

Historical Facts Pertaining to Root-and Trunkstocks for Pear Trees

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HISTORICAL FACTS PERTAINING TO ROOT- AND
TRUNKSTOCKS FOR PEAR TREES

Henry Hartman*

Introduction

Certain historical facts pertaining to root- and trunkstocks for pear trees in the Pacific Coast States are presented in this paper. Its contents consist largely of abstracts and deductions from letters and documents in the correspondence files of the Southern Oregon Branch Experiment Station for the period from 1920 to 1927. At that time, Professor F. C. Reimer, then superintendent of the Station, carried on an extensive correspondence with nurserymen, growers, seed dealers, research workers and others. This correspondence brings to light much information relative to the introduction, distribution and evaluation of such rootstocks as Serotina, Ussuriensis, Calleryana, Betulaefolia and French. It also contains pertinent facts regarding the introduction and use of blight resistant trunkstocks such as Old Home, Kieffer, Surprise, Estella, Chieh Li and others.

The letters bring out considerable information about where, when, and by whom the stocks were propagated; the sources of seeds from which the seedlings were grown, and, also, specific facts about where and when many of the trees were planted in orchards.

The contents of this correspondence are made public with the consent and cooperation of Professor Reimer and are released because they may be worthwhile to research workers and others now concerned with pear decline. The information may be of benefit to those trying to identify the root- and trunkstocks in present day pear orchards. The workers at the Oregon Agricultural Experiment Station are finding this information valuable in this respect.

Unfortunately the correspondence files are not intact for the entire period of Professor Reimer's incumbency at the Southern Oregon Branch Experiment Station. The files are missing for the period between 1911 and 1920 and they are missing for the interval from 1927 to 1946. However, they are complete for the period during which the Oriental rootstocks were planted most extensively in California, Oregon, and Washington. The search uncovered 866 letters which bear directly or indirectly on the root- and trunkstock problem. Only the more pertinent of the letters are abstracted here.

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Serotina

The exact time when the species of Oriental pears (P. pyrifolia) commonly known as Serotina, Japanese or Sand Pear came into use as a rootstock for pear trees is not definitely known. During the winter of 1921, Professor Reimer attempted to clear up the matter by writing to most of the older nursery concerns in the United States. The answers to these letters, while enlightening in some ways, failed to provide a clear-cut answer. Some of the concerns replied that they had no records when they first used the stock. One concern set the probable date as 1872 but inferred that this was largely a guess. Another firm recalled that it was using the stock in 1884 but stated that it had probably used it prior to this date.

A letter from Mr. J. H. Skinner, seedling grower at Topeka, Kansas, states that he was propagating Serotina in 1892. Another letter dated May 2, 1921, from Mr. W. A. McGill states that to the best of his recollection the Oregon Nursery Company, Orenco, Oregon, had been using the stock for the past 15 years. This means that this firm probably began using Serotina about 1906. The author of this paper recalls very clearly that he and his father propagated some trees on Serotina roots at Wenatchee, Washington, in 1903. This may have been the first use of the stock in the Wenatchee Valley.

Since the date of introduction of the other Oriental species as rootstocks for pears is clearly indicated in the correspondence, it appears that any orchard on Oriental roots planted prior to 1918 is almost certain to be on Serotina. The other Oriental species such as Ussuriensis and Calleryana were not available prior to this time.

Authenticated cases of the planting of pear trees on Serotina roots in the Rogue River Valley of Oregon date back to 1909 and 1910. A block of trees on this rootstock consisting of approximately 12 acres was planted in 1909 and another block of about 13½ acres was planted in 1910. From the correspondence and from other sources of information it appears that most of the trees on Serotina roots in the three Pacific Coast states were set out in the interval between 1910 and 1926. The use of this rootstock received its greatest impetus during World War I when seeds of Communis from France were not available.

It is true, of course, that Pacific Coast nurseries continued to propagate large quantities of Serotina seedlings after 1926, but it is wrong to assume that all of these or even an appreciable quantity were planted in western orchards. From 1926 on, a large portion of the fruit tree seedling business of the United States was carried on by Pacific Coast nurseries and a goodly portion of the seedlings produced at that time were shipped to eastern, midwestern, and southern outlets.

The matter of the purity of the seeds of Serotina seems never to have

received much attention. No one appears to have given consideration to strains and types of the species from which the seeds were obtained. A letter from Mr. S. Tokuda, Yokohama Nursery Co., Yokohama, Japan states that his company gathered its Serotina seeds from both the wild and the cultivated types of the species grown mostly in northern Japan. This may well account for the wide range of vigor and performance often noted among trees on this rootstock. Most of the seed of Serotina used by American nurserymen during the early days was imported from Japanese seedsmen or collectors.

Just why pear trees on Serotina roots continued to be planted in the Pacific Coast states as late as 1926 and later is hard to understand. Long before this date it was known that this rootstock was largely responsible for the occurrence of "hard" or "black" end, particularly in the fruit of the Bartlett variety. According to Professor Lenard Day, (Cal. Exp. Sta. Bul. No. 700), this shortcoming of Serotina was recognized in California as early as 1920. The same observation was made in the Pacific Northwest and at the annual meeting of the Northwest Horticulturists, Entomologists and Plant Pathologists held at Hood River, Oregon, in July of 1921, the matter was thoroughly discussed and growers were made fully aware of the findings at the time.

Serotina as a rootstock for pear trees apparently came into use in the Pacific Coast states without recommendation from research institutions. No record has been found to the effect that research agencies in any of the western states ever recommended the use of this stock. On the other hand, warnings against its use were issued frequently after 1920.

Ussuriensis

The rapidity with which Ussuriensis came into general use as a rootstock for pear trees was fantastic in some ways. This was only natural since growers in some areas were desperate because of fireblight and were willing to try anything.

While individual trees of Ussuriensis are known to have existed in the United States prior to 1900, the species commanded but little attention until about 1907. At this time Mr. Frank Meyer, plant explorer for the United States Department of Agriculture, collected seeds of the species in northern China and eastern Siberia. The seeds collected by Mr. Meyer, however, had been taken from wild trees and seedlings grown from this seed soon proved to be worthless as rootstocks for pears, largely because of lack of vigor.

It was only after Reimer's two expeditions to the Orient (1917 and 1919) that vigorous forms of Ussuriensis were available. The vigorous types were found to exist only among the cultivated varieties of the species, which at that time, were grown mostly in Manchuria in the region immediately north of the Great Wall.

Access to this region was most difficult. Transportation over long distances was possible only by mule pack over roads which often were nothing more than washed out creek beds or gullies. Travelers were in constant danger of attack from bandits. Once the region was reached the fruit from which the seeds were extracted was purchased from growers and the seed brought back to Japan or other ports of embarkation.

On the first expedition, Reimer was accompanied by Mr. S. Tokuda, who as already stated, was a representative of the Yokohama Nursery Co. Reimer collected seeds and scionwood for experimental purposes from many of the named varieties grown in the region. Mr. Tokuda collected seed from the same sources and this seed apparently was made available to American nurserymen either in the late fall of 1917 or early in 1918.

One of the first nurserymen to obtain some of the seed collected by Mr. Tokuda was Mr. A. L. Wisker, Mona Rica Nurseries, Grass Valley, California. Mr. Wisker must have planted this seed immediately since it appears that he offered one-year old seedlings for sale in the fall of 1918.

Some of the first seedlings grown by Mr. Wisker were purchased by Mr. Howard Reed, of Marysville, California, who set them out in the fall of 1918 or the spring of 1919. By the summer of 1921, Mr. Reed's orchards had been increased to approximately 212 acres. This planting is now a part of the Di Georgio properties near Marysville and is believed among the first commercial plantings of pear trees on Ussuriensis roots in the United States. From this time on, the planting of trees on Ussuriensis roots in California continued at an accelerated pace for a number of years.

The first commercial trees on Ussuriensis roots in the Rogue River Valley were set out in the fall of 1920 or the spring of 1921. The trees in this case were budded whips at the time of purchase and were produced by the Oregon Nursery Co., Orenco, Oregon. These trees, too, are assumed to have been grown from some of the seed collected by Mr. Tokuda in 1917. This block comprises about 14 acres and is intact except for about 40 trees which have gone down from decline and other troubles.

Most of the plantings on Ussuriensis roots were made without benefit of past-performance or research findings. The first trees on the vigorous types of Ussuriensis to be set out for testing were planted by Reimer in 1920. At a later date similar test plantings were made in California, Washington, and British Columbia but these plantings yielded no conclusive data for several years.

The matter of obtaining desirable Ussuriensis seed was a problem during the entire period when the species was being propagated. Concerns other than the Yokohama Nursery Company soon came into the picture, and either through ignorance or fraud, exported large quantities of worthless seed to the United States. It is questionable that some of the exporters ever made the long trek to Manchuria

to obtain seeds from the cultivated varieties. Some of the lots of seeds were Serotina. Others were mixtures of Serotina and Ussuriensis and still others were seeds from wild Ussuriensis or some other species. In 1923, L. B. Scott, Pomologist for the United States Department of Agriculture, then located at Shafter, California, reported that he had purchased Ussuriensis rootstocks which later were found to be mixed with Serotina, quince and even apple seedlings.

