The Transformation of the Quince

What Was Only a Cooking Fruit Now Delicious Raw

IT IS said that Henry Ward Beecher once gave a formula for cooking the quince. His rule was this: Take one quince, one barrel of sugar, and sufficient water.

This rule was given, I hasten to explain, at a time when my Pineapple quince had not been developed.

Had Mr. Beecher tasted one of these perfected quinces he would have seen that his joke no longer had its former force. For my Pineapple quince, and one or two others that have been developed even more recently, retain very little of that acrid quality which Mr. Beecher's barrel of sugar was designed to hide.

On the contrary, the new quinces, when fully ripe, are to be compared in texture of pulp and in edibility with some of the best apples, rather than with their quince forebears; and at the same

time they retain the matchless flavor that made the quince a favorite fruit for jellies and preserves even when its other qualities made it altogether inedible before cooking.

Indeed, the new fruit not only retains the indescribable but exquisite savor of its tribe, but has taken on quite pronouncedly the flavor of the pineapple, justifying its name in the estimate of most persons who have eaten it.

The transformation thus effected in the quality of the quince has been brought about through a series of experiments that began as long ago as 1880. When I first gave the matter consideration I reflected that the quince, although it had been under cultivation for at least two thousand years, had been distinctly neglected by the horticulturist. There was a prevailing idea that the quince tree would thrive on neglect, and that the inherent qualities of the fruit were such as to place it hopelessly beyond the reach of experiment except as material for cooking.

But I could see no good reasons why the quince should not be improved somewhat as the apple and pear had been.

So I commenced work by obtaining seeds of all the best strains of quinces, including among others the Orange, Angus, Portugal, Rae's Mammoth, West's Mammoth, and Champion. All of these are

varieties derived from the common species which the Romans called *Mala Cydonia,* or Cydonian apple, because an improved variety came to them from Cydon, in Crete. From this old Roman name we have for the common quince the scientific name of the present time, *Cydonia vulgaris.*

First Successful Matings

One of my earliest experiments was to cross the Orange quince with the Portugal quince.

The Orange type is generally much more productive than the Portugal, and the fruit is larger and more pleasing in form, being nearly round and quite smooth. It is also of a more attractive color. On the other hand, the pear-shaped Portugal quince, although having an objectionable rusty coat, is of a better quality, having a very pleasing flavor when cooked.

It seemed certain that from the combination of these two varieties it might be possible, by subsequent selection, to produce a quince superior to either.

Seedlings from this cross of Orange and Portugal quinces were raised extensively for several years.

Large trees upon which to graft and test them all not being available, the selected ones were set out on the Sebastopol place rather closely, in rows about 4½ feet apart. Although a thorough test

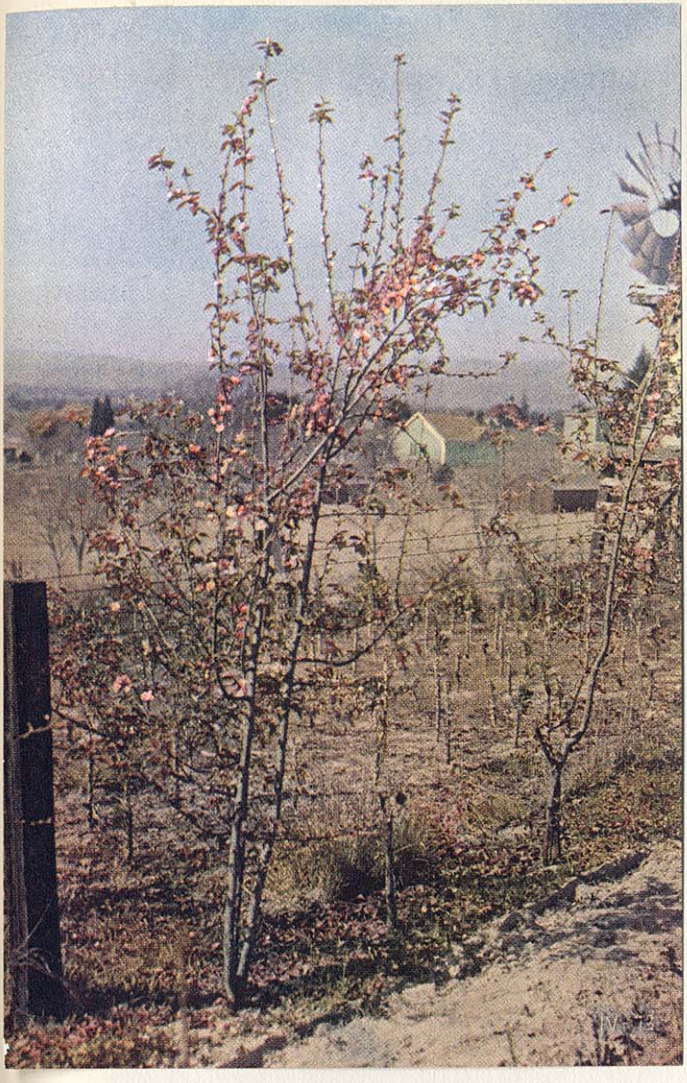
could not be made in this way of all the varieties, it was possible to make a very fair comparative test. The poorer seedlings were from time to time removed, leaving space for better development of those that remained. Later some of the trees whose fruit was not promising were used as stocks on which to graft hybrid pears and other seedlings.

