ashland	1890's	A. D. Helms	No
Norcross	E. of Central Point	1890's	W. H. Norcross	Yes
Hillcrest	N.E. of Medford	1897	Bill Stewart	Yes
Del Rio	W. of Gold Hill	1890's	Alf Weeks & Fred Deuel	Yes
Marshall	N. of Stewart Ave.	1897	J. H. Stewart	No
Hollywood	Jacksonville Highway	1898	Dr. Page	Yes
Phipps	Crater Lake & Vilas Rds.	1900	Phipps	No
Snowy Butte	S. of Central Point	1900	Olwell	No
Big Sticky	McLaughlin Dr.	1902	Phipps	Yes
Klamath	South Stage Rd.	1904	Alf Weeks	Yes
401	Vilas Road	1900's	Dr. Pickle	Yes
Suncrest	Valley View	1900's	Dr. Page	Yes
Wagner Butte	W. of Phoenix	1900's	Clint Stewart	Yes
Antelope	N.E. of Medford	1900's	Yankee Creek Smith	Yes
Don Clark	Vilas Road	1905	Don Clark	Yes
Court Hall	Vilas Road	1905		Yes
Most other orchards in the 401 area		1900-1910		Yes
Modoc	Near Table Rock	1908		Yes
Redskin	Near Table Rock	1908		Yes
Table Rock	Near Table Rock	1908	Col. Washburn	Yes

Pest Control

In the first cropping years there were few pests as is usually the case where a new type of crop is introduced. Codling moth worms were already here and quickly spread in commercial orchards so control measures were needed. But what to use? Eastern growers were recommending pasturing the orchards with sheep, pigs or chickens so they would eat the wormy fruits and the worms. This was not effective because many worms crawled down to the trunk and completed their life cycle under the bark flakes.

In 1887 one of the early biological control advocates appeared in the form of Professor Weed (Ohio?) who explained that a knowledge of the life history of an insect is the first requirement for its control. He mentioned some natural enemies of insects and quoted the following:

"The little fleas that do us tease
have other fleas to bite 'em
and these in turn have other fleas
and so, ad infinitum."

He then perversely suggested that arsenate of lead would control the curculio insect.

San Jose Scale arrived in California in 1885 and the State Entomologist recommended the following mixture for control of scale and fungi:

Concentrated lye	$\frac{1}{2}$ lb.
Sulfur	2 lbs.
Coal oil (kerosene)	2 qts.
Whale oil soap	8 lbs.
Copperas	2 lbs.
Water	22 gal.

He didn't mention how such a thick mixture was to be applied but as thick as that would be it would have to be brushed on. It was no wonder that by 1890 San Jose Scale had spread throughout the country. Considering that the above mixture was recommended by a state entomologist, we shouldn't be surprised at the primitive materials recommended in the following incident.

In 1892 Mr. Burrows and Mr. Grant of Grants Pass bought the right to use several pest control formulas for \$25. These formulas had been formally patented January 14, 1890, by Professor W. H. Brown, an entomologist "for the extermination of insects on fruit trees and other shrubbery," to wit:

No. 1 For winter use	
Water	40 gal.
Carbolic acid	6 oz.
Champion or Lewis Powdered lye	5 cans
Whale oil soap	6 lbs.
Coal oil (1 $\frac{3}{4}$ qts. stirred into 1 gal. boiling milk for ten minutes.)	1 $\frac{3}{4}$ qts.
Snuff (Scotch preferred) or its equivalent in Durham tobacco	1 lb.

No. 2. After the trees have been washed in the fall or winter and there still remains some scale or bark worms, add the following to one pail of the above wash:

Unslacked lime 3/4 lb.

Soap 1/2 lb.

Mix the pail of wash, lime and soap to a solution and apply with a brush.

No. 3. Omitted.

No. 4. To lessen the destructive work of the Codling Moth:

Water 40 gal.

Coal oil (used as in Recipe No. 1) 1 3/4 qts.

Asafoetida 4 oz.

Dissolve the asafoetida in turpentine, then mix.

For the primary hindrance of the hop insect, paint the hop poles with the above solution, omitting the water.

Formula No. 1 was to "exterminate" the insects. The directions to prepare it are explicit enough but they do not tell how to apply it or which insects it will "exterminate." Formula No. 2 corrects the omission of how to apply by referring to a wash applied by a brush. It also ameliorates the claim of "extermination" by suggesting another application to kill the scale and bark worms which survived the first application. The directions for Formula No. 2 are vague in recommending the addition of lime and soap to a "pail" of the wash but fail to say how large a pail (2 qts.? 4 gal.?). Formula No. 4 no longer claims extermination but speaks of "lessening the destructive work."

It is likely that had the food and drug administration been active then it would have taken a dim view of these materials and recommendations even though the patent office had been incautious enough to lend them the credibility of a patent. The distribution of authoritative insect control schedules was slow in coming about as the information was not available. In 1893 Ohio published the first extensive spray information on insect and disease control. It included information from bulletins of other states and the U.S.D.A.

Fortunately application of a wash with a brush was soon replaced by a "power" sprayer. The spray was put into a 50 gallon barrel mounted on a sled or wagon. A piston pump, installed along side the barrel was used to suck the spray out of the barrel and deliver it through a hose to an 8, 10 or 12 foot bronze or bamboo rod, with a nozzle on the end, at 30 to 40 pounds of pressure. A man then used the spray rod to apply a fine mist to the trees. The "power" to operate the pump was supplied by a strong man who pushed and pulled the pump handle back and forth. Such a pump cost \$20 to \$40. This equipment was fine for small trees but it was fortunate that gas engines came along to replace the man at the pump before the acreage increased too much or the trees reached full size.

The inefficiency of these materials and methods was attested by a grower newly arrived from the East. He objected to the fruit sorters throwing out his wormy fruit. He pointed out that most of the worms had already matured and gone and he assured the packing boss that all the rest were dead as he had punched a match into every worm hole.

Codling moth ruined the fruit but San Jose Scale would reduce tree vigor and actually kill trees if left uncontrolled.

In 1903 a high pressure sprayer (as much as 150 lbs.) operating on compressed air was introduced. It consisted of an air tank placed along side of the spray tank which had an air-tight lid. The spray tank was filled and the lid closed. Air was admitted to the spray tank by means of a long pipe along the bottom with holes at intervals. This would agitate the spray mixture as well as maintain the pressure. Each time the spray tank was filled the air tank had to be recharged with a compressor. J. A. Perry of Perrydale Orchard along the Jacksonville highway possessed one of these models. For reasons which experienced orchardists understand, this model was not a success. Sprayers with 100 gallon tanks and gasoline engines to develop a pressure of 150 to 300 lbs. came into general use about 1910.

New spray materials and better sprayers were soon to come. London Purple and Paris Green were introduced about the same time as the aforementioned exotic materials. These gave more dependable control of codling moth but also caused quite a bit of leaf and fruit burn. Arsenate of lead and lime sulfur became generally available in the early 1900's. These were safe to use but effective control was still not obtained, possibly because of poor coverage. At first the arsenate of lead was sold as a wet paste. In 1916 Mr. Cate ran tests and proved that the arsenate of lead powder was just as effective as the paste and much more convenient.

A long list of apple and pear insects and their control are listed in a spray calendar published in 1914 by P. J. O'Gara. The principal apple and pear insects and their control were:

<u>Pest</u>	<u>Control</u>
Dormant Sprays	
aphis	Black Leaf 40
San Jose Scale	
Blister Mite	Lime sulfur
Rusty Leaf Mite	
Eggs of Red Spider	
Buds opening	
Pear Thrips	Distillate oil emulsion plus Black Leaf 40
Summer Sprays	
Codling moth	4 lbs. arsenate of lead per 100 gal. water
Pear Slug	
Red Spider	
(Clover Mite?)	Black Leaf 40
Rusty Leaf Mite	
Apple Tingis	

Of these the San Jose Scale and Codling Moth were of major importance. Improved sprayers and lime sulfur were effectively controlling San Jose Scale but Codling Moth control was still a problem.

The better sprayed orchards were losing from 5% to 10% of their fruit and some orchards ran as high as 30% from codling moth worms even though 7 or 8 applications of lead arsenate were made. It was known that the worms over-wintered under the rough bark flakes. Growers were encouraged to scrape off all the loose bark flakes and replace them with a burlap band wrapped around the trunk. In the absence of bark flakes the worms would crawl under the burlap to spend the winter.

In early spring the burlap bands were removed, the worms destroyed and the band replaced. In one 1918 test, 655 moth larvae were found under a single band. Such a severe infestation made control with arsenate of lead very difficult.