In justice to the nurserymen in this country, it must be said that most of them made a sincere effort to supply trees grown only from the best types of seed. Acres of seedlings were actually plowed under when it was discovered that they were of inferior types. The situation, however, became so serious that in 1923 Reimer and others advised the nurserymen against the further propagation of Ussuriensis. Some of the nurserymen followed this advice but others did not, with the result that trees on Ussuriensis roots were still being planted in the western states as late as 1930.

That poor strains of Ussuriensis were planted in Pacific Coast pear orchards is evident at the present time. In some orchards on this rootstock one finds a mixture of vigorous and scrubby trees. Sometimes an entire block of low-vigor trees is found. Four such blocks, totaling about 19 acres, were located in the Rogue River Valley. The trees appear to have been propagated from seeds of the wild form. They are small trees for their age, with slender trunks and upright framework branches. Trees on the vigorous strains of the species, on the other hand, have large trunks and are spreading in habit.

Apparently under Oregon conditions trees on the weak-growing types of Ussuriensis are more susceptible to pear decline than are those on the strong-growing types.

The situation regarding the purity of Ussuriensis seed was further complicated by confused nomenclature. At one time seeds of Serotina were actually sold under the name Ussuriensis. There was precedent for this usage since the old botanical group *P. sinensis* Lind. which included the Sand pears, listed Ussuriensis as a synonym. Technically, this situation was cleared up in 1915 when Rehder broke up the old Sinensis group and raised Ussuriensis to full specific rank. Actually, however, the confusion in nomenclature persisted for some time after 1915.

More confusion resulted after Mr. H. E. Wilson of the Arnold Arboretum, identified certain wild pears in Japan as Ussuriensis. This proved to be erroneous but the idea persisted for some time and led Japanese seed collectors to believe that they had Ussuriensis in their own back yard, so to speak, and did not need to go to Manchuria for seed.

Calleryana

The introduction of P. calleryana as a rootstock for pear trees also dates back to Reimer's trips to the Orient.* At that time, Professor Reimer explored the distribution of Calleryana and related types in Central China, Korea, and Japan. From these explorations it appeared that the most typical forms of the species were to be found in Central China among wild trees which were abundant in some areas. According to Reimer, no typical forms of Calleryana existed in either Korea or Japan.

As a consequence of these explorations, Professor Reimer made arrangements with the Department of Agriculture of Nanking University for the collection of Calleryana seed to be available should the species prove to be desirable as a rootstock in the United States. In charge of the Department of Agriculture of Nanking University at that time was Dean John H. Reisner, who was an American and, who had received his training at Cornell University. Incidentally, Dean Reisner is now in charge of the agricultural research program in South Korea. Professor Reimer and Dean Reisner corresponded frequently and in considerable detail during the period when Calleryana seed was being imported. Apparently, the the Department of Agriculture of Nanking University supplied practically all of the Calleryana seed that was used in the United States between 1920 and 1926.

Unlike the unfavorable situation that developed regarding the purity of Ussuriensis seed, little trouble arose with Calleryana seed supplied by Dean Reisner and his collectors. Most of the seed was true to type, although some lots contained a small percentage of P. betulaeifolia and P. serrulata. A few lots of the seed failed to germinate properly but this was due apparently to faulty handling rather than to natural sterility. Some attempts were made by certain seed exporters in Japan to pass off seeds of P. faurei and P. hondoensis as true Calleryana but most of these attempts appear to have been stopped prior to actual exportation.

The question of winter hardiness was of concern with Calleryana. Damage from cold was reported from several areas in early tests. This apparently limited its use to the warmer portions of the United States. By 1925 Calleryana had become the most popular pear stock in the southern states and it was planted extensively in California and to a lesser extent in the Rogue River Valley of Oregon. The correspondence does not indicate that Calleryana was used in the colder regions aside from experimental plantings in Washington, British Columbia and the Hood River Valley of Oregon.

* A few pear trees were propagated on Calleryana roots at the Arnold Arboretum, Jamaica Plains, Mass., about 1904.

Betulaefolia

Since P. betulaefolia appeared to offer little resistance to fireblight in the early tests, it was not generally included among the Oriental stocks extensively used from 1920 to 1927. It is not likely, therefore, that many trees on Betulaefolia roots will be found in existing orchards. Later Professor Reimer found some types of Betulaefolia that were resistant to blight but there is no indication that these were distributed except among research agencies.

A few small experimental plantings of trees on Betulaefolia roots have been located in the Rogue River Valley and the correspondence shows that some trees of this combination were sent to growers in California for trial. The firm of Robertson-Vistica, Stockton, California, reported that it was propagating trees on Betulaefolia roots in 1925 but did not state how many.

Betulaefolia seeds were sometimes mixed with the Calleryana seed obtained from Central China but it appears that the percentage was small. Quite likely of course, some trees on Betulaefolia roots were propagated inadvertently, since it is known that nurserymen did receive on occasion, Betulaefolia seed in lieu of other species ordered.

French

The so-called French roots or seedlings of P. communis and allied forms have a long history of performance throughout the Western World. Their use as rootstocks in Europe dates back to the beginning of pear culture and they were the rootstocks used throughout the early years of pear growing in the United States. Apparently, all of the early pear orchards on the Pacific Coast were on French roots and in all orchards 50 years old or older the rootstock is likely to be French. At least this is true of the original trees. Where replanting has occurred one may find some of the replants on Oriental roots.

For many years, most of the seed from which French seedlings were grown was imported from France. These seeds usually came from native trees and were reclaimed from cider or "perry" mills. The seeds were not always pure Communis. In fact, most of the seed was a mixture of Communis and Nivalis or Nivalis hybrids. In the older orchards of the Rogue River Valley the amount of Nivalis or Nivalis types runs from 4 or 5 percent to as high as 60 or 80 percent as indicated by the rootsprouts. In fact, the presence of Nivalis-type sprouts now offers an easy means of distinguishing between old French and other sources of seedlings such as those grown from seeds reclaimed from cannery waste in this country.

So-called "domestic" French seedlings are usually grown from open pollinated Bartlett seed obtained from canneries. Just when seed from this source began to be used is not made clear by the correspondence. In a letter from the

firm of Robertson-Vistica, written September 9, 1925, Mr. Vistica states that he has obtained 200 pounds of Bartlett seed from the California Packing Corporation. Other letters written about this time indicate that there was interest in Bartlett seed, although none of them make reference to specific purchases of the seed.

Aside from Bartlett, some seedlings were grown from seeds of other named *Communis* varieties. Winter Nelis seed was used to some extent for this purpose. Also hybrid seeds obtained from such crosses as Old Home x Farmingdale, Old Home x P. 18 and P. 18 x P. 87 were used in a limited way after 1926.

French was always the recommended rootstock for the regions of the Pacific Coast where fireblight was not serious. This is shown by Reimer's correspondence and by recommendations that were made by research and extension agencies. In Oregon, for example, these recommendations are largely responsible for the fact that practically all of the pear trees in the Hood River Valley are on French rootstocks. Even when the use of Oriental stocks was at its height, research workers felt that the true solution to the rootblight problem in the blight areas would come with the finding of resistant French stocks and began their efforts along this line as early as 1923. Apparently, a trend back to the use of French began about 1924. More and more, nurseries went back to this stock after this date and there appears to have been renewed interest by growers.

Trunkstocks

The precise date when blight-resistant trunkstocks were first used is not revealed by the correspondence. It is known, however, that some nurseries were propagating pear trees with such trunkstocks as early as 1912. Apparently, the first of these to be used were Kieffer and Garber, both assumed to be hybrids of P. communis x P. serotina. These varieties were budded or grafted directly on French or Serotina roots and later were top-worked to desired varieties. While most of the trees of this combination were propagated by eastern and midwestern nurseries, the Oregon Nursery Company, Orenco, Oregon, was using Garber as a trunkstock prior to 1920. The extent to which either Kieffer or Garber was used on the Pacific Coast is not certain, although at least one fairly large shipment of trees with Kieffer trunks on French roots was received in the Rogue River Valley in 1916. The plantings made with these trees have been located and are intact at the present time. Kieffer and Garber, however, were only partially resistant to blight and the need for more resistant trunkstocks became apparent. Hence, a search was made by Reimer and other workers to find other blight-resistant trunkstocks.

The variety, Surprise, which is believed to be a pure form of *Communis* and which Reimer obtained from the Missouri Experiment Station, was introduced on a trial basis about 1916. This stock, however, was badly damaged by the severe freeze in the Pacific Northwest during December of 1919. The use of Surprise as a trunkstock was generally discouraged from this time on although some nurserymen continued to use it for some time after this date.

From Reimer's early experiments it appeared that the varieties Old Home Orel 15, Estella and Chieh Li were highly resistant to blight, and budwood of these sorts was supplied to nurserymen. Old Home is believed to be a pure form of Communis which Reimer obtained from Mr. Benjamin Buckman, Farmingdale, Illinois, in 1915. Orel 15 is a hardy variety of Communis which originally came from Russia. Reimer obtained it from the Iowa Experiment Station. Estella is supposed to be another of the French x Serotina hybrids and Chieh Li is a named variety of Ussuriensis which Reimer obtained in Manchuria in 1917.