By this method I have tested probably fifty thousand quince seedlings.

The first important result of this experiment in crossbreeding was the production of a quince of large size from a seedling produced by pollenizing a Portugal quince with the Orange quince. Among my seedlings one individual showed marked superiority over its fellows even in the seed-bed, by its unusual vigor and the rich green of its large, finely formed foliage.

Among the entire lot of 700 cross-bred seedlings, this one alone proved really valuable.

The fruit it bore received the Wilder Medal at the meeting of the American Pomological Society at Washington, D. C., in September, 1891. It was so generally admired and promised to be so valuable that Professor H. E. Van Deman, then Chief of Division of Pomology, U. S. Department of Agriculture, was pleased to have it named for him. The Van Deman quince inherits great productiv-



The Japanese Quince

Like a good many other fruit trees, the quince has been modified by the Japanese in the direction of brilliant foliage and beautiful flowers. It thus becomes an ornamental shrub in addition to its fruit-bearing qualities.

ity, size, nearly globular shape, smooth skin, and attractive color from the Orange quince, while it received its spicy flavor and tenderness from the Portugal. It has continued to be extremely prolific, and an unusually strong grower, and at the present writing, 1914, it is quite generally pronounced the best of all quinces, and the only quince worth raising in the eastern states. It has proved to be of remarkable hardiness and productiveness under the most adverse conditions.

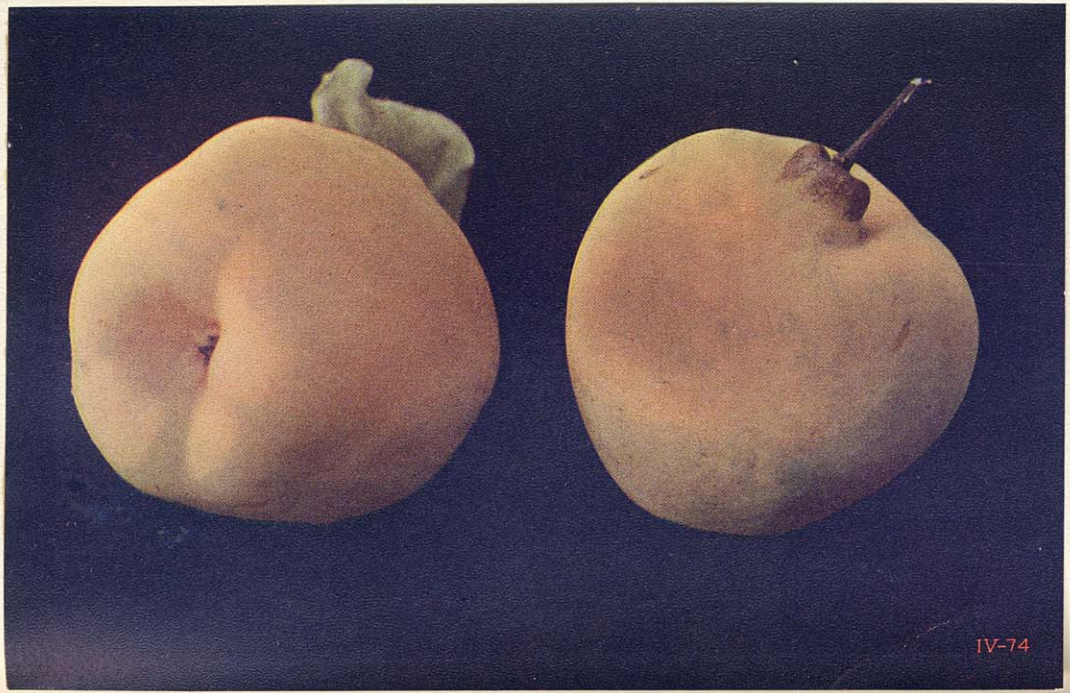
Under favorable conditions the Van Deman produces three distinct crops each season in California.

The first or main crop ripens on my experiment farm during the latter part of September. The fruit of this first crop is of extremely large size, often being over five inches in diameter, and weighing 25 ounces.