The next big step in spraying was the spray gun in the early 1920's. This permitted the man who was spraying to adjust a fine spray for close work and a driving spray to reach the tree tops. The spray pressure was increased to 250 to 400 lbs. in order to properly operate the guns. This provided faster spraying and more thorough coverage.

In 1914 Mr. O'Gara suggested the use of Bordeaux mixture as a repellent for grasshoppers, cut worms and flea beetles. This idea of a repellent was further recommended by Mr. C. C. Cate, County Agent from 1916-1925. It was known that blight was spread from active blight infections to uninfected parts of the same tree or other trees. Oil sprays on the trees and sulfur on the ground were recommended to repel insects which might spread blight. This must not have proved to be effective as in the years 1917-1920 it was recommended that oil and nicotine be used to kill blight carrying insects. Following this, bordeaux mixture was used to kill the organism instead of repelling the insect.

The presence of thrip had been frequently noted for many years and sprayed for on occasion. They were more prevalent, and damage observed, in 1928 and 1929 and many growers were excited about them. When sent in for identification they proved not to be pear thrips. In 1930 there was no thrip injury but the thrips were numerous. Apparently the thrip identification was accurate but the earlier injury attributed to thrips was misdiagnosed.

Spray practices took another step forward in 1929 when 10 orchards installed central spray plants. These had underground pipes throughout the orchard. The spray was mixed at the central tank, then pumped through the pipes. The spray crew could connect their spray hoses to faucets and spray continuously. This saved the time formerly wasted while the portable sprayer was refilled after each tank was emptied. The pressures were generally increased to 500 lbs. which broke the spray into fine droplets. Another big advantage was the ability to apply a dormant spray when the soil was too wet to hold up equipment, which was most of the time.

Little was known about the proper timing of sprays for good codling moth control. To study this, Mr. Cate built a frame to completely enclose a tree and covered it with 14 mesh wire screen. One tree in each of ten areas from Table Rock to Ashland was caged in this manner. Wormy fruits were put under each screened tree to insure plenty of worms. As stated, these worms over-winter under bark flakes and come out as moths in the spring.

These cages were frequently observed to determine when the first moths emerged and if there was a difference in time of emergence between Table Rock and Ashland.

Mr. Cate continued to observe the cages during the summer so sprays could be applied in relation to the increase in number of moths in the cages. This work was carried on for several years but was not exact enough to provide good timing.

Eventually the screened trees were replaced with fermenting bait traps. In 1929 Lyle Wilcox, County Agent 1926-35, after several years observing moth traps in various areas of the valley concluded that Codling moths emerged at the same time throughout the area. This simplified the timing of the moth flight as the traps were more accurate and fewer of them were needed.

In 1924 the two-spot spider mite arrived in the valley. It being the type of insect which feeds on the sap, it was not harmed by the arsenate of lead. Some type of contact spray was required and spray oils were found to be effective. By 1926 the spider mite was well established and the oil sprays used to control it greatly increased the problem of spray residue removal.

In 1929 R. K. Norris, entomologist at the Talent Experiment Station, showed that dormant oil sprays on Winter Nelis trees caused damage. The trees were late in leafing out and were small. This was confirmed in later years by L. G. Gentner who showed that the injury occurred in all years when Winter Nelis were sprayed with oil. Growers were urged to use alternate spray materials on this variety.

It was reported by early residents that in about 1903 a dry summer and a grasshopper invasion coincided. With little other green food available the grasshoppers ate the leaves on the fruit trees. Some growers painted a band of creosote around the trunks of the trees to repel the grasshoppers. However the grasshoppers flew into the tree tops and ate the leaves and the creosote killed the trees that were treated.

Plantings

It was also reported that a considerable acreage of apples and pears was poorly planted on unsuitable soil which was improperly prepared. Over 400 acres was planted in the Agate desert. This was done as a promotion to sell to unsuspecting and unknowledgeable investors in the North Central and Eastern states. The stock sold in most of these ventures soon became worthless.

The peak of the apple planting was reached about 1910. A combination of tree losses from blight, poor orchard performance on poor soils and poor market prices was more than the growers could tolerate. The total acreage planted to apples was never properly certified and estimates varied widely. A reasonable guesstimate would put the maximum planting of apples in the ground at one time at 10,000 acres. Many of the apple orchards were pulled and replanted to pears. Some were interplanted with pears and the apples pulled out a few years later.

There was no pause in the planting of pears, the principal varieties being Bartlett, Winter Nelis, Anjou and Bosc. In 1905 a carload of Comice and Bosc pears sold in New York for \$11.50 a box. In 1909 a similar sale of Comice was made in London. These sales spurred the planting of much additional acreage with more emphasis being placed on these two varieties.

Frost

It wasn't long after the orchards started producing that crops were lost to frost. The land promoters kept saying that cold spring weather would not recur. The growers could not afford to lose their crops so they attempted to control the frost. At that

time it was commonly felt that a heavy smudge would prevent heat loss so frost damage would not occur. It was also believed that the smoke would prevent the morning sun from thawing the fruit as rapidly. It was felt that rapid thawing increased the frost damage. Much wet straw, manure and leaves were burned for the sole purpose of producing smoke, hence the term "smudging."

It didn't take the growers long to decide that heat had to be added to keep the fruit warm, hence the change to the term "heating." Oil was scarce at that time so many growers burned wood fires. Dolph Phipps hauled coal from a coal mine of Roxy Ann and burned it in 1000 heaters especially made for burning coal. Briquets were also burned in special heaters. By 1910 oil became more generally available and was easier to handle so it was most widely used. It was burned in "lard pail" burners of 5, 7, and 9 quart sizes. Clusters of them were placed throughout the orchards and as many lighted as were needed to control the temperature.

Frost prediction was an unknown art at that time and critical temperatures at different stages of development were not known. Some progressive Rogue Valley growers cooperated with Mr. O'Gara as the pathologist was also in charge of the Medford Weather Bureau station which was then on top of the Liberty Building. Between them crude frost prediction methods were developed. In 1912 Mr. O'Gara would make his frost prediction early each evening. The prediction was given to the "operators" of the "Home" and "Pacific States" telephone companies. Growers would call in and get the frost forecast. On uncertain nights Mr. O'Gara remained in his office all night and updated his forecast each hour. In 1916 Mr. Claude Cate, Extension Agent, who replaced Mr. O'Gara, instituted the testing of thermometers for the growers.

This cooperative frost research and service was continued until 1917 when the Fruit Frost Service was established by the U. S. Weather Bureau. Floyd Young was assigned here as the meteorologist in charge to issue frost forecasts and perform associated services. The Medford office was the only one opened in 1917 but the service rapidly expanded to California and other states in later years. The Medford pear industry can proudly lay claim to being the originator of the first organized fruit frost forecasting service. In 1929 there were 85 growers heating 2600 acres of bearing pears which was 1/3 of the bearing acreage. It was necessary to heat on 21 nights.

Packing

As the production of fruit exceeded the local demand it was necessary to pack it for shipment to outside markets. J. H. Stewart shipped the first car of pears and apples in 1890. In the next few years he built the first packing house in the valley. This was a private packing house. The first commercial packing house was built by J. A. Whitman, son of J. D. Whitman. This was built only a year or two after the one built by Mr. Stewart. It was erected near the railroad tracks north of Stewart Avenue and close to the Whitman orchard. It burned down in 1912. The second commercial packing house was built by J. A. Perry on the north side of Main Street between Fir Street and the railroad tracks. The first carload of pears only was packed by Mr. C. A. Knight in 1906 at the Ala Vista Orchard south of Eagle Point.

As production increased more packing houses were built. Most of these were built at the larger orchards. This was necessary as roads were poor and crops had to be moved by horse drawn wagons. In the early 1900's the Rogue River Fruit and Produce Association was started as a cooperative packing and selling organization. It was built along the P & E tracks north of Vilas road. It suffered financial collapse in about 1910 but was reorganized and continued to function for 10 or more years. This

failure was a severe blow for the growers involved but additional pear acreage continued to be planted although the turning point had been reached for apples.

As roads were improved and trucks became commonly available there was a shift from on farm packing to larger centralized packing houses with cold storage facilities along the railroad tracks. Centralized packing houses standardized the fruit grades at a high quality level and the nearby cold storage houses assured rapid cooling and long storage life. These factors gave Medford the deserved reputation of producing high quality fruit which commanded a premium price in the markets.