From the correspondence it appears that these varieties, with the exception of Old Home, proved to be unsatisfactory for one reason or another. Reimer advised nurserymen against the further use of Orel 15 in 1921. He advised against the use of Chieh Li in 1922 and by 1923 he was recommending Old Home exclusively. Unfortunately, this advice was not taken immediately by all nurserymen. The correspondence shows that the other varieties were still being propagated as late as 1926. Old Home, of course, is the trunkstock most commonly found in Pacific Coast orchards but one may expect to find blocks of trees here and there where the trunkstock is either Orel 15, Estella, Chieh Li and possibly Kieffer, Garber and Surprise. We have found such blocks in the Rogue River Valley.

Reimer and other workers tested other blight-resistant trunkstocks aside from those listed above. Among these were Lemon (Russia), a hardy Communis variety, and Variolasa, a clone variety which differs from the type but which appears to be an Oriental hybrid of some sort. Other types tested were Farmingdale which Reimer obtained from Mr. Benjamin Buckman, Farmingdale, Illinois; Lawrence, a Communis variety from the middlewest, and Tolstoy, a cross of Clapp's Favorite and P. ovoidea produced by Dr. N. E. Hansen of the South Dakota Experiment Station.* While some trees were propagated on these trunkstocks by the Southern Oregon Branch Experiment Station it appears that none of the varieties were sent to nurseries for general propagation. Some of the trees and budwood of the varieties were sent to experiment stations and some trees were set out in trial plantings in the Rogue River Valley.

Abstracts of Letters
1921

January 5, 1921

A. L. Wisker, Mona Rica Nursery, Grass Valley, California to Reimer.

*Note: Some authors are of the opinion that P. ovoidea as described by Rehder is probably a variety of Ussuriensis. Reimer was unable to find the species during his travels in the orient.

States that he has just received 10 pounds of Ussuriensis seed from the Yokohama Nursery Co., Yokohama, Japan, but did not succeed in obtaining a like quantity of Calleryana seed. Says he can obtain 10,000 Ussuriensis seedlings from another nursery but does not feel he should take a chance since there is some question in his mind as to the identity of these seedlings. (Mr. Wisker was the first nurseryman to undertake the growing of Ussuriensis rootstocks in California. It appears that he grew his first lot of seedlings during the season of 1918 and went out of business during the winter of 1921-22).

January 13, 1921

Gregory Brothers Nursery Co., Marysville, California, to Reimer. Letter acknowledges receipt of Ussuriensis wood to be propagated by cuttings. (Subsequent correspondence does not indicate the outcome of this test).

January 15, 1921

Reimer to Gordon Brown, Hood River Branch Experiment Station, Hood River, Oregon. States that the Ussuriensis seed problem is not likely to be solved until the seeds can be produced in this country under controlled conditions.

January 20, 1921

Reimer to H. H. Clark, Secretary-Manager, Tenas Illihee Orchard Co., Central Point, Oregon. States that he will supply Mr. Clark with 100 scions of blight-resistant pear stock the following spring. Previous correspondence had indicated that Mr. Clark had 1000 Serotina seedlings which he wanted to graft to blight-resistant trunks. (The Tenas Illihee orchard was originally planted on wet soil and went out of existence years ago).

January 24, 1921

Oregon Nursery Co., Orenco, Oregon, to Reimer. Puts in an order for all the budwood Reimer can spare of blight-resistant pears during the ensuing budding season. Wants 15,000 buds of Orel 15 alone. Company also states that it expects to bud about 15,000 trees of Surprise.

Reimer replied that he could not furnish these quantities of budwood.

February 1921

An ad in the February 1921 issue of Better Fruit magazine states that the Washington Nursery Co., Toppenish, Washington, is offering trees of "blight proof Surprise on Japanese roots".

March 17, 1921

Stark Brothers Nurseries, Louisiana, Missouri, to Reimer. States that

Stark Brothers Nurseries have ordered Ussuriensis seeds from the Yokohama Nursery Co., Yokohama, Japan. Also states that some seed has been obtained from Mr. A. L. Wisker, Grass Valley, California.

Reimer replied April 4, 1921, that he could not vouch for the seed obtained from the Yokohama Nursery Co., but felt quite certain that the seed obtained from Mr. Wisker was true to name.

May 2, 1921

A. W. McGill, Portland, Oregon, to Reimer. States that to the best of his knowledge the Oregon Nursery Co., Orenco, Oregon, had been using Serotina rootstocks for the past 15 years.

May 3, 1921

Mr. Charles W. Kanick, Yakima, Washington, to Reimer. States that trees with Surprise trunks received in the spring of 1920 from the Washington Nursery Co., have developed severe injury.

Reimer replied that all Surprise trees which had been subjected to the severe cold of the winter of 1919-1920 had developed severe winter damage, in spite of the fact that the variety was winter-hardy in the Middle West.

May 24, 1921

H. E. Allenson, Scientific Assistant, United States Department of Agriculture, to Reimer. States that a nurseryman in Kansas received 140 pounds of what was supposed to be Serotina seed from a firm in Japan. When the shipment arrived it was noticed that the seeds appeared to be smaller in size than those of Serotina. This was called to the attention of the firm in Japan which replied that the seeds were the wild type of Ussuriensis and made the claim that this was "superior to Serotina". (The nurseryman was advised to reject the seed.)

June 28, 1921

J. H. Skinner, nurseryman, Topeka, Kansas, to Reimer. States that his firm has been producing Serotina seedlings since 1892.

June 28, 1921

Dr. W. L. Howard, University of California, to Reimer. States that Surprise trunks on Japanese roots are doing well after four years of trial.

August 4, 1921

Villa Nurseries, Portland, Oregon, to Reimer. Concern states that it

wants to import Oriental pear seed for planting during the ensuing fall and seeks advice as to what type of seed to import.

Reimer replied August 18, 1921, that Ussuriensis was probably the best available at that time.

August 8, 1921

Washington Nursery Co., Toppenish, Washington, to Reimer. States that company has planted 100 pounds of Ussuriensis seed which it obtained from the Yokohama Nursery Co., Yokohama, Japan. Company is anxious to have Reimer inspect this stock so as to be sure of its identity. Letter also states that company is growing a large block of Serotina seedlings.

August 12, 1921

Oregon Nursery Co., Orenco, Oregon, to Reimer. Puts in an order for 5000 buds of Orel 15. Reimer replied, August 18, 1921, that he would send Old Home and Estella instead, since he was no longer advising the use of Orel 15 as a trunkstock.

August 18, 1921

Reimer to Russellville Nursery Co., Portland, Oregon. States that he will send budwood of blight-resistant pears.

August 20, 1921

Reimer to Washington Nursery Co. States that he is sending budwood of Old Home, Estella and Chieh Li.

August 25, 1921

Reimer to Albany Nursery Co., Albany, Oregon. States that he is sending budwood of Old Home, Estella and Chieh Li.

August 25, 1921

Reimer to Russellville Nursery Co., Portland, Oregon. States that he is sending buds of Old Home, Estella and Chieh Li.

August 25, 1921

Reimer to Oregon Nursery Co., Orenco, Oregon. States that he is sending some budwood of Old Home, Estella and Chieh Li but says he does not know which of these will ultimately prove to be the best as a blight-resistant trunkstock.

August 30, 1921

Oregon Nursery Co., Orenco, Oregon, to Reimer. States that company has just budded 400 seedlings to Estella, 200 to Old Home and 135 to Chieh Li.

September 13, 1921

A. L. Wisker, Grass Valley, California, to Reimer. States that he will have 10,000 Bartlett whips on Ussuriensis roots for sale that fall.

September 19, 1921

T. Sakato and Co., Yokohama, Japan, to Reimer. Company states that it can obtain Calleryana seed from Korea for distribution in the United States. Reimer replied, October 8, 1921, that Calleryana seed obtained from Korea would be unsatisfactory and that the best sources of Calleryana seed were in Central China.

September 20, 1921

Reimer to J. A. Ream, Paradise Valley, Butte County, California. States that Surprise is undesirable as a trunkstock and recommends Old Home instead.

September 20, 1921

Reimer to Shenandoah Nurseries, Shenandoah, Iowa. States that he has just returned from California where he inspected a young block of Ussuriensis seedlings "some of which are in their third season of growth in the orchard". (This means that the first of these trees were planted either in the fall of 1918 or in the spring of 1919. Other correspondence establishes the fact that this block of trees, which consisted of about 212 acres, was planted by Mr. Howard Reed of Marysville and that the seedlings were propagated by Mr. A. L. Wisker of Grass Valley, California. The tract is now a part of the Di Giorgio holdings at Marysville and appears to be the first, or among the first, commercial planting of Ussuriensis in the United States.)

October 8, 1921

Reimer to Shenandoah Nurseries. After identifying three lots of seedlings supposedly grown from Ussuriensis seed, Reimer reported to the nursery company as follows: "The seedlings grown from seed obtained from Yokohama Nursery Co. and from Mr. A. L. Wisker, appear to be genuine Ussuriensis. Those grown from the seed furnished by T. Sakato and Co., are Serotina and not Ussuriensis."