The second crop ripens about November, and the third a month later. With these later crops the fruit is usually much smaller. But all are of good flavor, texture, and quality. They bake as quickly as apples, and are tender when thus prepared.

The dried or canned fruit retains the much desired quince flavor.

At the time when the Van Deman quince was introduced, in 1893, I had growing for compari-



Fruit of the Japanese Quince

The Oriental taste in fruit is different from the Occidental. As a rule the fruits developed in the East are somewhat harder in texture, and more acrid in quality than those that have been developed in Europe and America. There is less difference in this regard, however, in the case of the quince than with some other fruits, notably the pear. The Japanese quince has been used by Mr. Burbank in crossbreeding experiments in the development of his perfected varieties.

son trees of all the other varieties above mentioned. But no one of them bore fruit at all comparable to the new variety.

The new tree, in addition to being a very prolific bearer, also had the habit of early-fruiting.

Trees two years old have been reported as bearing fruit.

From Florida a Van Deman quince is reported that took on eight feet of new growth within one year from the time of planting. In Washington two trees in their third season bore twenty fine quinces weighing from twelve to fourteen ounces each as their first crop, and a little later a second crop declared to be quite equal to the other.

Seedling Tests and New Crosses

I had, of course, made crosses between various other varieties in the quince orchard and in due course developed other seedlings that showed valuable characteristics.

I learned by experience to be able to select seedlings of the quince, as of other fruit trees, by observing the character of the leaf and stem.

Seedlings having leaves that are large, thick, dark green, and glossy, and that show prominent rounded buds and upright branches with thick, bright wood are those that may be expected to produce the largest and finest fruit.

Worthless seedlings are known by the oppo-

Foliage of the Japanese Quince

The thick, fibrous leaves of the Japanese quince add to the beauty of the tree. The branches, however, are likely to be spiny. The quince appears to represent a somewhat more primitive type of plant than most other of our cultivated fruits. Mr. Burbank suggests that the cultivated quince of to-day is in about the condition of development represented by the pear of the Roman time.

site characters. Seedlings having small, knotted, twisted wood; slender, small, sharp buds; long joints; woolly, wild-looking leaves, and irregular rambling tendency of growth should be rejected, as they will rarely produce fruit of any value.

There are notable exceptions to these rules of correlation between twig and foliage and fruit-quality, but, as a rule, the qualities just noted may be depended upon to serve as useful guides.

My second important new quince was grown as a seedling from Rae's Mammoth. It was, I am confident, a third generation seedling of a cross between Rae's Mammoth and the Portugal quinces. Its immediate pollenate parentage is not a matter of record, as a great number of cross-bred quinces were under observation at the same time, and specific record was kept only of the first pollenations.

This offspring of Rae's Mammoth was at first called the Santa Rosa, but was subsequently re-christened by the introducer as the Child's quince. It is remarkable for its great size and productiveness, for beauty of form, and for its pale lemon yellow or almost white skin; also for the tender flesh and delicious flavor of its fruit, and the diminutive size of the core.

So fine-grained and tender is the fruit, and so free from the harsh acidity of the old quince, that

it is equal to some popular apples for eating raw, and fully equal to the best apples or pears when baked, stewed, or canned. It will cook as tender as the best apple in five minutes. Moreover, it makes a superior light-colored dried fruit.

In form the fruit is somewhat intermediate between the Portugal and Rae's Mammoth, inheriting from both parents; but in quality it is far superior to either. This new variety has been rather extensively distributed in the eastern states. The only complaint heard of it in the colder climates is that it does not bear so well as in California, but this is the case with all quinces. The soil and climate of California are peculiarly hospitable to this fruit.

The Pineapple Quince

I have elsewhere called attention to the fact that once a tendency to variation has been introduced by crossing among plants of a given company, the effect appears to be cumulative.

Thus opportunity is often given in later generations for selections that will lead to relatively rapid progress along the desired line of development.

Such was the case with the quinces. As selection proceeded one generation after another, the tendency to improvement became more pronounced. The new varieties already secured were

a very great advance upon their progenitors, but there ultimately appeared a seedling that produced a fruit far superior even to the very good ones already introduced.

This superlative variety, which appeared as the culminating product, for the moment at any rate, of fifteen years of selective breeding, was the one referred to at the beginning of this chapter.

Because of its peculiar flavor this new quince, as already stated, was named the Pineapple.

It is additionally remarkable for the early-bearing and great productiveness of the trees, for the large and uniform size of the fruit, which is moreover exquisite in form and of a pleasing light lemon yellow color.

Everyone knows that the ordinary quince cannot be eaten raw with any degree of satisfaction, nor with any expectation of personal comfort in the immediate future. Even children, voracious and unexacting as are their appetites, will scarcely eat a common quince.