With the increased importance of a quality pack, the Medford fruit industry organized and conducted a packing school in 1909. The students were shown proper wrapping and packing procedures, then put to work under close supervision until they gained the skill and rhythm necessary to put up a pack with the exact number of fruit per box, which varied with fruit size. This school was almost before its time as the apple box was not standardized by Oregon law until 1910. Mrs. Eva Martin received a certificate of attendance at the apple packing school on 9/16/09 from Mrs. Raymond Furry, Phoenix. An interesting sidelight of pear packing resulted when Edythe Stone of Central Point wrote her name and address on a pear wrapper in 1911. The pear with wrapper was bought by a lady in Scotland who wrote back and enclosed a twig of scotch heather.

The Oregon Horticultural Society was established in 1885. Cardwell and Lewelling were among those who assisted in its organization. It met each year but the industry had not matured enough to justify the publication of a proceedings until 1909. At this meeting most of the members were from the Willamette Valley and Hood River. J. P. Naumes, a Hood River grower, was a member and later was awarded a medallion for an apple display. He later brought his family to Medford where his son, Joe Naumes, established a substantial position in the industry. Only two Medford growers were members, L. Kinnear and Charles Meserve. They were supported by S. W. Phillips of Grants Pass. The membership fee was \$1.00 including the Proceedings.

It is interesting to note that the State Board of Horticulture was also established in 1909. In 1910 J. A. Westerlund became the first life member of the society from Medford. No mention was made of the Medford fruit industry in either the 1909 or 1910 proceedings.

The 1911 meeting introduced a resolution to eliminate the term "choice" for the lowest grade of fruit as it was misleading and untrue. They recommended the terms Extra Fancy, Standard (instead of Fancy) and C Grade (instead of choice). The resolution was never implemented.

Two Southern Oregon growers were chosen as presidents of the Oregon Horticultural Society in consecutive years. C. E. Whisler, Medford, served in 1913-14 and Col. R. C. Washburn, Central Point, served in 1914-15. This was the first meeting held in Medford. These early members pioneered the way and Medford growers have been prominent in the Society activities ever since.

Blight

Another problem that became serious was fire blight. This is a bacterial disease that attacks pears and apples and related ornamentals. This disease was native to the Eastern United States where pear orchards in the more humid climatic conditions are more severely attacked. However when it attacked the local orchards in 1905 the

trees were young and vigorous and highly susceptible. Many limbs and trees were lost. The growers had little understanding of the problem so they appealed to the U.S.D.A. to station a pathologist in Medford to assist the growers with control measures.

In 1909 P. J. O'Gara, a fruit tree pathologist was stationed in Medford with an office and laboratory in the Liberty building, on the corner of Main and Grape. Mr. O'Gara urged the growers to cut off all diseased limbs and to patrol the orchards constantly to detect new infections. More importantly, he urged the growers to carefully sterilize their tools and cuts with bichloride of mercury. Whenever a saw or knife cut through diseased tissue, bacteria would cling to the cutting surface and be carried from one cut to the next, so cutting could actually increase the amount of the disease. This spread was reduced by sterilizing the cutting tools with bichloride of mercury.

Mr. O'Gara continued to work on blight problems and due to his efforts, or to less favorable weather conditions, blight was brought under control. In 1912 this statement was made, "The blight is fully under control in Rogue Valley and will not again become a serious pest provided the orchardists exercise diligent care in eradication of any infections that may appear in their orchards." This was probably the last and only time anyone has mentioned "eradication of blight." It continues on a sporadic basis to be one of our most destructive pear diseases.

The U.S.D.A. wanted to assign Mr. O'Gara to another area in 1911 but through the intervention of the fruit growers, led by Mr. A. C. Allen, a different arrangement was made. Mr. O'Gara resigned his position with the U.S.D.A. and accepted an appointment by the County Court as County Pathologist. The County agreed to pay the expenses of the office but the fruit growers had to pay the salary of \$5000 a year for Mr. O'Gara.

In order to finance this the local fruit growers organization, probably the County Horticultural Society, voted to have a special assessment on land planted to fruit trees. The assessment was a \$20.00 per acre increase in valuation of the land if the trees were mature and a \$10.00 increase if the trees were non-bearing. This special assessment continued in force and after Mr. O'Gara left in 1914 the money went into the County general fund. This continued until the early 1950's when an investigation was made by Ward Spatz. As no official record could be found authorizing this extra tax on orchard land the tax was discontinued.

Experiment Station

Medford was now a major pear and apple producing area. As the climate and soils here did not resemble those in other fruit areas, Oregon Agricultural College decided to establish a branch experiment station in this area. In 1911 Professor F. C. Reimer was hired to be the founder and first superintendent of the new station. His first task was to select an acreage of uniform soil suitable for experimental work. About 17 acres of ground between Highway 99 and Bear Creek, 1/2 mile north of Talent was selected. A large 2 story building was erected to serve as his home, the offices and laboratory.

Extension Service

In 1914 Congress passed the Smith-Lever Act which established the Cooperative Extension Service and appropriated money to pay part of the salaries of the agents if the states would pay the remainder. Counties which wanted to join in the cooperative venture would have to contribute office quarter and pay all expenses of equipment and operation. As Mr. O'Gara had just resigned as county pathologist, the fruit growers asked Jackson county to appropriate money for an Extension Service. This was

immediately done so Jackson county is numbered among those first counties to establish an Extension Service.

Professor F. C. Reimer, Superintendent of the Southern Oregon Branch Experiment Station was put in charge of the Extension Service until C. C. Cate, the first full time extension agent arrived in December 1915. During this interim M. P. Henderson served on a part time basis from 7/1/14 to 8/31/15. L. G. Gentner also served as an assistant from 4/1/15 to 8/1/15 and as acting pathologist from 8/1/15 to 1/23/16. During this time pear scab was severe in the valley. Dr. Gentner studied the situation and wrote a fine paper explaining the nature of pear scab and effective control measures.

Fruit Growers League

With pear production, harvesting, storage and marketing becoming more complex each year, the growers felt the need of an organization so they would have an effective voice. The following article, written by E. W. Carlton details the steps taken:

THE FORMATION OF THE FRUIT GROWERS LEAGUE

1913 was a year of severe pear blight infestation. To effect a clean-up a committee composed of citizens and orchardists was formed. The County Court appointed a dozen or more inspectors to assist growers in their work of eradication. There was much publicity with posters throughout the valley and the press gave much space to the movement. Mr. W. A. Sumner was president of the committee and the writer was the secretary.

From this effort came the idea of a permanent organization of fruitgrowers and farmers to promote the interests of those engaged in agriculture. A mass meeting was called and an organization THE FARMERS AND FRUITGROWERS LEAGUE was formed. This action probably took place in the spring or early summer of 1914. There was the usual Board of Directors and the accustomed officers. Eventually it developed that the farming interests took little or no part in the effort so the name became THE FRUIT-GROWERS LEAGUE. Unfortunately the records of the League were destroyed by fire in the Chamber of Commerce office which occurred in 1937 or about then as a thoro search failed to find them elsewhere. So the early records do not exist.

E. W. Carlton

In the early years of the League each grower-member was charged a uniform fee. In 1922 this was \$3.00 and there were 175 members. In later years an assessment was placed on each box of pears packed or cannery equivalent. In 1928 the assessment was 4 mills which was added to the cost of packing and remitted to the Fruit Growers League.

Blight

Mr. Carlton states there were "a dozen or more" inspectors to assist growers in their work of blight eradication. Extension Service records of that era state that there were 18 blight inspectors hired by the county at one time at a cost of \$18,000 for salaries alone. A photo of some of these men in 1916 show County Agent C. C. Cate, Horticulture Commissioners A. C. Allen and C. A. Noren and Inspectors J. C. Aitken, E. Oatman, C. Martin and Ross Kline.

Mr. Cate carried a State Department of Agriculture appointment which empowered him to remove diseased trees. Many diseased trees, if neglected by the owner, were removed and the cost added to the owners property taxes.

In spite of the recommendations of the specialists the area suffered periodic blight epidemics and periods of much lower rates of infection. These created the false impression that control was being obtained. While many thousands of pear and apple trees were killed by blight, it would have been worse if control efforts had not been made.

In 1914 Warnock's blight cure was applied to two blighted trees by Prof. Henderson and L. G. Gentner who were acting County Agents at the time. These treatments were examined in 1916 by Claude Cate, then County Agent. The blight was still active and had spread so much that the trees had to be removed. The old saying is that if an unscrupulous salesman runs fast enough he will catch a sucker. In this case the Extension Agents intercepted him and saved the growers untold losses.

The first break came in 1918 when Mr. Cate reported to Prof. Reimer that mercuric chloride used to sterilize the cuts and cutting tools, was effective only on the tools but was not effective on the cut surfaces. Prof. Reimer immediately confirmed this observation and started a testing program to find a material which was an effective sterilizer on cut surfaces. Mercuric cyanide was found effective so a combination of the two materials was used with much improved results.