Mr. D. S. Lake, Shenandoah Nurseries, replied as follows on December 20, 1921: "I note what you say regarding this year's pear seedlings. Sakato and Co. claim that their seed is genuine Ussuriensis, but I do not have confidence

enough in these Japanese seedsmen to stand behind what they say and guarantee the goods to be true to representation". Mr. Lake goes on to say that his company will gladly pay Reimer's expenses to the nursery if Reimer feels that further identification is necessary. (The Shenandoah Nurseries at that time was growing its pear seedlings at Perry, Kansas.)

October 15, 1921

Shenandoah Nurseries, Shenandoah, Iowa, to Reimer. States that it has purchased 200 pounds of Ussuriensis seed to be planted in 1922.

October 21, 1921

Masila Valley Fruit Association, Masila, New Mexico, to Reimer. Association states that it has purchased 2000 Ussuriensis seedlings from Shenandoah Nurseries, Shenandoah, Iowa.

October 24, 1921

Washington Nursery Co., Toppenish, Washington, to Reimer. States that Pacific Seed Company, Sacramento, California, is offering Ussuriensis seed at \$12.50 per pound and Calleryana seed at \$10.00 per pound.

Reimer replied, October 28, 1921, that he knew nothing as to the sources of the seeds offered by this company.

October 30, 1921

Professor H. Ueki, then stationed at the Arnold Arboretum, Jamaica Plains, Massachusetts, to Reimer. States that he can obtain 50 bushels of Calleryana seed from Korea.

Reimer replied that these seeds would not be satisfactory, since the wild pears of Korea belong to the species, P. faurei and are not true Calleryana. (P. faurei is a dwarf form of Oriental pear.)

November, 1921

Mr. A. L. Wisker, Grass Valley, California, to Reimer states, "We are purchasing no Ussuriensis seed this year, since we are going out of business."

(Other correspondence indicates that Mr. Wisker went out of business largely because of his inability to obtain seeds of Ussuriensis and Calleryana upon which he could rely.)

December 8, 1921

Mr. C. A. Reed, Hood River, Oregon, to Reimer. Inquires as to the desirability of blight-resistant rootstocks for pears in Hood River Valley.

Reimer replied, December 12, 1921, that he thought Hood River growers should continue to use French rootstocks since blight was not a serious problem there.

December 21, 1921

Leffingwell Corporation, Los Angeles, California, to Reimer. Letter indicates that corporation has set out ten acres of *Ussuriensis* seedlings which it expects to bud to Bartlett. These trees were planted in "the Sierra Foothills". Letter also states that corporation intends to set out 30 additional acres.

1922

January 21, 1922

Reimer to S. Tokuda, Yokohama Nursery Co., Yokohama, Japan. In this letter Reimer comments as follows: "We have obtained further results on our work with resistant pear stocks during the past two years and have reached certain conclusions regarding seeds and seedlings".

First. The best seedlings are grown from *P. Ussuriensis* of Manchuria and Northern China.

Second. The best seedlings of *P. calleryana* are grown from seeds from Central China.

Third. None of the types of pears from Japan are *P. ussuriensis*. The *P. hondoensis* is certainly very distinct from *P. ussuriensis* and it is not satisfactory as a stock for our pears here. I hope, therefore, that you will have none of this seed collected. You will recall that Dr. Wilson thought that this type was somewhat similar to *Ussuriensis*. I disagree with him emphatically on this point.

Fourth. The *P. calleryana* from Japan and Korea are not desirable as stocks for our cultivated varieties. The growth of these is altogether too slow. The Korean type is utterly worthless, due to its very slow growth. These types are very easily distinguished from the Chinese types by their leaves. (A similar letter was sent to T. Sakata and Co., Yokohama, Japan, on February 13, 1922.)

March 3, 1922

Washington Nursery Co., Toppenish, Washington, to Reimer. Concern inquires as to whether Surprise will or will not scion root if planted deeply.

Reimer replied March 20, 1922, that he had noticed no tendency of self-rooting in Surprise.

March 10, 1922

Yokohama Nursery Co., Yokohama, Japan, to Reimer. States that its source of Serotina seeds contains a mixture of types but does not contain Ussuriensis.

March 15, 1922

Washington Nursery Co., Toppenish, Washington, to Reimer. States that Pacific States Seed Co., Sacramento, California, was offering seed of both the wild and the cultivated types of Ussuriensis.

April 3, 1922

Reimer to S. Tokuda, Yokohama Nursery Co., Yokohama, Japan. Reimer comments as follows regarding types of seeds of Calleryana and Ussuriensis:

"I wish to emphasize the fact that the Korean type of P. calleryana is not satisfactory as a stock in this country. It is a perfect dwarf here and is really more of a shrub than a tree.

"In regards to the larger type of P. calleryana which we found in the Temple grounds in the Ise Province, I wish to state that these seedlings grow much faster than those from Korea, and therefore, are superior to the Korean type. However, this type from Ise is too slow a grower to make a highly desirable stock for our cultivated pears. The type from Central China extending from the southern portion of the Shang Tung Province throughout Central China, is by far the most desirable of all of these Calleryana types and the only one that grows fast enough for our cultivated varieties in this country. I think for wet soils this type of Calleryana from Central China will be superior to P. ussuriensis.....

"I should like to emphasize again the great importance of getting the cultivated type of P. ussuriensis. The wild type is such a slow grower that it is very unsatisfactory.....

"I think I mentioned in my previous letter that P. hondoensis is not satisfactory because it is also a slow grower in this country".

April 8, 1922

Reimer to F. W. Willard, Yakima, Washington. States that in his opinion Old Home and Estella should be hardy in the Yakima Valley.

June 4, 1922

Mr. L. Chenay, Sardis, British Columbia, Canada, to Reimer. States that he planted the first commercial pear orchard in British Columbia five years before. Says that he planted 2,300 trees, 800 of which were on Japanese roots. Wants to know where he can obtain more trees on Japanese roots.

Reimer replied that trees on Japanese roots could be obtained from either, the Oregon Nursery Co. at Orenco, Oregon, or the Washington Nursery Co., at Toppenish, Washington.

July 22, 1922

Kirkman Nursery, Fresno, California, to Reimer. States that concern has 140,000 Japanese seedlings ready to bud. These trees were being grown at Woodburn, Oregon.

Reimer replied that in his opinion these trees should be budded to Old Home.

July 31, 1922

Kanocti Nursery Co., Finley, Lake County, California, to Reimer. Makes inquiry as to where Ussuriensis stock can be obtained. States it cannot obtain stock in California since Mr. A. L. Wisker has gone out of business.

Reimer replied that the stock could be obtained from the Washington Nursery Co. at Toppenish, Washington, and from the Mount Adams Nurseries at Husum, Washington.

August 3, 1922

State Department of Agriculture, Sacramento, California, informs Reimer that Ussuriensis stock is available at the Silva-Bergtholdt Co., New Castle, California.

August 7, 1922

Reimer to Oregon Nursery Co. States that he is pleased to hear that Oregon Nursery Co. will stop using Orel 15 and Surprise as trunkstocks.

August 8, 1922

Mount Adams Nurseries, Husum, Washington, to Reimer. Places an order for 20,000 buds of Old Home.

Reimer replied that he could not send that many buds but would send all he could spare.

August 9, 1922

Gordon Brown, Hood River, Oregon, to Reimer. Places an order for 600 buds of Old Home.

August 12, 1922

Oregon Nursery Co., Orenco, Oregon, to Reimer. Wants 500 to 1,000 buds

each of Old Home, Estella and Chieh and puts in an order for a like amount to be sent to Clarksburg Nursery Co., Hood, California.

August 19, 1922

Mount Adams Nurseries, Husum, Washington, to Reimer. Puts in an order for 15,000 buds of blight-resistant pears. (It is presumed that Old Home was implied in this case. Previous correspondence indicates that this nursery company preferred Old Home to all other trunkstocks at this time.)

August 29, 1922

Reimer to G. B. Deane, Medford, Oregon. States that seeds of Ussuriensis can be purchased from R. C. Robbins, 20 E. Jackson Boulevard, Chicago, Illinois. (R. C. Robbins was the United States representative for the firm of T. Sakato and Co., Yokohama, Japan.)

September 7, 1922

R. S. Lake, Shenandoah Nurseries, Shenandoah, Iowa, to Reimer.

Says that his firm is receiving orders for Ussuriensis seedlings and expects to continue growing Ussuriensis so long as the demand continues. Says he is sending seedlings for identification but fears that some of them are not true to name. Mr. Lake feels that it is going to be difficult to obtain Ussuriensis seeds of the proper strains in the future.

September 11, 1922

Benjamin Buckman, Farmingdale, Illinois, to Reimer. States that he is sending budwood of Farmingdale.

Reimer replied November 20, 1922, that the budwood was received and that the buds had taken well. (This letter appears to establish the date of introduction of Farmingdale into the Pacific Coast region. Reimer had been trying to obtain the variety from Mr. Buckman since 1915.)

October 4, 1922

C. E. Moyer, nurseryman, Roseburg, Oregon, to Reimer. Inquires as to whether Japanese or French rootstocks should be used in soils which are heavy and inclined to be wet during the winter and early spring.

Reimer replied December 1, 1922, that he recommended French rootstocks for such conditions.