But the Pineapple quince when thoroughly ripe rivals the apple as a fruit to be eaten raw.

It will also cook as tender as the tenderest cooking apple in four and one-half minutes. No other quince previously known can be cooked so quickly. It makes a delicious jelly with a strong, pure pineapple flavor. The jelly, indeed, is far superior to

that made from any other quince, and in the estimate of many it is superior to that made from any other fruit.

The Pineapple quince, moreover, is probably the first variety to be profitably shipped from California to eastern markets.

In 1910 Mr. H. A. Bassford, one of the largest growers of California, shipped this variety in ordinary twenty-pound plum crates. The earliest shipments sold at auction for $3.50 per crate. Later shipments brought $1.50 per crate.

A Practical Shipping Fruit

I mention these practical details because the value of the quince as an orchard fruit for shipment to distant markets has been very little recognized. Doubtless the forbidding qualities of the ordinary quince are responsible for this lack of popularity. But now that the Pineapple quince has been introduced, there should be an entire change of popular attitude toward this really admirable fruit.

I may add that I have even more recently found among the seedlings one that rivals the Pineapple, and which has qualities that fully justify its introduction as another new and distinct variety.

This newest of my quinces—called the Burbank—is somewhat larger than the popular Orange quince and of much better form. It is as smooth

as an apple, having completely dropped the objectionable habit of producing wool on the skin. The tree is vigorous; it grows in fine form; and it is an early and astonishingly prolific bearer.

The fruit has the cooking qualities of the Pineapple quince, and is superior for drying and canning, and quite unrivaled except by the Pineapple for the making of jelly.

Testing Remoter Cousinships

It goes almost without saying that I did not carry the work with the quince far before I undertook to introduce new blood from more remote sources.

All the varieties hitherto named are descendants of European stock, and are of the same species. But the quince, like the other orchard fruits, has Oriental representatives,—races that migrated eastward from their Central Asiatic home while the parents of the European quince were migrating westward. In China and Japan there are quinces that are listed as belonging to three different species, named *Cydonia sinensis C. japonica,* and *C. maulei.* All of these are quite different from the European quince as to growth, foliage, and fruit.

As early as 1884 I began making hybridizing tests with these Oriental quinces.

Particular interest attaches to the experiments

Chinese Quince

The Chinese quince somewhat resembles a cucumber. It has no qualities that commend it to the Occidental palate, yet it might prove serviceable as a hybridizing agent in the production of new varieties of quince.

in which the first-named member of this Oriental trio was used. This is popularly known as the Chinese cucumber quince, sometimes called *Pyrus cathayensis,* the Cathay pear.

In its general appearance this Chinese tree is a small, upright grower, quite unlike the ordinary quince. It is not hardy in the northern United States. The leaves resemble those of the apple or pear more than those of the quince. They turn scarlet in the fall. The flowers for which the tree is mostly grown vary from pink to crimson, making a gorgeous display in the early springtime. The fruit is variable, but is usually long, green, very hard, bitter, and uneatable however prepared, but quite fragrant.

In shape as well as in size the fruit suggests a large, full-grown, white-spine cucumber. It has usually a smooth, though sometimes netted waxy skin. A single fruit from it may weigh more than two pounds.

It will be clear from this description that the Chinese quince, or Cathay pear, differs very widely from the European quince. Its fruit is wholly inedible, yet there is no reason why this might not be made over into a profitable and delicious fruit. It is merely a fruit that has retained the qualities, undesirable from the human standpoint, of its remote ancestors. Perhaps it is not much worse to-

day than the common quince was in the time of the Romans.

In hybridizing this peculiar fruit with the common quince I worked with an open mind, anxious to see what result the experiment might bring forth.

The pollen of the common quince was applied to the pistils of the Chinese species. Pollenation was successful; the appearance of the young seedlings grown the following season left no doubt of that. A glance showed that a certain proportion were hybrids, and even when they first broke the soil they presented much larger cotyledons of a different color from those of either parent.

These seedlings were carefully planted in open ground at Sebastopol with some uncrossed seedlings of the Chinese quince in the same row for comparison, the hybrids, however, being given the choice of soil and location.

We have previously learned that hybrids usually grow more vigorously than uncrossed seedlings, but the case of these quinces proved a very notable exception to this rule. At the end of two years the Chinese quinces of pure stock ranged from eight to twelve feet high, while the hybrids, which had been given more room and the best soil, were dwarfs only six inches high, some of them even less.

The foliage of these curious miniature trees was generally a composite, somewhat suggestive of each parent. But in a few instances plants showed leaves much shorter and more rounded than those of either parent, and having the edges coiled back in a semi-circular form. This peculiar coiling of the leaves was probably due to the fact that the mid-rib was inclined to grow more rapidly than the edges of the leaf.