Blight Resistant Roots

Prof. Reimer also reviewed the literature on blight and learned that certain pear species and varieties varied in their blight resistance. With this knowledge he set out to collect these resistant kinds. This would enable the growers to use resistant rootstocks and trunk stocks so blight would be confined to the top variety and the entire tree would not be lost. Kieffer was already being grown in the Eastern states because it was a somewhat resistant variety. A few hundred acres of Kieffer trees on seedling roots were planted here between 1915 and 1928. These were later grafted to the desired variety.

Starting in 1913, Prof. Reimer gathered 30 distinct species from Europe, Africa, Japan and Asia including India and China. All but five were undesirable. He also located two blight resistant seedlings in the midwest. One, located at Farmingdale, Illinois, was named Farmingdale and used for breeding blight resistance. The other also came from Illinois and was named Old Home and was used as an interstock. For clarification it should be stated that Reimer was not the first to introduce "Jap root" which caused so much grief. It was introduced to the Northwest in 1895.

Prof. Reimer made two trips to the Orient (1917 and 1919) and gathered seeds from many species. These were brought back to the Talent Experiment Station and, with his other collections, formed the most extensive collection of pear species and varieties in the world.

Growers were still suffering heavy blight losses so they had trees propagated on several of these roots and interstocks before they had been thoroughly tested. The County Agent's report, 1924, says that 30,000 blight resistant trees have already been shipped in this year and there may be 15,000 more.

This resulted in problems that started almost at once and continued until 1960. Some of the stocks were not hardy and were killed by a bad freeze in 1924. This included Kieffer which grew in the cold Eastern states. Others did not grow well and some produced "black end" fruit. By 1925 Mr. Cate stated that blight resistant stock was not in good favor.

Among the hodge-podge of trunk and root combinations the Old Home trunk on Calleryana root was the most numerous and the best although the Old Home when young suffered from a severe trunk and branch canker. However there are many fine orchards still growing on this variety/trunk/root combination.

Bordeaux for Blight

Blight continued to take its toll. In 1922 E. W. Carlton sprayed with bordeaux. He sprayed alternate sets of three rows, the other 3 row sets were left as checks. He was excited to find very little blight in the sprayed rows. His examination of the unsprayed rows showed very little blight in them either. As he had almost always had blight, he felt the bordeaux must have acted as an insect repellent. He continued to use the bordeaux.

During the 1924 season Prof. Reimer set up a test on the Experiment Station. The treated plot was sprayed with a mixture made of 3 lbs. of copper sulfate plus 6 lbs. of lime in 50 gallons of water (3-6-50). It was applied at the full bloom and ten days later. A check plot was left unsprayed. His results were the opposite of Mr. Carlton's as he had blight in both plots.

Feeling that the full bloom spray was too late he repeated the test in 1925. The first spray was applied just before bloom and two more at ten day intervals. The sprayed block had 666 infections per row and the unsprayed block 2150 infections or about three times as many. Control would probably have been better if the sprays had been closer together and more applications used. Fruit russetting occurred in the wet year of 1925 but did not occur in the dry year of 1924. However it is in wet years when control is most needed.

In 1925 Mr. Cate reported the worst blight outbreak in ten years. Most of the growers who used the bordeaux spray had much less blight. The Modoc and Red-skin Orchards near Table Rock were singled out for special comment. They had been in an almost hopeless condition but had used bordeaux for three previous years and in 1925 "they were the cleanest orchards in the valley."

It was pointed out even then that in wet springs there was considerable fruit russetting. Mr. Wilcox, County Agent 1926-1935, continued to recommend its use. However as the late sprays caused most of the russetting there was a gradual drift away from the petal fall and the ten days later sprays to prepink and pink bud sprays. These were safer but not timely for blight control. The last season it was applied was in 1931 when only a few growers used it. It was discontinued with the statement that sprayed orchards had as much blight as unsprayed ones and there were no facts to prove its value. The mis-timing was ignored.

Prof. Reimer had the right idea but the wrong concentration. The University of California, Davis, picked up the idea later in the 1930's and did more testing. They reduced the concentration to $\frac{1}{2}$ - $\frac{1}{2}$ -50 or even $\frac{1}{4}$ - $\frac{1}{4}$ -50. If applied in the early full bloom and frequently thereafter it gave good control of blight and did not russet the copper tolerant varieties such as Bartlett and Comice. It was re-introduced to Medford in 1945 by Cliff Cordy. It still is the basic material used for blight control.

Pear Maturity and Storage

While the first carload of pears and apples was shipped from the valley in 1890 there was no real knowledge of when pears should be picked. Again this problem is succinctly discussed by Mr. Carlton:

THE PRESSURE TESTING OF PEARS

At a meeting of the Board of Directors of the Fruitgrowers League probably in 1916, Mr. W. A. Sumner, the President, said to the Board, "According to our custom we sent to Mr. Palmer some pears from his orchards. In acknowledging them Mr. Palmer said, 'Do you men know when to pick pears?' and I have to acknowledge we don't but we should find out." The Board agreed with Mr. Sumner. Mr. C. C. Cate, the County Agent, was called to the meeting and was told to find out when to pick pears. Mr. Cate spent a year or so testing the various methods then in use and found none reliable. One day he had an inspiration, or so it turned out, in recalling what one does to test fruit for ripeness--a pinch. He sent his idea to the State College of a "pressure tester" and asked that one be made. This one is still in use by the County Agent. The pounds recorded on the tester meant nothing until extensive ripening tests were made to determine keeping and flavor qualities after cold storage. To have available a cold storage room for this work a number of growers contributed to a cold storage room in an existing plant. In some ten years the industry had a range of pressures for each variety of pears grown in the Valley--the highest pressure at which picking may be done, and the lowest pressure when picking must be completed, to produce full flavor and keeping quality. This investigation was continued for many years to determine variables such as the influence of soil types on maturity.

E. W. Carlton

The fruit growers must have spoken to Mr. Cate with emphasis because in 1917 a full fledged investigation of methods of determining proper picking maturity was launched by a research team from Oregon Agricultural College. This involved picking samples of pears of all major varieties. First pickings were made a few days in advance of the start of harvest of each variety. Additional pickings were made at five day intervals throughout the harvest seasons.

Each picking of fruit was tested for specific gravity, sugar, starch and acid content. This chemical analysis was made to determine if any of the factors were related to maturity. There was no reliable relationship. The results were published in 1918 by Lewis, Magness and Cate. While a reliable guide to maturity was not discovered, the basis for proper storage procedures was established.

During the winter Mr. Cate conceived the idea of a pressure tester and he and Mr. Murneek built a rudimentary model consisting of a 7/16 ball bearing half imbedded in a block of wood. The block was placed on a scale and the pear pressed on the bearing until it touched the wood. At that point the pressure on the scales was read. This was used during the 1918 investigations and clearly showed a distinct correlation between the degree of maturity and the resistance to pressure. These results were published in 1919.

Now that the principle of the pressure tester was established a more convenient testing apparatus was designed. This new model was built by Professor C. E. Thomas. A further improved model was built a year or two later. These testers were used by Mr. Murneek in a very detailed study of pear maturity and fruit growth in relation to the pressure test. These results were published in 1921.

Henry Hartman continued the investigations in 1923. He confirmed the accuracy of the pressure tester on pears but showed it was not a good indicator of maturity in apples.

As Mr. Carlton stated, it took some ten years before good correlations were established. The next bulletin on the subject was published in 1927 by Hartman, Magness, Reimer and Haller. They point out that the pressure tester is "fairly

reliable" but needed to be used with care. It is interesting to note that Dr. Magness, a co-author of both bulletins, while still expressing skepticism of the accuracy of the pressure tester, had modified the design and produced a portable version known as the Magness of U. S. tester. He must have had more confidence in it then he expressed. This 1927 bulletin thoroughly discussed the interrelationship of time of picking, proper storage and ripening of Bosc pears.

The third bulletin by Hartman, Reimer and Norris in 1929 gives a complete discussion of harvesting, storage and ripening of the seven major varieties of pears grown in the Rogue River Valley. They state here that "of the several tests of maturity considered, none proved the equal of the so-called pressure test."

This series of studies was the first comprehensive investigation of maturity, storing and ripening of pears ever conducted and has served as a basis for all later investigations on the subject.

During this same period Professor Hartman developed a pear wrap impregnated with oil and copper for the control of scald and nest rot. Congress also passed the Federal-State shipping point inspection service act in 1922.

