California Avocado Association. Annual Report. 1916. 2: 55-67

THE AVOCADO INDUSTRY AND THE AVOCADO ASSOCIATION.

PRESIDENTIAL ADDRESS.

Dr. H. J. Webber
Director, Citrus Experiment Station, Riverside, Cal.

GENTLEMEN OF THE CALIFORNIA AVOCADO ASSOCIATION:

It gives me great pleasure to have the honor of calling to order this Third Semi-Annual Convention of the California Avocado Growers' Association. This is a great convention of a great industry. In accepting the presidency of your Association, I was mindful of my lack of special knowledge of the avocado industry and of my inability to fill the position as it should be filled. In view of the action of the Association at its last meeting, however, it seemed wise for me to accept the trust and at least for a term serve the Association as best I could.

The short history of the Association is a record of success. The first meeting of the Association was an organization meeting only. The first and second semi-annual meetings, both held in Los Angeles, were large and important conventions, notable for their great interest and enthusiasm. This meeting, I am sure, is destined to be an equally enthusiastic and important gathering.

The success of the Association from the first was in very large measure accomplished through the untiring work and the enthusiasm of your retiring president, Mr. E. G. Hart, of Los Angeles. The Association owes to Mr. Hart a debt of gratitude that can only be repaid by a continued and maintained policy of developing and enlarging the Association to the point where it will fully meet the demands of the rapidly growing industry.

The Avocado Association was organized to foster the development of the avocado industry, particularly in California. This, as I understand it, is the broad aim of the Association. The Association will thus expect to be active so far as possible with all phases of the industry. In the present stage of the development of the industry, the greatest good is likely to be derived from the collection and dissemination of knowledge relative to the culture of the avocado, and for several years it is probable that the main interests of the Association will center on discussions of varieties, propagation, cultivation, irrigation, and like problems. Soon, however, we will be confronted with marketing problems and the development of markets. Indeed in this direction in my judgment, it behooves us to be at work continuously. To provide a market for our fruits, people must be taught to use them. We must recognize conditions as they exist. At the present time the avocado is known only to a few thousand people, and a large crop of fruits could not be sold to advantage. The greatest problem of all the problems before the Association is to educate a sufficient number of our people to the use of the avocado, to provide a market for the fruit as rapidly as our new plantings come into bearing.

Condition of the Industry in California

The avocado in California is such a new industry and interest in its culture has developed

so rapidly that only a comparatively small number of growers and nurserymen in the center of the activities have any adequate idea of the greatness and magnitude of the development in California. I quote the following statement from a publication of one of the best known avocado growers of Florida: "This tree (the avocado) is the greatest money producer for Southern Florida, and the people of Southern California have gone wild over it, even though they have to send to Florida for seed, grafts and trees." It is clear that this gentleman is not aware that California has already developed 10 varieties to Florida's one and that it has already been pretty definitely proven that our native California seedling varieties are far better suited to our climatic conditions than any of the varieties imported from Florida. We do not necessarily need their stocks and varieties, but we do desire to try everything they have available to be sure of keeping our industry in the fore-front of the advance.

The old seedling avocado trees in Florida and in California are in general of about the same age, but the planting of commercial groves began in Florida at least 10 years earlier than in California. In Florida the interest in commercial avocado culture began about 1900; while in California the first interest in commercial plantings can hardly be said to have started prior to 1910 or 1912.

In California even today our planting is very small and altogether probably does not exceed more than a total of 300 to 400 acres. In large part this area is of young trees from two to four years of age. The California industry is founded on the results obtained with a few trees planted in isolated places in dooryards, such as, the Chappelow tree at Monrovia and the Ganter tree at Whittier. The sale of fruits from some of these old trees, together with the sale of bud wood, has netted such fabulous incomes as to stimulate a gold fever interest. We must remember, however, that in the development of the industry the financial returns quoted from such trees are even more exceptional than California weather, and are a detriment rather than an aid to the industry. Even the present high prices of $5 to $10 per dozen, at which the best avocados sell, are liable to be misleading. The industry must be able to develop successfully and dispose of its products probably at one half the present prices, if it is to become a truly important industry in the state. That this is possible I am certain all of us are convinced. We see in the avocado a fruit of the highest food value, attractive, palatable, and easily grown. Under our normal conditions it is exceedingly productive and gives a very high food value yield per acre. It appeals to the writer to be just the type of product California has need-ed, as it will enable us to produce a much larger percentage of our own food, and its largest value for a number of years will be for our own home consumption. Indeed one of its most valuable uses will be as a home fruit. Every home yard should contain two or three trees of as many varieties, ripening at different seasons, in order to have a continuous succession of fruits. Rapidly, however, the fruit will become national in character as people learn to use it, and thus the Association will be confronted with all of the problems of a great industry.