October 22, 1922

Mr. George B. Van der Hellon, East Sacramento Land Company, Sacramento,

California, to Reimer. Wants to know which blight-resistant stocks are best for Sacramento area. States that his company has 400 acres of Sacho River bottom soil which it intends to plant to Bartlett pears.

Reimer replied December 1, 1922, that he thought Old Home or Estella on Ussuriensis roots would be best because of the serious blight problem in the Sacramento area.

December 1, 1922

Reimer to Dean Reisner, Nanking University, Nanking, China. In this letter Reimer attempts to interest Dean Reisner in collecting seeds from the cultivated varieties of Ussuriensis for distribution in the United States and comments as follows: "I realize that such seed will be more expensive than seeds from the wild type but I think that even then it will be possible to sell the seed in this country at \$5.00 or \$6.00 per pound. Unless we can get seed of the cultivated types of Ussuriensis this species will be entirely out of the question as a rootstock. The wild type is such a slow grower that it is entirely worthless for our purposes. We could not use it even as a gift".

December 5, 1922

Mount Adams Nurseries, Husum, Washington, to Reimer. States that firm has about 10,000 Old Home and Estella trees for sale at that time.

December 14, 1922

Thomas Lane, tree seedsman, Dresher, Pennsylvania, to Reimer. States that he is offering Kieffer pear seed at \$3.50 per pound.

December 19, 1922

Mount Adams Nurseries, Husum, Washington, to Reimer. States it has ordered 100 pounds of Calleryana seed from Nanking University. Also states that some concerns are offering Ussuriensis seed at \$3.00 per pound. Does not believe that seeds of Ussuriensis from cultivated varieties could be offered at this price.

December 20, 1922

R. S. Lake, Shenandoah Nurseries, Shenandoah, Iowa, to Reimer. Says that he is sending seedlings of what is supposed to be Ussuriensis for identification.

Reimer replied January 3, 1923, that, in his opinion, the seedlings were Serotina and not Ussuriensis.

1923

January 14, 1923

Reimer to Professor A. H. Hendrickson, Mountain View, California. "I wish to thank you for your letter of January 10 giving me a report on the seedlings of the various species and their behavior in land infested with oak root fungus. I am glad to know that all but one of these trees have so far proved to be immune to the disease". Reimer comments further that the tests cannot be regarded as final, since oak root fungus often develops slowly.

January 29, 1923

Reimer to Alaska Packers Association, West Sacramento, California. In this letter Reimer states: "some time ago I made arrangements with Mr. Jange-neel to send you trees of P. calleryana and P. betulaefolia; these to be tested out, as I understand it, on land on which the water table is high and where alkali is showing. These seedlings will go forward by express tomorrow".

January 29, 1923

Reimer to Reverend William Hunter, Kwangning, Manchuria, China. This letter is in reply to a letter written by Reverend Hunter to Reimer on January 2, 1923. Reimer continues in his attempt to interest Reverend Hunter in collecting Ussuriensis seed in Manchuria, believing that the situation would be improved if the seed collection was in the hands of Americans. He tries to point out that the venture could be made to pay since American nurserymen were willing to pay well for the seed if they could rely on what they were getting.

He lists the areas in Manchuria where desirable seed could be obtained and he calls attention to the fact that some of the cultivated varieties of Ussuriensis do not produce good seedlings. He says that varieties such as Chiu Tze Li, Hsiang Sui Li, Huang Hsiang Sui Li, Mien Suan Li, and Chieh Li appear to be satisfactory but that Ya Li, Hung Li, and Pai Li are unsatisfactory. (There is no indication from the correspondence that Reverend Hunter went ahead with the project.)

February 8, 1923

Philip Bancroft, Walnut Creek, California, to Reimer. States that he has 1,400 Ussuriensis seedlings, which have been budded to Bartlett.

February 15, 1923

Oregon Nursery Co., Orenco, Oregon, to Reimer. Puts in an order for: 400 grafts of Old Home, 350 grafts of Chieh Li, and 400 grafts of Estella.

Reimer replied, February 26, 1923, that he would send Old Home and Es-

tella but would not send Chieh Li.

March 2, 1923

Mount Adams Nurseries, Husum, Washington, to Reimer. Informs Reimer that the firm of George S. Bush and Co., 259-212 Coleman Building, Seattle, Washington, is handling the Calleryana seed for Nanking University. Also states that Calleryana seedlings now growing contain a small percentage of Betulaefolia.

April 13, 1923

California Fruit Exchange to Reimer. States that Exchange is interested in testing Ussuriensis for the benefit of its growers. Exchange is also interested in growing Ussuriensis from cuttings.

May 13, 1923

Reimer to Mr. R. C. Robbins, 20 East Jackson Boulevard, Chicago, Illinois, American representative for T. Sakato and Co., Yokohama, Japan. States that the Ussuriensis seed sold to Mr. N. S. Bennett, nurseryman, Medford, Oregon, turned out to be Betulaefolia and not Ussuriensis.

May 22, 1923

Shenandoa Nurseries, Shenandoa, Iowa, to Reimer. States that they have obtained Calleryana seed from Nanking University.

May 23, 1923

Mount Adams Nurseries to Reimer. States that they planted 40 pounds of Calleryana seed but that germination was poor.

May 23, 1923

Washington Nursery Co. to Reimer. States that they have obtained 12 ounces of Betulaefolia seed from Henry and Lee, New York City. States that they are sending six ounces of this seed to Reimer.

August 13, 1923

Mount Adams Nurseries, Husum, Washington, to Reimer. Puts in an order for 6000 to 7000 buds of Old Home. States that Old Home has proven to be the best of the various trunkstocks tested.

August 14, 1923

Reimer to Columbia and Okanogan Nursery Co., Wenatchee, Washington. States that he is sending 1000 buds of Old Home.

August 17, 1923

Washington Nursery Co., Toppenish, Washington, to Reimer. Letter states that company prefers Old Home to either Estella or Chieh Li as a trunkstock. Wonders as to whether it should sell trees already propagated on Estella and Chieh Li to growers. Says it already has orders for 6,900 trees of Old Home.

Reimer replied, August 31, 1923, that he was pleased to hear that company expects to use only Old Home as trunkstock in the future. Reimer comments further to the effect that he now prefers Calleryana over Ussuriensis as a blight-resistant rootstock. He has come to the conclusion that it is hopeless to try to obtain reliable seed of Ussuriensis from present sources. He feels that the situation is different in the case of Calleryana, since the collection of Calleryana seed is in the hands of Americans whom he feels can be trusted. Also, good Calleryana seed can be collected from wild trees which are abundant in Central China. Good seed of Ussuriensis, on the other hand, has to come from certain cultivated varieties grown only in remote places such as southern Manchuria.

August 23, 1923

Reimer to Mount Adams Nurseries, Husum, Washington. Recommends that Old Home be used as a trunkstock in the future in preference to Estella or Chieh Li. States that Chieh Li does not start off well and appears to suffer from drought.

August 25, 1923

Washington Nursery Co., Toppenish, Washington, to Reimer. States that concern is planning on growing Calleryana seedlings and inquires as to its limitations.

August 28, 1923

Mr. J. U. Pearson, Marysville, California, to Reimer. States that he purchased 10,000 Ussuriensis seedlings from Shenandoa Nurseries, Shenandoa, Iowa, but that he and Mr. Howard Reed are in doubt as to the true identity of these seedlings.

Reimer replied that he would need no less than 12 specimens for identification. (The correspondence does not indicate whether or not the seedlings were actually sent to Reimer for identification.)

August 31, 1923

Reimer to Benjamin Buckman, Farmingdale, Illinois. Reports that shoots of Farmingdale have developed some tip blight during the first year of growth.

September 1, 1923

Reimer to Henry and Lee, seed dealers, 97 Water St., New York City. Comments as follows: "A year ago you sent us a pound of seed labeled P. betulaefolia and asked us to test this out as a stock for pears. About half of this seed was planted early last spring and not a single seedling in the lot proved to be P. betulaefolia. All of these were the Japanese type of P. calleryana and of little or no value as a stock here. Evidently the seed which was sent to you was mislabeled. I should very much like to know from what source in the Orient you obtained this".

September 2, 1923

Earl Fruit Co., Sacramento, California, to Reimer. Inquires as to where it can obtain from 1000 to 5000 Ussuriensis seedlings for planting on its own properties.

Reimer replied, October 4, 1923, that the seedlings could be obtained either from the Washington Nursery Co. at Toppenish, Washington, or the Mount Adams Nursery Co. at Husum, Washington. Reimer also suggested that Calleryana might be preferable to Ussuriensis and that Old Home should be used as the trunkstock.

September 13, 1923

Mr. H. C. Ingram, Polytechnic College of Engineering, Oakland, California. States that he expects to plant from 50 to 100 acres of Bartlett pears and inquires as to the best blight-resistant rootstocks.

Reimer replied October 4, 1923, that he believed that Old Home on either Calleryana or Ussuriensis would be all right.

October 4, 1923

Mr. Selden Smyser, Washington State Normal School, Ellensburg, Washington. Inquires as to the best blight-resistant rootstocks for pears.