Pear Ripening

The growers and packers could now make use of the new information on harvesting and storage. However the ripening was done in the larger cities where the fruit was sold and these marketing organizations were largely unaware of the new ripening information. The Bosc pear production was increasing rapidly in the late 1920's and it was the most difficult to ripen. There were 784 cars of Bosc shipped from Medford in 1928 and because many were improperly ripened they were of poor eating quality. The sales in many cases did not cover production costs. To improve the pear quality, the next year the growers through the Medford Bosc Committee placed an assessment on each box of Bosc packed. They then commissioned Henry Hartman to visit the major markets and assist the Bosc handlers with proper ripening. While he was financed by the Bosc Growers and shippers he worked under the direction of the Medford Winter Pear Committee.

Bosc pears were made available in Detroit by the Medford Winter Pear Committee. Professor Hartman had them held in a steam heated room at 65° for a few days before sale. The pears developed fine quality and the reaction of the stores was gratifying. He conducted similar demonstrations in New York and hoped it would become generally used. This was optimistic so Hartman continued his pioneering work for several years.

Market Promotion

In the fall of 1931 the Washington growers joined the effort and the cooperating areas were incorporated in March 1932 as the Oregon-Washington Pear Bureau. This organization likewise was supported by an assessment on all winter pear varieties but its objectives were enlarged from improved ripening to include market promotion as a major aim.

The next step occurred when representatives from California met with representatives of the Oregon-Washington Pear Bureau in Medford on July 9, 1937. At that time the California winter pear growers merged with the northwest group and formed the Oregon-Washington-California Pear Bureau. This is the oldest organization of its kind and its objectives have been copied by other farm organizations. This is another example of the leadership provided to the coastwide pear industry by the Medford growers and shippers.

Irrigation

The first known irrigation "right" in Oregon was issued in 1852 to Mr. Jacob Wagner to withdraw water from Wagner Creek to irrigate 69.4 acres. An historic marker southwest of Talent commemorates this act.

Most of the early pear plantings did not have access to stream flow so they were clean cultivated all summer. This was to prevent the growth of weeds which would use scarce moisture, and to maintain a mulch which was reputed to prevent evaporation. In actuality it was only the weed control which conserved the moisture. Orchard photos of early orchards are notable in that weeds are totally missing and the trees are vigorous.

As the trees increased in size their water requirements increased and the orchards began to show the affects of drought by growing less and producing smaller fruit. With this evident need for irrigation it wasn't long before efforts were made to supply it. The following early history of irrigation development is taken from a paper prepared by G. J. Pendleton, Secretary-Manager of the Rogue River Valley Irrigation District and J. O. McGinnis, Manager of the Medford Irrigation District. The Talent history was obtained from Walt Hoffbuhr, Manager of the Talent Irrigation District.

The Fish Lake Water Company was organized in 1897 for the purpose of storing and transporting water into the Rogue River Valley for irrigation of some 55,000 acres of land.

The new company began work on the Fish Lake road, and in the following year water right filings were made and permits granted by the State of Oregon. In 1902 the road was completed as well as a log dam capable of impounding 4,500 acre feet of water. That same year water was delivered through new canals to the Agate Desert, now known as White City.

In 1904 the canal was enlarged and extended to the Upton Lateral on Delta Waters Road, just west of Crater Lake Avenue in Northeast Medford. Next the canal was extended, in 1906, across Bear Creek to the Berrydale area near the Big Y.

Fish Lake Water Company mortgaged its system to Pat Welch of Spokane, Washington, in 1909 or 1910. He began a land promotion project, using his own personnel, to plant several hundred acres of orchards which then sold for two or three hundred dollars per acre. Welch acquired outright ownership of the water company and began operating as the Rogue Valley Canal Company, The Mt. Pitt Water Company and the Public Water Company after the land development project failed, shortly after the 1910 boom. His private lands were operated as a cattle ranch. He made no further enlargement of the water system until 1919-1920 when he contracted with the Medford Irrigation District to construct, furnish water to, and maintain for two years its water system.

Further enlargements were made between 1916 and 1930: Fish Lake Dam was constructed to its present height; Cascade Canal connecting Fish Lake and Four Mile Lake was completed as well as Four Mile Dam and the Medford Irrigation system; the main canal from Little Butte Creek to Bradshaw Drop and the Hopkins Canal were enlarged with more permanent structures. However, the Welch interests and the Medford District were soon involved in litigation over many matters, including incomplete construction work and conflicting water rights. The legal problems continued

until 1927 when the parties stipulated that the water supply was just insufficient to serve 55,000 acres of land. Consequently the Medford District was cut to 10,500 acres and the Hopkins system to 4,784 acres. The Rogue River Valley Irrigation District, organized by farmers, then bought the present irrigation system from the Welch interests in 1929. Since then additional water has been made available to both the Medford and Rogue River Valley Districts through the Talent project. The Rogue River Valley District has added Agate Reservoir to its system to provide water for new lands in that district. Both districts have improved their systems through an extensive rehabilitation project, begun in 1957 and now complete, in cooperation with the U. S. Bureau of Reclamation.

Today the Medford District serves 11,050 acres of land and the Rogue River Valley Irrigation District serves 7,712 acres. Together they have two water rights on Butte Creek, one for 10.5 cubic feet per second (c.f.s.) with a priority of 1899 and one for 500 c.f.s., dated 1909. However, the two districts are not able to utilize 500 c.f.s. actual flow during the irrigation season because there isn't that much water, and that is the reason the Fish Lake and Four Mile Reservoirs were built. The Jackson County Watermaster estimates the summer actual flows of the north and south forks of Little Butte Creek to be 60 c.f.s. in good and average years. Thus, water for irrigation on the valley floor must come from storage in the two reservoirs. The stored water is brought down Little Butte Creek to the diversion facility near Lake Creek. There the stream is divided, sending down Little Butte Creek the amount of water determined by the Watermaster as sufficient to meet all downstream prior water rights. The remainder is diverted to the irrigation districts' systems. Water sent down Little Butte Creek cannot be brought back into the irrigation systems at any point.

The Talent Irrigation District was organized in 1916 and 75¢ per acre was levied on the cooperating farmers' property to carry on the investigation. In 1917 the land owners voted in favor of \$600,000 of 30 yr. bonds on their property to construct the project. In 1919 S. S. Bullis conveyed the right to 30 c.f.s. of McDonald Creek and Little Applegate to the district. The McDonald unit was completed in 1920.

Property for the Emigrant Reservoir was purchased in 1920 and the contract for the dam was awarded in 1924 and was nearly completed the same year with a capacity of 8,000 acre feet. Property for the Hyatt Reservoir was purchased in 1923 and the dam completed the same year with a capacity of 16,000 acre feet.

Congress authorized the Talent project including Howard Prairie and the enlargement of Emigrant in 1955 and set aside \$500,000 for it. In 1956 the farmers who would use the irrigation water voted 111 to 11 in favor of bonding their property for \$5,810,000 as their share of the cost of the project which was completed in 1962.

These irrigation districts provided water which was vital to much of the agriculture in the valley. Agriculture also paid the whole cost of most of the projects and their share of the costs of the Talent project. As a result of this system of reservoirs the county was furnished free of charge (except the Talent project) the base for much of its recreational facilities.

Drainage

It was fortunate indeed that the need for stored water for irrigation was foreseen as early as 1897 because it was 1923 before there was widespread orchard irrigation. With the relatively shallow soils underlaid with layers impervious to water it should have been no surprise that a drainage problem would come close on the heels of irrigation. In 1928 the growers requested drainage assistance. F. E. Price, later

Dean of Agriculture at Oregon State University, worked in the valley in 1928 and 1929 demonstrating methods of alleviating the drainage problem.

In 1929 the fruit growers requested federal assistance with drainage. The U.S.D.A. acted quickly and R. A. (Arch) Work was assigned to the area on July 1, 1929, to do soils and drainage work. The pear growers were prosperous that year having produced a pear crop with a value of \$7,000,000. They also expected to plant 700 to 800 more acres of pears. Mr. Work was a knowledgeable soils man and soon set about to organize some drainage districts. The growers agreed with all good intentions but the depression and disastrous pear prices made most of the projects financially impractical but some projects were completed. In 1931 the U. S. Bureau of plant industry arranged to set up a federal experiment here and assigned Dr. W. W. (Bill) Aldrich, a horticulturist and plant pathologist, to join Arch Work to cooperatively carry on pear tree and soils research. They published several bulletins which are still basic to drainage and irrigation practices and pear tree responses to irrigation, pruning and other cultural influences.

Fertilizer

As the trees grew larger their first requirement was for more water but a concurrent shortage was fertility. Natural fertilizers were not available in sufficient supply so synthetic fertilizers were needed. There had been only a few well laid out tests of synthetic fertilizers. A questionable test was made in Massachusetts in 1889 and a careful test at Cornell in 1900. The results were inconclusive.