Unavailing effort was made for two years to stimulate the growth of these interesting hybrids.

The pure bred Chinese quinces in the same row came in due course to the time of fruiting, but the hybrids showed no propensity to flower, and the tallest were less than a foot in height when their uncrossed relatives had grown to the height of ten or twelve feet.

Transplanting to orchard soil and special cultivation appeared to have no effect on the dwarfs. The experiment was made of grafting some of them into old quince trees of each of the parents. Some of the grafts grew and had rambling, spiral-shaped branches, but they stopped growing when they had attained a length of two or three feet. Grafting appeared to give them somewhat enhanced powers of growth, but, like the hybrid seedlings from which the cions were cut, they remained absolutely sterile.

No bush or tree of the entire lot put forth a single blossom.

Other Dwarfs Recalled

It is interesting to recall, in connection with the curious result of this experiment in hybridizing the quinces of widely varying species, the results of my hybridization of the California and Persian walnuts.

It will be remembered that the hybrids thus produced were of extraordinary growth, but that they produced very few nuts, and that among the seedlings of the second generation there were many trees of dwarfed growth, suggesting the quince hybrids.

We found reason to believe that the curious result of hybridizing the walnuts might be explained on the supposition that the parent forms had diverged almost to the point of mutual antagonism. They had not varied quite to the point where their offspring were sterile, but they were approaching that limit.

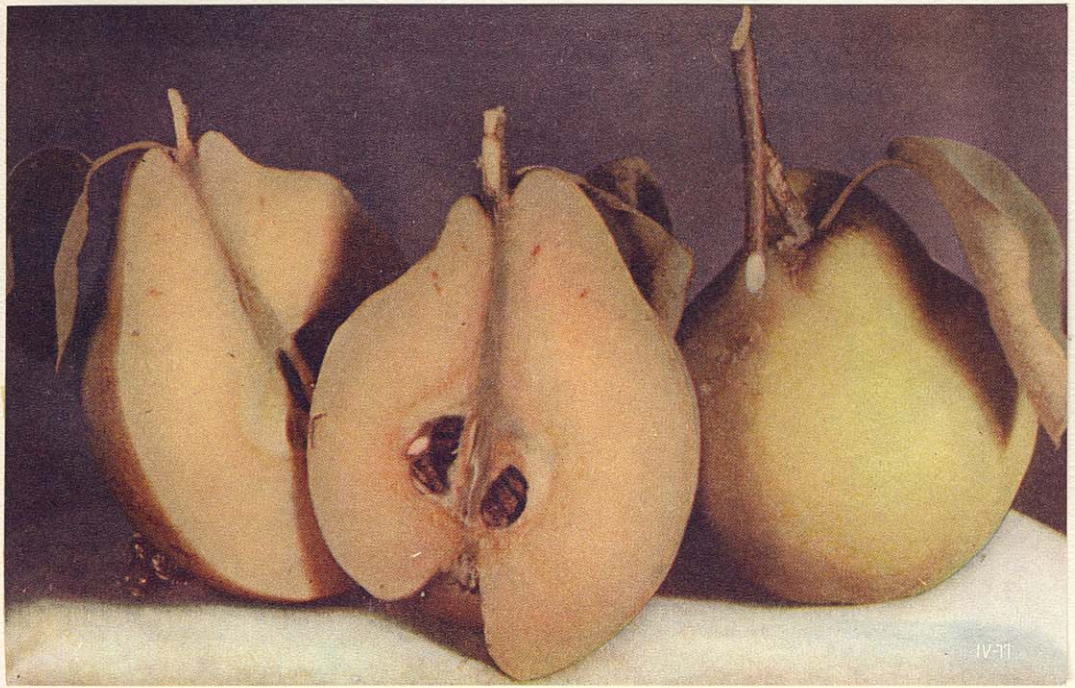
The quinces of the experiment now under consideration had diverged one stage farther. They are still within the limits of affinity that permit cross-fertilization, but not within those that permit the production of fertile offspring. Their case is rather to be likened to that of our petunia and tobacco hybrids, which, as the reader will recol-

lect, were lacking in virility and produced no blossoms. The similar case of the motley hybrids made by crossing various members of the rose family with their cousin the dewberry will be recalled. Also the strange progeny of the strawberry and the raspberry.

The Chinese-European hybrid quince, then, in its dwarfed growth and its sterility merely illustrates the principle of growth that we have previously seen manifested with various other plants.

But the extreme dwarfness of the progeny gives an element of added interest. It would be worth while, could time be found for it, to make more extensive hybridizing tests along the same lines. Possibly some other strains of the two species than those employed might prove to have slightly greater affinity. In that case it is conceivable that a new race of quinces might be produced that would bear fruit of a new character and give us an interesting and perhaps valuable addition to the rather small list of orchard fruits.