Reimer replied October 6, 1923, that he preferred Calleryana over Ussuriensis and recommended Old Home as the trunkstock.

October 4, 1923

Reimer to J. S. Malloway, Delhi, California, comments as follows: "I think you will find the Agriculture Department of the University of Nanking a thoroughly reliable source of pear seed".

October 15, 1923

Dean John H. Reisner, Nanking University, to Reimer. States that Washington Nursery Co., Toppenish, Washington, has placed an order for 100 pounds of Calleryana seed.

November 13, 1923

Reimer to Mr. R. C. Bobbins, care of T. Sakata and Co., Chicago, Illinois. "Mr. N. S. Bennett, Medford, Oregon, recently asked me to make an examination of seedlings which he produced from seed which he tells me he purchased from you as P. ussuriensis. I find that all of the seedlings in this particular case are P. betulaeifolia".

November 13, 1923

Reimer to Dean John H. Reisner, Nanking University. In this letter Reimer gives a list of localities in Central China where he believes that desirable seeds of Calleryana can be collected. He points out that Calleryana seed should be collected from areas that are free of native trees of P. betulaeifolia.

November 13, 1923

Reimer to Philip Bancroft, Walnut Creek, California. Comments as follows: "In regard to additional seedlings, will state that you can obtain almost any quantity from the Mount Adams Nursery, Husum, Washington, and we will send you one hundred seedlings of P. betulaeifolia this winter".

November 20, 1923

T. Sakata and Co., Chicago, Illinois, to Reimer. Comments as follows: "This is to acknowledge receipt of your courteous letter under date of November 13, advising us regarding the pear seed furnished Mr. N. S. Bennett of Medford, Oregon. As this particular order was packed in Japan we are of the opinion that an error must have been made and Betulaefolia shipped instead of Ussuriensis. We see no occasion for this error as we had scores of orders for Ussuriensis which were all satisfactorily filled last year".

December 1, 1923

Reimer to Henry and Lee, Seedsmen, 97 Water St., New York City. States that seeds obtained from this firm were of the Japanese form of Calleryana, P. koehnei and not Betulaefolia as ordered. Goes on to state that P. koehnei is worthless as a rootstock for pear trees.

December 1, 1923

Reimer to Yokohama Nursery Co. Comments as follows: "I have watched with great interest the seedlings grown from various lots of seeds in this

country and which were purchased as P. ussuriensis. Nurserymen in various parts of the United States have sent samples for identification. Unfortunately some of these lots are P. serotina and not P. ussuriensis. These have been purchased from various firms in Japan".

Reimer comments further to the effect that Ping Li seedlings appear to be satisfactory and again calls attention to the fact that the wild forms of Ussuriensis are worthless as rootstocks for pears.

December 6, 1923

Washington Nursery Co. to Reimer. Letter comments as follows: "We cannot supply trees of Winter Nelis on French roots. The only ones we have are on Japanese pear". (Reimer wrote no less than 15 letters to various nurseries before he found one that could furnish Winter Nelis trees on French roots. This is indicative of the extent to which pear trees on Oriental roots were being propagated at that time).

December 27, 1923

Reimer to Mr. Philip Bancroft, Walnut Creek, California. Comments as follows: "We will send you, within the next few days, 100 seedlings of P. betulaefolia and 50 of P. calleryana".

December 28, 1923

Robertson and Vistica Nursery, Stockton, California, to Reimer. Mr. Vistica states that he has obtained 20,000 Calleryana seedlings from the Mount Arbor Nursery at Shenandoah, Iowa, which he expects to bud in 1924. Also states that he has budded 100,000 Old Home on French seedlings.

December 31, 1923

Reimer to Washington Nursery Co. In this letter Reimer comments as follows: "For the present you should cease propagating Chieh Li as a trunkstock for pear trees. It is a very poor grower on heavy clay or adobe soils. While it is more resistant to blight than Old Home it is unsatisfactory in this Valley because of its slow growth on heavy soils".

December 31, 1923

Reimer to Washington Nursery Co., Toppenish, Washington. Recommends that Estella be dropped as a blight-resistant trunkstock and that Old Home be used exclusively in the future.

1924

January 7, 1924

Reimer to Robertson-Vistica Nursery. In answering a specific question as to the best varieties of *Ussuriensis* for rootstock purposes Reimer comments as follows: "The best varieties of P. ussuriensis from which to grow seedlings appear to be Ba Li, Ping Li and Chieh Li". (While Reimer no longer considered Chieh Li to be satisfactory as a trunkstock, it appears from this statement that he still considered the variety to be satisfactory as a source of seedlings.)

January 16, 1924

Yokohama Nursery Co., to Reimer. "We understand from your information that Ping Li cultivated form is the best of all as stock trees. We are collecting this particular variety from Yugakujo every year. This season we have ordered collected 1000 pounds but only one-third so far has come to hand and the rest is doubtful. This season is off year for the seeds, also Pyrus serotina is entire failure and different firms here are supplying American orders with useless old seeds".

January 17, 1924

Reimer to Mr. C. E. Wise, O'Fallon, Missouri. States that Orel 15 on Japanese root can be obtained from the Albany Nursery Co., Albany, Oregon. (Mr. Wise wanted about 100 of these trees to plant on his property at Grants Pass, Oregon. In this letter Reimer advised against using Surprise as a trunkstock.)

January 20, 1924

Reimer to Dean John Reisner, Nanking University. States that he is sending trees of blight-resistant Calleryana. Dean Reisner expected to plant these trees for future production of Calleryana seed.

January 21, 1924

Professor W. L. Howard, University of California at Berkeley, to Reimer. Wants to obtain Old Home on its own roots so as to test it for resistance to oak root fungus.

January 23, 1924

Howard Reed, Marysville, California, to Reimer. Desires to obtain trees of Ping Li (*Ussuriensis*) and Calleryana for the purpose of setting up a source of seed.

January 25, 1924

Reimer to G. E. Alexander, Livingston, California. States that he had no stock of Calleryana for distribution at that time but states that the Calleryana seed offered for sale by Nanking University was probably the best seed of this species then available.

January 29, 1924

Reimer to Professor Stanley Johnson, Experiment Station, South Haven, Michigan. States that seedlings of Calleryana and Ussuriensis can be obtained from Mount Adams Nursery, Husum, Washington, and from Washington Nursery Co., Toppenish, Washington. Also states that Serotina seedlings can be obtained from many nurseries including the Mount Arbor Nurseries and the Shenandoa Nurseries, both of Shenandoa, Iowa.

February 4, 1924

Reimer to Dr. T. Francis Hunt, College of Agriculture, Berkeley, California. Comments as follows: "In regard to Old Home scions, will say that our supply is quite limited but we will send you all that we can spare and this will probably be enough to make 200 grafts. We have recently sent some scionwood to Dr. Howard".

February 26, 1924

Dr. T. Francis Hunt, office of the State Leader, University of California at Berkeley, to Reimer. Comments as follows: "I got 500 Ussuriensis from the Washington Nursery Co., at Toppenish and there seems to be a great deal of doubt about them being Ussuriensis. In the lot are a few that look like what we think is Ussuriensis but most of them do not appear to be".

February 27, 1924

Reimer to Mr. H. E. Dobish, County Agent, 609 Bird St., Oroville, California. Letter comments as follows: "I wish to state that the trees in Oroville which have been called P. calleryana and which closely resemble this species are Pyrus koehnei or could be classified as Pyrus calleryana, subspecies koehnei. This type comes from extreme southern China. It is not as desirable as the typical Pyrus calleryana". (From other correspondence it appears that the possibility of using the seed from these trees as a source of pear stock had been considered.)

July 8, 1924

T. Sakato and Co., Yokohama, Japan, to Reimer. Informs Reimer to the ef-

fect that Washington Nursery Co., Toppenish, Washington, refuses to pay a bill of \$1,300.00 for pear seed on the grounds that the seed received was Ussuriensis and not Serotina as ordered.

August 8, 1924

Mr. George E. Alexander, Livingston, California, to Reimer. Wants to know where he can obtain 1000 buds of Old Home to bud on Ussuriensis.

August 10, 1924

Reimer to Robertson-Vistica Nursery, Stockton, California. States that from now on there is not likely to be much demand for trees on Ussuriensis roots but that there should be a demand for trees on Calleryana.

September 6, 1924

Washington Nursery Co. to Reimer. States that company obtained \$1,300.00 worth of seed from T. Sakato and Co., Yokohama, Japan. This was supposed to be Serotina. At planting time it was noticed that the seed was labeled Ussuriensis and not Serotina. As the seedlings developed it was noticed that they were dwarfish in character and the company suspected that they were of the wild type of Ussuriensis. Samples were sent to Reimer for identification.

Upon receipt of the samples, Reimer replied by wire as follows: "Ussuriensis seedlings probably wild type".

The above telegram was followed by a letter from Reimer dated September 24, 1924. In this letter Reimer states that seedlings grown from the vigorous cultivated varieties of Ussuriensis will grow from 50 to 100 percent larger during the first season than will seedlings grown from seeds of the wild type.