In 1906 Axel Amundsen, a Talent orchardist, visited his home in Norway and returned with a sack of sodium or calcium nitrate. It was referred to as "Heavenly Manure" as it was extracted from the atmosphere. This was applied to his pear trees and was the first chemical fertilizer used in the Rogue River Valley. As the orchard is still producing, his confidence in it seems justified.

Nothing further was done locally with synthetic fertilizers until 1914 when Mr. O'Gara recommended nitrate of soda in a dormant spray at 100 or 200 lbs. per 100 gallons of water. In 1917 Mr. Cate encouraged a half dozen orchardists to use nitrate of soda as demonstration plots. A few more growers put out plots in 1918. Fifty growers tried it in 1919 and seventy growers used sixty tons of nitrate of soda in 1920. Concurrent tests were being made by Reimer at the experiment station. These tests showed that nitrogen was the only element needed.

It seemed logical that if nitrogen was needed it would be cheaper to plant a nitrogen gathering crop, such as alfalfa, as a cover crop. Test plots of alfalfa were tried but were not successful as they were detrimental to the trees.

The next best method seemed to be to haul in alfalfa hay and spread it through the orchard. This was first recommended by County Agent Wilcox in 1927. Sulfate of ammonia was recommended to replace nitrate of soda at that time. In 1928 alfalfa hay was available at \$8-\$10 per ton in the field and it cost \$2-\$2.50 per ton to haul it. The demand for alfalfa hay exceeded the supply so straw plus sulfate of ammonia was used but was not the equal of alfalfa hay. In 1929, 3000 tons of alfalfa hay that had been rained on was spread on 1500 acres of orchard. This hay cost \$3 to \$6 per ton.

Hay was spread on 1600 acres of pear trees in 1930. At this time the fertilizer companies were pushing to get the growers to use complete fertilizers. Local, long term test plots by County Agent Wilcox however did not encourage this. These plots

showed that potash failed to improve storage quality. Phosphate hastened maturity and shortened storage life. Sulfate of ammonia was recommended.

An iron deficiency caused by an excess of lime induced a chlorosis which was first reported here in 1930. California had experienced the problem earlier and had worked out a cure. This consisted of boring a series of holes around the tree trunk and inserting iron sulfate. This was tried and found 100% successful.

At the time of these tests there were ten known essential elements. Since that time the need for five trace elements has been discovered. While these are used in minute amounts they are just as essential as the other ten.

Spray Residues

The Medford area had always relied heavily on European markets to purchase many of its pears. In the 1920's about one half of the winter pear crop and much of the Bartlett crop were marketed in Europe with England being a major consumer. In 1925 England placed a tolerance of .01 grains of arsenic trioxide per pound of fruit (.015 ppm). England had seized several carloads of apples in 1925. The shippers had to unpack the fruit and brush or wipe off the arsenic.

The Talent Fruit Growers Association was organized in 1926 principally to oppose governmental regulation of spray residue on fruit. The Traffic Association, later called the Medford Pear Shippers Association, was also formed in 1926 with Myron Root as president and Guy Connor as secretary-treasurer. While its objectives were to deal with packing, transportation and selling, it was immediately involved in the spray residue controversy.

As the harvest season approached and England indicated it would stand fast on its tolerance it caused a chaotic situation in Medford. The Southern Oregon Emergency Committee was formed. It was composed of bankers, growers and shippers with Paul B. McKee as chairman. This committee in cooperation with the Fruit Growers League sponsored a delegation of three to visit Washington D.C. to obtain relief if possible. It was not possible.

A series of grower meetings was held to discuss the problem. Professors R. H. Robinson and S. C. Jones, chemists at O.A.C., came to Medford to develop a method of removing the arsenic.

On June 7 County Agent Wilcox sent out a letter informing the growers they would have to meet the .01 tolerance.

On June 29 a "second and final" letter was sent to tell the growers to wipe all pears. The apple treatment would be decided later.

On July 10 a letter was sent saying that fruit sprayed with oil and lead arsenate could not be wiped and meet the tolerance.

On July 14 a letter said hand wiping was adequate if arsenate alone had been used.

On July 21 a letter said hand wiping was damaging to the finish of the pears due to an accumulation of grit and wax in the gloves. Gloves should be changed twice a day.

On July 24 a carload of wiped pears sprayed with oil and arsenate of lead was seized. Four more letters of instruction followed.

In the meantime chemists Robinson and Jones had developed a dipping process that "cleaned the fruit beyond suspicion." It consisted of dipping the fruit for 10 to 15 minutes into a solution of one gallon of hydrochloric acid and 125 gallons of water then rinsing in clean water. This may have cleaned them beyond suspicion but somewhat over 10% of the washed lots failed to meet the .01 tolerance. As the U. S. tolerance was higher the fruit could be sold domestically.

This was the first time growers were forced to comply with a spray residue problem. The ingenuity, vigor and tenacity of the Medford growers in solving this problem must be admired. The season was summarized by the statement "such a chaotic and disorganized season hurt the entire industry and a repeat must be prevented or many growers will be financially ruined."

The dipping process was changed to a continuous washing process and came to be considered a normal part of the packing procedure. Much credit is due Professors Robinson and Jones for their perseverance in finding a suitable procedure to enable the growers to market their 1926 crop while the experiments were in process. The other apple and pear areas in the U. S. adopted the Medford procedure. Again the Medford growers led the way.

Subsoiling

Somehow the practice of subsoiling had become established in the early 1920's. County Agent Wilcox discouraged it but said he could not see any bad effects from it. In the depression the bad effects became quickly apparent, it cost money, so it was abandoned. The practice appeared in later years but was discouraged by County Agent Cordy as being useless except in the rare case of a hard pan. In these cases it was necessary to place the subsoiler just deep enough to break up the subsurface hard pan. Very little real subsoiling has been done in recent years. The brown soil on slopes around the west side of the valley form a layer relatively impervious to water at a depth of 6 to 10 inches. Breaking up this layer on a contour across the slope has been advised to assist in water penetration.

Depression

The pear growers had increasing crops and fair prices during the late 1920's so in spite of some cultural difficulties they were financially sound. In 1930 the area produced their largest pear crop so they were hopeful despite the stock market crash of October 1929. Market prices were poor and the large crop was not enough to offset the low returns and many growers netted red ink. This was Dr. L. G. Gentner's first year as entomologist on the Talent Station and his sound research and advice were sorely needed to help the growers with increasing pest problems. Dr. Gentner served as entomologist from 1930-1962.

Growers were still hopeful that good markets would return but they were forced to cut expenses as much as possible. As the depression dragged on, more and more growers either neglected their orchard or gave them bare maintenance care. The first thing to go was clean cultivation so orchards no longer looked neat and weedless. Spraying was also neglected and pests and diseases became more of a problem. Blight became especially bad when not removed and it provided a source of infection for the neighboring orchards.

In 1935 C. B. Cordy (1935-69) was hired as an extension agent to work with the fruit growers. The Fruit Growers League requested that the blight in uncared for orchards be removed or the orchards cut down. They appointed a blight committee to advise with Cordy on steps to be taken. The committee recommended that if growers persisted in ignoring the blight in their orchards that a condemnation be issued. If the growers ignored the warning then the orchard would be cut down. This was discussed with legal authorities and they approved of the procedure.

At this time there was only one blight inspector, Howard Warner, who worked full time assisting growers with the blight problem. Seventy five to one hundred orchards were condemned. The blight was cut out of many of them, but in some cases the growers preferred to pull out the trees.

A crew of W.P.A. workers had been furnished to the project to cut down trees if the grower ignored the notices. These were sad days to see the loss of a lifetime of work because of lack of money and an uncontrolled disease. In three years about 1500 acres of pear trees were removed before the enabling legislation was declared invalid. Orchard inspections were continued and a small county budget was made available to remove trees with the growers consent.

It became apparent during this time that the most vigorous trees were damaged the most by blight. Several steps were taken to counteract this. Growers were advised not to irrigate or cultivate early if blight was a problem. Cultivation and irrigation was to be withheld until the blight dried up.

Pruning was also a problem. The growers cut blight all summer then gave a regular pruning during the winter. This double pruning forced our vigorous new growth which was very blight susceptible. It was recommended that trees cut heavily for blight should not receive winter pruning. Even if there was very little blight removed the amount of pruning should be minimized.

These practices soon removed blight from the epidemic category so that it was more readily controlled by the normal surgical procedure.