In this connection I may refer again to the experiments in which I hybridized the quince and the apple, and to others in which the quince and pear were similarly united. The story of these experiments has been told in earlier chapters, and no detailed account of them need be given here. It suffices to repeat that the hybrids in each case



Van Deman Quince

This was the first of Mr. Burbank's important quince productions. It was descended from an original cross between the orange cross and the Portugal quince. It took the Wilder medal at the meeting of the American Pomological Society in Washington in 1891; and was named after Professor Van Deman, then head of the Department of Pomology of the U. S. Department of Agriculture. It is very prolific, hardy, and is regarded in many parts of the East as almost the only quince worth raising. Its productivity, size, shape, smooth skin, and attractive color are inherited from the orange quince; its spicy flavor and tenderness from the Portugal.

failed to blossom; hence that the experiment, quite as in the cross with the Chinese quince, came to no result of practical value.

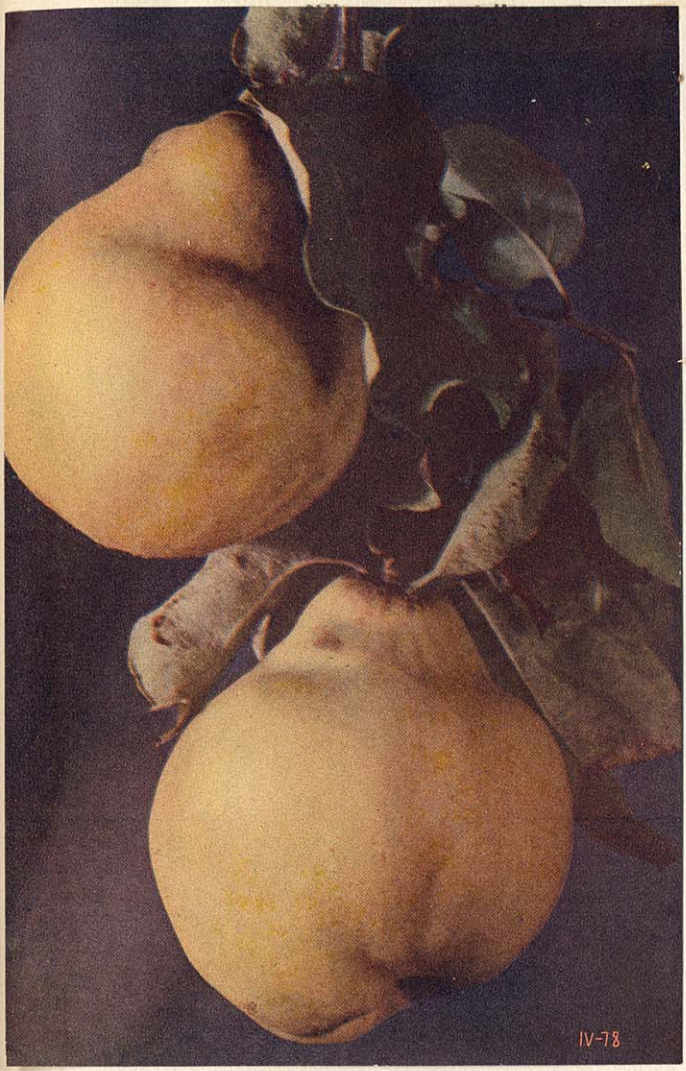
But here, again, it should be borne in mind that more extensive experiments in hybridizing these related species might give us a combination that would be slightly less antagonistic.

It goes without saying that a fertile hybrid between quince and apple or between quince and pear would be a fruit of altogether exceptional interest and of the most inviting possibilities. The experiment of hybridizing these common fruits may readily be made by the amateur, and there are few simple hybridizing experiments that are more attractive as to their possible results or more instructive from a scientific standpoint.

Tests With Japanese Quinces

The two remaining Oriental quinces have already been named as *Cydonia Japonica* and *C. maulei*. It should be added that the latter is probably to be considered as a sub-species. Japanese quinces do not bear very freely, and their fruit has a great variety of forms, and is of such extreme acidity as fully to justify Beecher's celebrated formula—which, indeed, is said to have been suggested by an unfortunate experience with the Japanese quince.