Reimer goes on to comment that he knows that some of the seed collectors in the Orient are obtaining their Ussuriensis seeds from wild trees rather than from the cultivated varieties. He sees no hope in this situation unless we can develop sources of seeds in the United States. He points out that the situation is different with Calleryana. Here the seed collection is in the hands of Americans whom he feels can be trusted. Calleryana seed is collected from wild trees in Central China and the likelihood of contamination is far less than with Ussuriensis where the seed must be obtained from the cultivated varieties in southern Manchuria, a region which is difficult of access. Because of this Reimer states that he is now advising nurserymen to propagate Calleryana instead of Ussuriensis. (Other letters written at this time indicate that the Washington Nursery Company refused to pay for the above order of seed, even though it was threatened with a law suit and that it finally destroyed all of the seedlings.)

September 24, 1924

Reimer to Professor A. Kikuchi, Lottori Agricultural College, Lottori, Japan. In this letter Reimer comments as to the undesirability of the seeds

from the wild types of *Ussuriensis*, as follows: "In this connection I wish to state that seedlings from the wild type of *Ussuriensis* are very slow growers and not satisfactory for stock purposes in this country; in fact, they are worthless because the scion or top rapidly outgrows the stock. We are condemning this wild type in the most vigorous terms. Some of the Japanese nurseries have sent seed of this type to this country and it is proving undesirable and we are certainly condemning their seed and methods. I hope, therefore, that you will do everything possible to prevent them from sending such seed. In fact, if they continue sending such seed we will advise all of our nurserymen to cease purchasing pear seed of all types from them".

September 24, 1924

Reimer to S. Tokuda, Yokohama Nursery Co., Yokohama, Japan. Reimer comments as follows: "During the past two years many of the nursery trees grown from seed of *P. ussuriensis* obtained through some of the Yokohama nurseries have clearly demonstrated that much of this seed has been gathered from the wild trees in Manchuria. This is evidenced by the small size and slow growth of these trees. I have felt that some of the seed collectors in Manchuria were collecting from wild trees rather than from cultivated types".

"I have just had a letter from Professor Kikuchi, who has been traveling in the southern part of Manchuria, and he tells me that collectors have been collecting seed from wild trees of *P. ussuriensis* and forwarding them to some of the nurseries in this country. This substantiates the conclusions which I had already reached regarding the source of seed of many of the seedlings grown here".

"One thing is certain: These seedlings from the wild type are making such poor growth and giving such poor results that some of our growers are beginning to condemn *Ussuriensis*, and, furthermore, if the practice is continued it will kill the entire *Ussuriensis* seed business and growers will use *P. calleryana* from China instead".

1925

January 9, 1925

Robertson-Vistica Nursery to Reimer. Requests scionwood of best strains of *Calleryana* and *Ussuriensis* for the purpose of starting a seed orchard.

January 9, 1925

Robertson-Vistica, nursery, to Reimer. This concern states that Ripon Nursery Co. is growing Old Home on *Calleryana* for them under contract. Concern also states that it intends to set out *Calleryana* trees for seed production. States that concern has had good luck growing Old Home from cuttings. Believes that this method would be commercially feasible if growers were willing to pay 10 cents more for trees.

January 17, 1925

Neosho Nurseries, Neosho, Missouri, to Reimer. Concern inquires as to the desirability of Ussuriensis as a rootstock for pears. States that up until now it has propagated only Serotina with Kieffer or Garber trunks.

March 17, 1925

British Columbia Fruit Growers Association, Kelowna, British Columbia, to Reimer. Inquires as to where Old Home on Calleryana trees can be obtained.

Reimer replied, March 30, 1925, that such trees could be obtained from Washington Nursery Co., Toppenish, Washington, Mount Adams Nursery, Husum, Washington, Robertson-Vistica Nursery, Stockton, California.

April 5, 1925

Samuel Fraser Nursery Inc., Geneseo, New York, to Reimer. Mr. Fraser states that he understands that much of the pear seed obtained from France is actually P. nivalis and not P. communis.

Reimer replied, April 19, 1925, that pear seed obtained from France contained a varying percentage of P. nivalis but that the bulk of French pear seed was P. communis.

April 22, 1925

Mr. C. C. Clark, Soulshyville, California, to Reimer. States that he has scionwood of Old Home which he will sell at 25 cents per scion.

Reimer replied, April 29, 1925, to the effect that the price was too high.

May 5, 1925

Robertson-Vistica Nursery, Stockton, California, to Reimer. States that it will have the following trees available in the fall of 1925.

Old Home on Calleryana, 100,000

Old Home on French, 50,000

Old Home on Ussuriensis, 10,000

Says it already has taken orders for over 36,000 Old Home on Calleryana roots, 20,500 of which are going to River Farms, Knights Landing, California.

May 13, 1925

Washington Nursery Co., to Reimer. Reports that all of its Calleryana seedlings were frozen back to the ground during the previous winter. The seedlings made new growth during the spring months, however, and expects that from 40 to 50 percent of them will be ready for budding by late summer. Company re-

ports that Ussuriensis seedlings suffered no damage from the winter cold.

June 4, 1925

Stark Brothers Nurseries, Louisiana, Missouri, to Reimer. Inquires as to the desirability of producing pear seed in the United States.

Reimer replied, July 9, 1925, that in his opinion the pear seed problem would never be solved until we grew our pear seed from known sources in this country.

June 6, 1925

Reimer to Washington Nursery Co. Replying to letter of May 13, Reimer felt that Calleryana is superior to Ussuriensis for regions where winter cold is not a serious factor.

June 11, 1925

Washington Nursery Co., to Reimer. Letter states that Ussuriensis seedlings in the nursery at Toppenish suffered no damage from a winter freeze where temperature reached 11° below zero. Serotina, French, and Calleryana all suffered some damage during the freeze.

June 30, 1925

Dean J. H. Reisner, Nanking University, to Reimer. States that thus far in 1925 he had received orders for 340 pounds of Calleryana seed but had received no orders for Ussuriensis.

July 18, 1925

Robertson-Vistica Nursery to Reimer. Mr. Vistica states that his firm is now obtaining their supply of Old Home buds from the Wolfskill orchard at Marysville.

August 19, 1925

H. Fujita and Co., General Importers and Exporters, Dairen, Manchuria, to Reimer. Company announces that it is prepared for the first time to offer Ussuriensis seed for export and wants to know who are the chief importers of this seed in the United States.

Reimer replied, September 26, 1925, that the chief importers of Ussuriensis seed at that time were Washington Nursery Co., Toppenish, Washington, Shenandoa Nurseries and Mount Arbor Nurseries, both of Shenandoa, Iowa.

September 1, 1925

Mr. A. H. Brewster, Salem, Oregon, to Reimer. Inquires as to best rootstocks for pears in the Salem area.

Reimer replied that French should be best for any area where blight is not a serious problem. He cautioned against the use of Serotina as a rootstock and stated that the Chinese species had not received sufficient trial to warrant their use under Willamette Valley conditions.

September 8, 1925

California Nursery Co., Niles, California, to Reimer. Requests shipment of 500 buds of Ussuriensis, 500 buds of Calleryana and 500 buds of Old Home. (Apparently, the Calleryana and Ussuriensis buds were to be used in propagating trees for future seed production and the Old Home buds were to be used as a future source of Old Home budwood. The correspondence does not indicate that the California Nursery Co. was propagating Calleryana or Ussuriensis at that time.)

September 9, 1925

Robertson-Vistica Nursery, Stockton, California, to Reimer. States that it has obtained 200 pounds of Bartlett seed from the California Packing Corporation. Believes this seed will afford good opportunity for experimentation.

September 28, 1925

L. C. Barnard, County Agent, Kelseville, Lake County, California, to Reimer. Inquires as to the desirability of Calleryana as a rootstock for pears in Lake County.

Reimer replied as follows on October 22, 1925: "It would be necessary to try it (Calleryana) on your soils and in your locality before conclusions could be drawn regarding its value there".

December 7, 1925

Mr. M. Jongeneel, Manager, Land Department, California Packing Corporation, to Reimer. States that California Packing Corporation has planted 100 acres of pears consisting of Old Home on French, Ussuriensis and Calleryana. Also states that company expects to plant an additional 160 acres the next year.

December 11, 1925

H. B. Howell, County Agricultural Agent, Grants Pass, Oregon, to Reimer. States that a grower at Grants Pass has just received a shipment of trees from

the Washington Nursery Co., Toppenish, Washington, which are Surprise on Calleryana. (It is strange that Surprise was still being used as a trunkstock as late as 1925.)

December 17, 1925

Dean John Reisner, Nanking University, to Reimer. Dean Reisner comments as follows regarding the influence of the Chinese civil war on the collection of Calleryana seed in Central China: "We are sorry to have to write that we shall be able to send you only about one-half of the amount of seed you ordered from us. All arrangements had been made for the collection and part of the collection had already been made when the military authorities seized our collectors and threw them into prison. After they were released they were sent out of the province."

December 22, 1925

Reimer to H. A. Hyde Co., Watsonville, California. Expresses the belief that French rootstock should be best for the Watsonville area.

December 28, 1925

Gordon Brown, Hood River Branch Experiment Station, Hood River, Oregon, to Reimer. States that Mount Adams Nurseries, Husum, Washington, will have trees of Old Home on French roots for sale during 1926.