The change from clean cultivation to minimum cultivation was another great change. Fortunately essentially all orchards (and all those not cultivating) were irrigated. Many fruit areas grow permanent cover crops but in this area the trees suffer if a permanent cover crop is planted or if cultivation is delayed too long in the spring. A happy medium was "trashy cultivation." The orchard was disced as early in the spring as feasible and only enough to chop up the cover crop to reduce competition with the trees. Grass and weeds quickly regrew and prevented erosion. Putting in the irrigation rills and smoothing out the ground before harvest was about all the additional cultivation necessary.

Snow Surveys

After the irrigation districts were operating there were years when the reservoirs didn't fill and water shortages still occurred. If the growers were forewarned they could change their cultural practices to conserve water. The problem was there was no way in which to accurately predict a water shortage. Snow surveys were initiated by Congressional appropriation in 1935 and this included Southern Oregon. Arch Work was put in charge of the project.

By measuring the snow pack and cooperating with the power company and the irrigation districts fairly accurate estimates of the water supply were made. These surveys did not produce more water they merely predicted the shortage. A need for

additional irrigation supplies existed throughout this period until the Howard Prairie project was completed.

Marketing

With the depression worsening each year in the 1930's the foreign market decreased. At the same time the Medford crop was increasing so it was necessary to sell more pears in an already glutted market. The Federal government, in conference with western pear growers, agreed that it was essential to expand sales into markets which did not normally buy pears. In order to encourage this the government agreed to pay a subsidy for each box of pears sold in specified out of normal channel markets in this country and abroad.

The effect of this program is tabulated below:

	BOXES SOLD				
	<u>1937-38</u>	<u>1938-39</u>	<u>1939-40</u>	<u>1940-41</u>	<u>1941-42</u>
DOMESTIC	37,000	120,200	189,500	224,000	190,000
EXPORT	<u>38,000</u>	<u>79,000</u>	<u>124,000</u>	<u>151,000</u>	<u>none</u>
TOTAL	75,000	199,200	313,500	275,000	190,000
Per box subsidy	50¢	50¢	40¢	40¢	30¢

The subsidy was designed to offset the differential in price between sales in established markets and sales in out of normal channel markets. The economics of the plan were poor but the concept was excellent. There was a much greater differential in sales return than the government allotment so the growers had to absorb the loss at a time when they could ill afford it. However as can be seen in the table above the pear consumption did materially increase in markets which formerly had used very few pears.

With the advent of World War II the government established a ceiling on pear prices. In war times ceilings also act as floors as a surplus of an agricultural commodity is rare. Surpluses were uncommon and the ceiling price covered the growers cost of production and a bit over for debt payments. The pear markets were greatly broadened and while it is difficult to isolate the influence of the war, it seems probable that the subsidy program did hurry the advent of widespread pear distribution.

Another marketing innovation was the origin of the Comice gift box and its market development by the ingenious Harry and David in the mid 1930's. From modest beginnings the Comice gift box rapidly grew to the point where it required the bulk of the large Comice to fill its demands. The gift business consistently expanded into related areas but the use of the Comice pear as a deluxe item and its eventual influence in improving the price for the remainder of the Comice on the open market was of major significance to the Medford pear industry.

While the market for large Comice had improved some other varieties such as Winter Nelis, Howell and Patrick Barry could not be profitably sold so over a period of ten years most of these were grafted over to other varieties including Comice.

Diseases

Scab, a fungus disease and blight, a bacterial disease, were the only diseases of any consequence until barkoedema, a virus disease which had always been with us, began to receive prominence in the late 1920's. There is no control for the disease and it is spread only by budding or grafting. Any grower or nurseryman who used bud wood from a tree infected with barkoedema would produce trees all of which would be infected. One of the symptoms consists of rough areas on young wood with tissue discoloration beneath the rough area. In most cases the infected trees grow normally but occasionally a tree will be dwarfed. The other symptom is a deep pit or pits in the pear. Beneath the pits are strands of woody material extending to the core. Both of the symptoms vary from minor to severe. In some cases the entire crop on a tree will be unusable. Careful observation and testing disclosed that all Bosc trees were infected with the virus so barkoedema free trees could not be propagated.

Bosc is the variety most severely affected but Anjou is also somewhat susceptible. In view of this, severely affected blocks of Bosc were top worked to Comice, Bartlett and Red Bartlett. In some cases orchards which were planted as Comice about 1910 were top worked to Bosc in 1925 and again top worked to Comice in the 1940's. In some cases the orchards were topworked once or twice more as growers tried to keep abreast of changing consumer tastes.

It was not until about 1960 that O.S.U. discovered a tree that by happenschance had been propagated from a stony pit free bud. Therefore all buds from that tree were free of stony pit, as barkoedema came to be called. A stony pit free block of trees was established at the Suncrest Orchard near Talent and one on the Hanley Station so its performance could be watched. Mother trees were also established at nurseries so essentially all Bosc trees planted since 1962 are free of stony pit.

New storage rots in pears began to appear in the early 1930's. Gray Mold, or nest rot, had always been a problem but the use of copper impregnated wraps developed by Henry Hartman reduced this problem by preventing the rot from spreading from one pear to another. Pin hole rot (no better name given) appeared in sufficient amounts to cause a problem in 1930.

In the mid 1930's some of the so-called bullseye rots appeared. The rots appeared in fruit from certain orchards and not in others although the fruit was run through the same packing line. In the mid 1940's Stop Mold appeared on the market for storage rot control. Dr. E. S. Degman, Horticulturist on the King's Highway Station (1938-52), conducted tests in cooperation with the pear shippers. The tests showed that the Stop Mold gave excellent control of the common rots but only fair control of the bullseye rots.

Samples of the bullseye rots were sent to various pathologists for identification. About as many different names were sent back as samples sent in. The varying identifications were most likely the fault of those of us who selected the samples to be sent and all of the rots may actually have been present.

In 1956 Iain MacSwan, Extension Plant Pathologist from O.S.U., in cooperation with the pear shippers and the shipping point inspectors, started a systematic study of storage rots. The inspectors saved the rotted fruits found during routine inspection. These were examined by MacSwan and the organism identified. This program of identification and testing of control materials was carried on intensively for four years with identifications being made for another 10 years.

The principal rot was Cladisporium with lesser amounts of perennial canker, Blue Mold and Gray Mold. In an occasional year other of the bullseye rots would predominate.

It was found that most of the infections in Anjou and Bartlett had entered through the unbroken skin. In the case of Bosc 75% of the infections started where the skin was broken. This emphasized the need for handling the Bosc with care.

Fair control was obtained by using Stop Mold in the dump tank. Fair control was also obtained by spraying with Ziram before harvest. Good control was obtained by using both the preharvest spray and the Stop Mold in the dump tank.

The Big Fire

On June 25, 1946 a fire started along fruit row and destroyed the packing houses of American Fruit and Crystal Springs. It took great cooperation to get the crop packed as picking started on August 8 but the whole crop was picked, packed and stored. It was the largest pear crop ever produced up to that time.

Modern Synthetic Chemicals

The first of these to make an impact was the stop drop hormone. It was field tested in 1941 and was so successful it was used commercially in 1942. Before the stop drop many Bartlett orchards would have from 50 to 200 pears per tree on the ground after picking. Some of these were normal drops and some were accidentally shaken off by the pickers. One or two hormone sprays before harvest stuck the pears on so normal drops were eliminated and picker drops were greatly reduced. The spray was cheap and it made a spectacular reduction in crop loss.

In June 1946 a new aphid was observed in pear orchards by Dr. Gentner. It was widespread in the area and exuded honeydew in which sooty mold grew and russeted the fruit.

Samples were gathered by Dr. Gentner and sent to Washington D.C. for identification. It proved to be a new species so was named Gentnerii after its discoverer.

On July 20, 1946 the Medford weather bureau recorded a temperature of 115° F. The hottest on record. It was so hot that it eliminated the aphid. This is the easiest and quickest any serious insect pest was ever eradicated.

At the time of this hot spell some orchards were being sprayed for mite control with a dinitro material called DN-111. As high as 70% of the fruit was burned in some of the orchards sprayed on the hot day. Earlier sprays caused commercial loss but not as severe.

DDT became available this year and the worms had become resistant to arsenate of lead so many growers switched to DDT. Those who sprayed it on had essentially 100% control. Other growers dusted it on but all of these failed to get good control. Thus ended the threat of worm infestations and began the fear of DDT contamination. This was a historic month.

The European red mite was found for the first time in June 1947 and was widespread in the valley by 1948. It was controlled by dormant oil sprays or summer sprays of Parathion. However mites soon developed a resistance to Parathion.

Shortly after the introduction of the new organic pesticides San Jose Scale became a problem again and has continued to be a serious pest. This was probably due to the pesticides killing the natural parasites of the scale.