There is great diversity of bloom among



Santa Rosa Quince

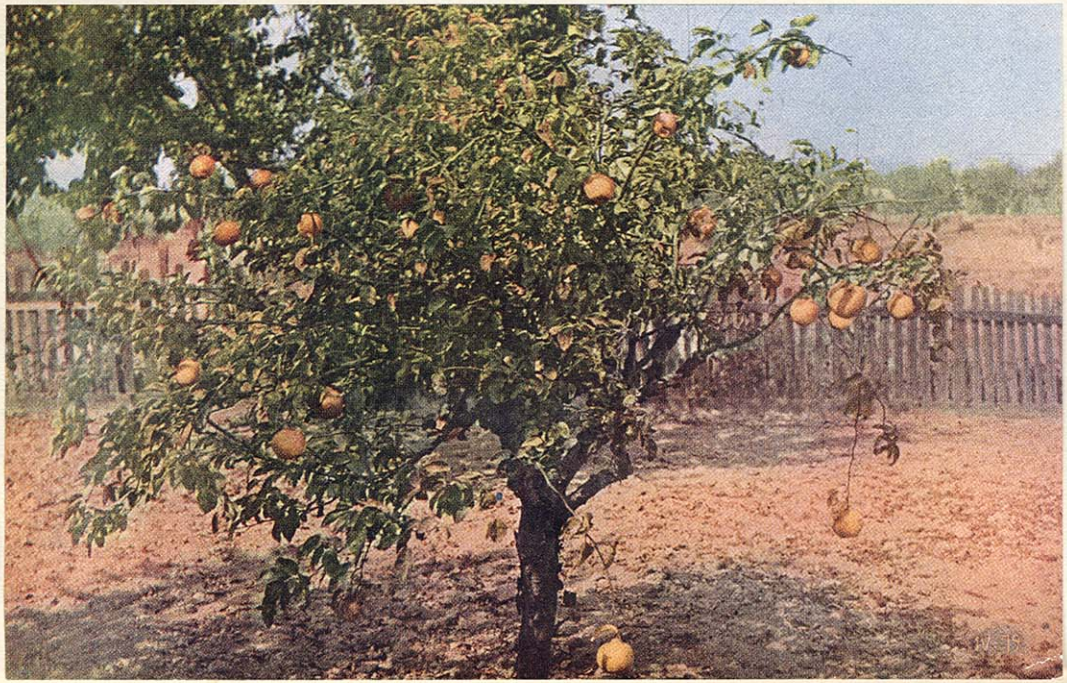
This was Mr. Burbank's second important new quince, and was grown as a seedling from Rae's Mammoth, crossed with the Portugal quince. It is remarkable for its great size and productiveness, for beauty of form, and for the tender flesh and delicious flavor of its fruit, and the diminutive size of the core. It was rechristened Child's Quince by the introducer to whom it was sold.

established varieties, the flowers ranging in color from pure white to bright scarlet and deep crimson. Some of them are double. The tree is raised for ornament only. The bushes are aflame with leaf buds early in the spring. A little later they light the landscape with their gorgeous array of deep crimson, scarlet, pink, and yellowish or white blossoms. Again, late in the autumn, they are brilliant with bronzed leaves, and present fruits of curious and interesting forms.

This, obviously, is a very different tree from the common quince. It seems so distinct that I have never attempted to hybridize the two. But I have crossed the various Japanese quinces among themselves.

The crossbred seedlings vary widely in foliage, blossom and fruit. Some of the fruit produced was as large as ordinary apples, and of varying shape. Where experiments were made with the sub-species *C. maulei,* there was greater promise than in the case of the other flowering quinces. This sub-species is a more abundant bearer than the others, and its fruit is of less objectionable quality.

The uncrossed specimens of this sub-species are low, spiny shrubs, not more than two or three feet high, with short, stiff, spiny branches, which are often woolly when young. The bushes are multi-



The Pineapple Quince on the Tree

Mr. Burbank's Pineapple Quince, the culminating effort of fifteen years of selective breeding, combines the good qualities of the other quinces with especial properties of its own. It has the flavor of the pineapple, and has such qualities that it may be eaten raw like the apple. It will cook as tender as the tenderest cooking apple in four and one-half minutes. The tree is extraordinarily precocious, sometimes bearing fruit when only four months old. Tiny trees of the pineapple quince are sometimes borne to the ground with their weight of relatively colossal fruits.

plied readily by division; that is, from rooted suckers, which spring up from the parent plant. The flowers, which are usually borne in abundance, are of a bright orange-scarlet. There are races of the sub-species that have variegated leaves tinged with delicate pink and white.

This type of flowering quince has much to recommend it as an ornamental shrub. Moreover, my hybridizing experiments, as far as they went, indicated that the *C. maulei* has valuable latent possibilities as a fruiting shrub.

From the many thousand seedlings a good many promising specimens were obtained. Some of these produced large, handsome, light crimson blossoms, and extremely large orange-like waxy golden fruit in the greatest profusion. These quinces, indeed, are among the handsomest of all fruits. They always attract attention by their peculiar form, golden color, and exquisite fragrance. The flesh, however, is usually hard and very acid, though not unlike some varieties of the common quince.