1926

January 11, 1926

Reimer to Mr. Harry Holmes, Bear Creek Orchards, Medford, Oregon. Advises using trees with Old Home trunks on French roots in areas where oak root fungus has been a serious problem.

January 13, 1926

James T. Jardine, Director, Oregon Agricultural Experiment Station, to Reimer. States that already over 7,700 copies of Reimer's bulletin on pear rootstocks were sent out over a six months' period. (It is interesting to note that of the numerous requests that came to the Station for this bulletin, over three-fourths of the requests came from the state of California. This bulletin, Ore. Sta. Bul. No. 214, has long been out of print.)

January 17, 1926

Reimer to B. T. Galloway, United States Department of Agriculture, Wash-

ington, D. C. Reimer comments as follows: "Now in regard to getting seed of cultivated P. ussuriensis and P. calleryana: To get just the right kind of seed is going to be a difficult and perhaps impossible matter. In fact, this is the most discouraging feature of our work with pears here. That is, the difficulty of getting in abundance, good reliable seed of the right kind after determining which is best".

January 19, 1926

Mr. George C. Roeding, California Nursery Co., Niles, California, to Reimer. States that he has about 20 large pear trees which he wants to graft to Calleryana, Ussuriensis and blight-resistant French to be used as future sources of seed.

Reimer replied, January 29, 1926, that he was sending scions of Old Home, Ba Li, Hsiang and some scions of blight-resistant Calleryana.

January 26, 1926

Mr. O. L. Craton, Hood River, Oregon, to Reimer. Inquires as to where seeds of French, Calleryana and Serotina can be obtained. Also wants to know how many pounds of seeds would be required to grow 1,000,000 seedlings.

Reimer replied, February 4, 1926, that seeds of all three species could be obtained from the Washington Nursery Co., Toppenish, Washington. Reimer also states that one pound of French or Serotina seed will usually contain from 8,000 to 10,000 seeds, while a pound of Calleryana seed will contain from 38,000 to as many as 50,000 seeds. He stated also that nurserymen usually expected about one half of the seed to germinate and develop into usable seedlings and that from 40,000 to 50,000 seedlings could be grown on one acre of ground.

January 29, 1926

Reimer to M. L. Dean, State Department of Agriculture, Boise, Idaho. States that he feels certain that Calleryana will prove to be too tender under Idaho conditions.

January 29, 1926

Silva-Bergthold Co., New Castle, California, to Reimer. States that seedlings are being sent for identification. Says that seed was purchased for Serotina but that seedlings appear to be Ussuriensis. Also, asks whether it is true that Calleryana is as good as French for wet soils.

Reimer replied, February 4, 1926, that he could not distinguish between Serotina and Ussuriensis seedlings during the dormant season. Also states that it is impossible to know how well Calleryana will withstand wet conditions since the species has been used as a rootstock for less than ten years.

February 1, 1926

Mr. George C. Roeding, California Nursery Co., Niles, California, to Reimer. Letter comments as follows: "From the conversations I have had with you from time to time, I appreciate very fully indeed the importance of getting a strain of Pyrus communis which would prove resistant to blight. This is one of the things I know you have been aiming at for some time. The very fact that the French pear is so well adapted to Pacific Coast conditions and that the edible types of pears are practically all of European origin, makes it a wonderful thing eventually if a blight-resistant variety of European pear could be developed".

February 2, 1926

Arnold Arboretum to Reimer. Reports that Calleryana has proven to be winter hardy at Jamaica Plains, Massachusetts. States that trees on Calleryana roots at the Arboretum are 20 years old.

February 2, 1926

Robertson-Vistica Nursery, Stockton, California, to Reimer. States that it has 250,000 seedlings grown from domestic French seed. Also states that it has over 1,000,000 Calleryana seedlings grown from 200 pounds of seed. Expects to sell a large number of Calleryana seedlings to be used for the purpose of inarching trees on Japanese roots. Also states that it is propagating trees on Betulaefolia.

March 21, 1926

Philip Bancroft, Walnut Creek, California, to Reimer. Reports on the performance of various rootstocks on alkali soils. Attributes failure of some trees to high alkalinity and to the fact that water stood around the trees during hot weather. Apparently sees no specific differences between species in regard to soil alkalinity.

April 2, 1926

Robertson-Vistica Nursery, Stockton, California, to Reimer. In this letter Mr. Vistica states that his firm has planted 20 acres of Old Home trees for seed production. The firm expects to graft every 10th tree to Farmingdale so as to obtain Old Home x Farmingdale seed. The exact location of this orchard is not given but the letter states that it is planted at least 20 miles away from other pear orchards. (The correspondence contains no other references to this orchard.)

May 7, 1926

Woodburn Nursery Co., Woodburn, Oregon, to Reimer. Letter states: "Under separate cover we are sending you a few seedlings that we bought for the cultivated type of Ussuriensis. Have only grown Ussuriensis for a few years so am not very familiar with it but these are different from what we have had and I am afraid they are the wild or dwarf type".

Reimer answered as follows on May 25: "In reply to your letter of May 7, will say that the pear seedlings which you sent appear to be the wild type of Ussuriensis".

May 12, 1926

Robertson-Vistica Nursery, Stockton, California, to Reimer. Mr. Vistica states: "Some trees on Calleryana roots went bad during recent hot spell. Took some of them to Dr. Milbrath of the State Department of Agriculture. He agrees with me that stagnant water at bottom of the roots during hot spell is cause".

July 20, 1926

Oregon Nursery Co., Orenco, Oregon, to Reimer. Company states that it expects to bud 10,000 seedlings to Old Home, Estella, Chieh Li and Surprise. Wants to know how many of each variety to bud.

Reimer replied, July 21, 1926, as follows: "In regard to the four varieties of pears which you inquire about I would suggest that you use only Old Home. The other three varieties, namely Surprise, Estella, and Chieh Li, have not proved as satisfactory as Old Home. I strongly recommend that you drop these from your list".

July 30, 1926

Gordon Brown, Hood River, Oregon, to Reimer. States that he has 800 Japanese, 800 Ussuriensis and 1,600 French seedlings growing in his own orchard. He also expects to plant some Calleryana and Betulaefolia. Expects to use Old Home, Comice, Flemish Beauty and Buerre Easter as trunkstocks.

August 2, 1926

Pacific Coast Tree Fruit Seedling Growers, Vancouver, Washington, to Reimer. Concern states that it sold over 250,000 Ussuriensis seedlings in 1925.

August 7, 1926

Kirkman Nurseries, Fresno, California, to Reimer. States that concern is now in the orchard business with 40 acres of four-year-old trees on Japanese

roots located at Brentwood, California and 40 acres each of one and two year old trees on quince roots. The latter blocks were situated on the Stauslaus River near Escalon, California.

August 25, 1926

W. B. Cooney, County Agent, Roseburg, Oregon, to Reimer. Inquires as to what rootstocks should be used in case of a black, sticky type of soil in Douglas County, Oregon.

Reimer replied, September 10, 1926, that French stock should prove to be satisfactory, since blight was not a serious factor in the Roseburg area.

August 27, 1926

Kirkman Nurseries, Fresno, California, to Reimer. Inquires as to the desirability of grafting Old Home and Estella on quince roots.

Reimer replied that he had not tried out these combinations but expected to set up some tests in 1927.

September 3, 1926

Gordon Brown, Hood River Branch Experiment Station, Hood River, Oregon, to Reimer. States that he is using French, Serotina and Ussuriensis in a test planting at the Station with Old Home, Comice, Buerre Easter, Flemish Beauty, Vicar of Winkfield, German Sugar, Lemon and Orel 15 as trunkstocks. He intends to add Calleryana to his test collection of rootstocks.

September 10, 1926

Mr. R. H. Atkins, Marysville, California, to Reimer. States that he wants to experiment with deep planting of Old Home to see if this variety is resistant to oak root fungus like other French varieties.

September 22, 1926

M. J. Heppner, Research Assistant in Pomology, University of California, Davis, California, to Reimer. Inquires as to desirability of using Bartlett seed as a source of rootstocks for pears. Says he has compared Bartlett seedlings with those grown from ordinary French seeds and observed that Bartlett seedlings are the more vigorous of the two. Also inquires as to desirability of P. nivalis as a rootstock for pears.

Reimer replied, September 29, 1926, that he too has noted the vigor of Bartlett seedlings and sees no reason why these seedlings should not make good rootstocks. As to P. nivalis, Reimer states that he has not made a special study of this species. He mentions the fact that Nivalis seedlings are often found among seedlings grown from seed obtained from France.

September 29, 1926

Reimer to Mr. M. Jongeneel, California Packing Corporation, San Francisco, California. In this letter Reimer states: "On my return from the East I had a few hours between trains at Sacramento and got in touch with Mr. Kinman and made a hurried trip to your ranch at Rio Vista to see the pear trees on the various plots."

"There seemed to be no difference there at that time between the trees on French and on Calleryana. However, the trees on Ussuriensis were, for some reason or other, dropping many of their leaves. If this is typical of the behavior of this stock under these conditions in late summer, I do not believe it will prove as satisfactory as French at Rio Vista. I believe, further, that French stock will be satisfactory there, since I understand that pear blight is not a serious factor in that region".