A change in spray application occurred in 1946 with the introduction of the air blast sprayer. It was quickly accepted by the growers as it permitted quick application of sprays and reduced the amount of labor required. Its inability to get thorough coverage in the tree tops may also be involved in the resurgence of San Jose Scale.

Airplane spraying was introduced at the same time as the speed sprayer. It would not give good coverage on the lower leaf surfaces so it did not get general acceptance. However it was used extensively in the application of stop drop hormones and copper dust for blight control.

In October of 1950 over 9 inches of rain fell which saturated the soil. Later rains maintained this saturated condition all winter and spring. Pear trees are very tolerant of winter wet feet but this extended period of saturation damaged them severely. In the following years many trees on soils with only fair to poor drainage showed greatly reduced vigor or actually died.

Pear Psylla

The Pear Psylla found its way into New England in 1832 and spread over the Eastern states. It was the most serious pest of pears. In July of 1939 a severe infestation was discovered in the Spokane area. State and federal entomologists met and decided to eradicate it unless a survey in the Yakima and Wenatchee areas were found to be infested. The survey showed too great an area was infested so the eradication program was dropped.

The first psylla were found in the Rogue Valley in 1950 and in 1951 they had spread over the entire valley.

Pear growers were alerted and advised of the best known controls which were none too good. Summer infestations were not unusual and heavy infestations after harvest were rather common. To complicate control the psylla had the ability to develop resistance very rapidly.

County Agent Don Berry (1954-), an entomologist, was assigned the task of observing levels of insect populations, studying the constantly changing pesticide situation, cooperating with Dr. Gentner in assessing the commercial effectiveness of pesticides and cooperating in the making of spray recommendations.

Pear Decline

In the summer of 1955 there were scattered trees throughout the valley that suddenly wilted and died or nearly died. This was an enigma as there was no apparent cause and surrounding trees were unaffected. Because of the sudden nature of the collapse the term quick decline was applied to the problem. In ensuing years the problem continued and in addition to the quick decline, a slow decline developed. The slow decline trees did not wilt but grew less and produced little or no fruit.

In a few years a relationship was discovered between rootstock and decline. The quick decline was much worse in trees growing on two species of oriental seedlings. The slow decline affected principally the trees on other roots. In 1958 a relationship was suggested between heavy pear psylla infestations and decline. In 1960 it was found that there was a deterioration of the cells at the graft union

in affected trees. Observations by Cordy in 1959 showed that trees on Old Home roots were not subject to decline. This started a flurry of tree propagation on Old Home stock. However it soon became apparent that the decline had already affected most of the susceptible trees so nurseries again propagated on their regular rootstocks.

Further testing showed conclusively that pear psylla feeding definitely resulted in decline and it was suspected that the psylla spread a virus from one tree to another while feeding on the leaves. It was later shown that it was not a virus but a mycoplasma that caused the problem. The difference being that trees could recover from a mycoplasma attack but could not recover from a virus.

About 20% (150,000) of the pear trees in the Rogue Valley were killed or damaged so badly they were removed. Another 20% were damaged to the point of producing a half crop or less. The remaining 60% were damaged less or not at all, at least visually. All orchards lost some trees. Orchards most severely damaged were removed. The remaining orchards still occupied the same acreage but with fewer trees and hence lower production per acre potential but the production costs per acre remained about the same.

To make matters worse it requires much greater management skill since decline to maintain the orchards in good vegetative and productive condition. Local growers deserve great credit in making this adjustment.

The Grape Mealy bug was found in an orchard in 1959 by Don Berry. The area was surveyed and the insect was found to be limited to the one orchard. The owner agreed to apply special sprays to the infested area in an effort to keep it from spreading. This effort was well repaid as it was confined to the original orchard for fifteen years before gradually spreading out to other orchards in the southern end of the valley.

Utilization of Low Grade Pears

The Sabroso plant designed to produce a pear concentrate began operations in 1964. It utilized low grade pears which had formerly been destroyed. The principal market was in the Caribbean area where it was reconstituted into a fruit drink. Domestic market outlets have been developed for other pear products. This operation not only brings some small return to the grower but it alleviated a potential public nuisance resulting from the former disposal method.

Orchard Heating

On May 1, 1954 a severe frost settled in the valley orchards when the fruit was in the small green fruit stage. The orchards that were well heated and the orchards on high ground had good crops. The remainder had little or none to harvest. The valley produced only 50% of a normal crop. This was the worst loss on record. The heated acreage was increased from 4,000 acres to 6,000 as soon as the growers could afford to buy heaters. This also increased the smoke and the townspeople requested relief. The pear growers agreed to dispose of all slip lid heaters over a 5 yr. period. This was about completed when the 1963 frost reduced the crop to 1/3. Again there was an outcry against smoke and again the growers agreed to dispose of their "lazy flame" heaters over a period of years.

The cost of heaters and heating were increasing to the point that it appeared feasible to review overtree sprinkling. In the fall and winter of 1964-65 Cliff Cordy set up a test plot and determined how much water was required to protect a

crop against loss. .15 inches per hour was enough for average orchards but cold orchards needed .16 inches per hour.

While this research was going on, Dunbar Carpenter was installing a system. It worked so well that he and other growers installed such systems in about 1800 acres of pears. There is now little or no more water available in present supplies to expand the sprinkled acreage.

Since the advent of decline in 1955 there have been about 2000 acres of new pear plantings. Some of this has been planted with 200 to 350 trees per acre. The oldest of these are now producing. This is not nearly as much acreage as has been removed but it will give a boost to the industry as more and more of it comes into production.

Dr. Peter Westigard took over as entomologist at the Experiment Station in 1962. In addition to the regular chemical control program he started work on an integrated program utilizing chemicals to supplement the control provided by predators and parasites. Commercial application of this practice is difficult but further research may make it practical. He also assisted in the development of the yearly spray programs which emphasized maximum utilization of natural control, minimum amounts of pesticide concentration, low per acre cost but effective control. Some of these seem contradictory but they are worth striving for.

Dr. Porter Lombard took over as station superintendent in 1963. He has put considerable stress in rootstocks and tree training methods, chemical thinning and other plant physiology projects.

Economics

The fruit industry has been plagued with many years of poor crops or poor prices or both. Unfortunately poor crops here are not associated with good prices as they may be offset by good crops elsewhere. Each year that the area suffers an economic downturn a considerable change in ownership occurs.

In 1930 there were 400 pear growers. In 1975 there were 100, although the acreage was about the same. This reduction in number of growers was not by choice but by economic necessity.

In 1927 there were 27 organizations handling pears. This was reduced to 23 in 1930 and to 13 in 1977 (see page 29). This change was also dictated by economics. It was cheaper to haul the fruit to a large packing house with attached storage and adjoining railroad facilities. This also put the small grower at a disadvantage. To offset this the SOS cooperative was formed so the small grower members were, in effect, owners of packing and storage facilities.

Poor crops valley wide have been associated with frosts such as those in 1954-63-68-70 and 72 (see graph page 30). Individual growers have suffered severe losses from wind, hail and other natural causes. All of these have been responsible for changes in orchard ownership. The survivors are the fortunate, the frugal, the good managers and those having better than average orchards.

September 16, 1977

Fruit handling firms in the Rogue Valley from Ashland to Grants Pass
in 1927, 1930 & 1977

1927	1930	1977
Ala Vista	Ala Vista	Barnum
American Fruit	American Fruit	Bear Creek
Bear Creek	*Bardwell Fruit Co.	Culbertson
C & E (Connor & Edminson)	Bear Creek	Del Rio (G.H.)
Del Rio	*Big 7 F D 1	Earnest
*Edgell	*Cobb	Lowry (Phoenix)
*Eisman & Hunt	C & E (Connor & Edminson)	Modoc
*Hanley	Del Rio	Naumes
*Hearty	*Growers Exchange	Pinnacle
*Heller	Kimball Fruit Co.	Reter
*Independent (Phoenix)	*Medford Fruit Co.	Rogue River Orchard
*Kaufman	Newbry & Sons	Root
Kimball (G.P.)	Palmer Corp.	SOS
*Mitchell	Pinnacle #1	
Newbry & Son	Pinnacle #2	
Palmer Corp.	Riverview	
Pankey Corp. (G.H.)	Rogue River Co.	
Pinnacle #1	Root & Pankey	
Pinnacle #2	Sgobel & Day	
Riverview	SOS	
Rogue River	Suncrest	
Sgobel & Day	*J. M. Thorniley & Son	
SOS	Van Hoevenberg	
*Stewart		
Suncrest		
Van Hoevenberg (Sams Valley)		
Vilas		
*Not listed in 1930	*Not listed in 1927	