The extreme hardiness of this species, and its great productivity make it a very valuable parent for crossing with other allied varieties. It would be highly interesting and perhaps important to experiment in crossing these shrubs with the common quince. If the cross could be effected, it is

Pear Seedlings Grafted on Quince Stocks

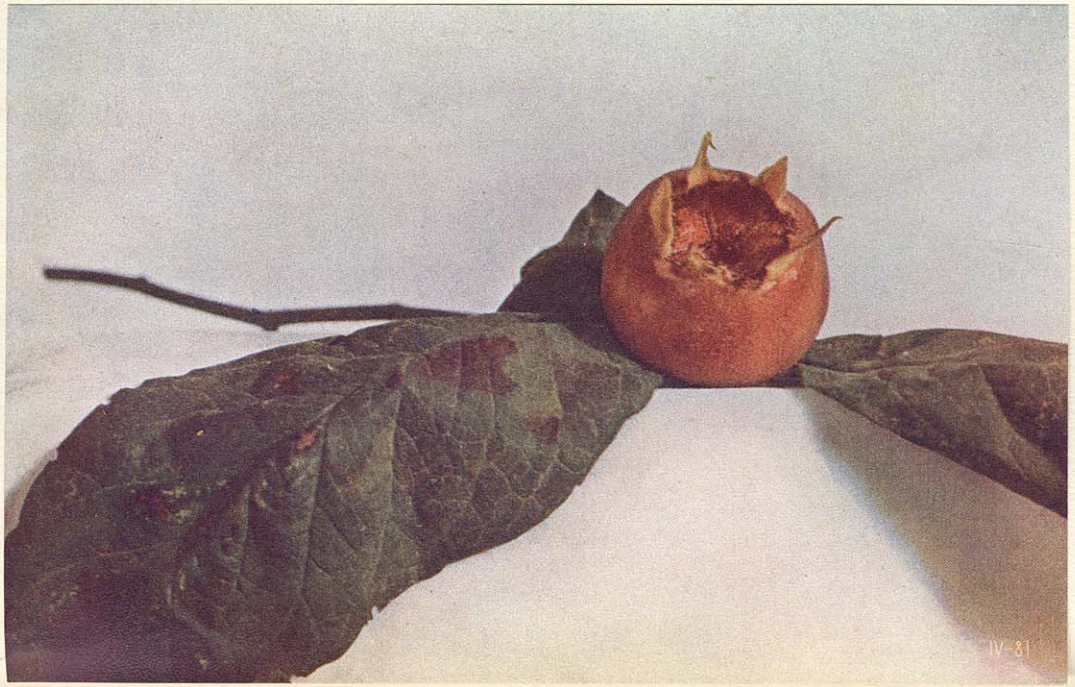
The quince root system makes an ideal stock for grafting, and the pear thrives admirably on this stock. More than a thousand such grafts are to be found in the space shown in this picture.

not unlikely that very valuable betterments could be brought about. It is at least within the possibilities that a quince might be developed that would be superior in various ways to even the best of the European varieties. But doubtless a long series of experiments would be necessary to attain this goal.

Whatever the precise steps through which the further development of the quince is brought about, there can be no question that this fruit has a very important future. It has been neglected in the past, and the fact of its tendency to vary toward the wild type, demonstrates the comparatively slight improvement that has been made in it through artificial selection. But the production of the new quinces that I have described opens a broad new field in quince culture. The first steps in improvement have sufficed to show that the fruit is responsive.

The quince of to-day is, indeed, a half wild product that has waited long for its opportunity.

It remains for the fruit growers of tomorrow, working with the partially developed product in hand, to see that the possibilities of this unique fruit are realized. So hardy, prolific and generally attractive a tree should make especial appeal to the amateur orchardist. The fact that the quince has been neglected, and thus has abundant possi-



The Medlar—A Cousin of the Quince

The Medlar, known to the botanist as Mestilus, is a native of central Europe. There is a single species only, but there are several cultivated varieties. The fruit is too acid for most tastes, but after being mellowed by the frost it is relished by those who care for acid fruit. It is hardy as far north as central New York in the eastern states, and of course throughout California. It is worthy of more attention than it has received from the American fruit developer. Mr. Burbank has grown it, and has made tentative efforts at its improvement, but these have not been carried to a conclusion.

bilities as yet unrealized gives it additional attractiveness from the standpoint of the amateur.

In case of apple or pear or peach we have to do with fruits that have been carefully studied in thousands of experiments generation after generation. Even so, we have seen that there are still good opportunities for further experiment.

But how much larger and, so to say, more accessible are the opportunities in case of a fruit that has been generally ignored as has the quince. Why not avail yourself of these opportunities?

—It remains for the fruit growers of tomorrow working with the partially developed product in hand, to see that the possibilities of this unique fruit are realized.