Problems of the Industry Varieties.—Nowhere in the history of horticulture, so far as I am aware, has there taken place such wonderful advance in the development of varieties in so short a space of time, as has occurred with the avocado in California. A decade ago the avocado in California was known only through a seedling here and there in yards, such seedlings having been grown from imported seeds mainly from Mexico, Guatemala, Hawaii and Florida, the Mexican and Guatemalan seedlings predominating. Fortunately, the natural desire of Californians to demonstrate the wide range of tropical and semi

tropical products that could be grown here as novelties led to a considerable number of such seedlings being grown. Since the interest in the commercial culture of the avocado became acute, every nook and corner of the state has been searched for such seedling trees, and every promising seedling has been subjected to careful scrutiny and study.

The result has been wonderful, indeed, and far beyond any result that could have been predicted. The seedling trees have been found to be exceptionally variable in all important characters, such as, season of maturing, type and habit of growth, size, shape and quality of fruit, and the like. The range of variation exhibited is wonderful and is to be accounted for probably from the wide range of different sources from which the seeds were imported and the long years of accumulated variations that have been produced in the native home of the fruit through its extensive production as seedlings, without propagation by budding or grafting. It is fortunate for us at this stage that we are able to reap the benefit from these accumulated natural variations. Already over 50 of these promising native California seedlings have been given varietal names and are being more or less extensively propagated for planting.

The intensive interest in the development has also led several enterprising growers and nurserymen to secure buds from promising trees in Mexico and Guatemala to be grown and tested here.

While the result of this rapid development is highly creditable and of the greatest advantage to the industry ultimately, it nevertheless is accompanied with grave danger. Already we have over a hundred varieties to choose from in planting an orchard, and in almost no case have we adequate data and knowledge regarding any of them, to enable the planter to judge which are the superior ones. These new seedling varieties have been named and introduced mainly by various parties owning the original trees, and naturally each introducer of a variety believes it to be the best variety yet named. I would have scant patience with an introducer of a variety, if he did not believe his variety a superior one. These men, as a whole, honestly believe in their varieties. There can be no question of this. Yet we all know that we already have too many varieties and that some of them must be superior to others. The most important work of the next few years will be to determine which of these numerous varieties are the superior ones, worthy of general propagation. In the meantime much of the planting that will be put out must be determined largely on imperfect evidence and faith. I do not wish to draw this picture too dismal. There are a few varieties that seem to have been sufficiently tested so that we know them to be good. No one can say, however, that these will not be superseded in a few years by much superior sorts.

It is highly interesting and gratifying to note the continuous advance that is being made through the introduction of new sorts in extending the season of ripening of the fruit. The great desideratum is to find satisfactory varieties maturing their fruits in the winter during the period from December to March, inclusive. The general consensus of opinion seems to favor the so-called Guatemalan or thick-skinned varieties. The spring and summer is covered by a number of fairly good varieties of this type, but there are only a few early and late sorts from which to select. The Fuerte and Puebla, both imported varieties, are apparently among the most promising winter sorts, yet introduced, ripening their fruits apparently from December to February. The fruiting habits of these varieties as judged by several budded trees in each case are apparently very satisfactory, the trees being of good shape and prolific. Little is yet known in either case, however, about the peculiarities of the

fruit and its quality. Of the better known early sorts, we have such varieties as the Challenge, season February to May, Solano, season March to May, and the Spinks, season February to August, and Surprise, season February and March. Of these varieties the Challenge has a very large seed, the Solano is very low in oil content, and the Spinks and the Surprise have not yet been sufficiently tested to justify their general acceptance as standard sorts.

For early summer and mid-summer fruits, the two varieties that now seem to be in the lead are the Blakeman and the Lyon, with especial emphasis on the former. The Lyon while a good fruit seems inclined to overbear when young, which tends to weaken the trees, and again the tree is a tall, upright grower of a shape not now recognized to be particularly desirable. The Spinks variety mentioned above also extends into this season. The Dickey, the Miller, and the Monroe are other varieties of this period that are highly recommended by some growers. The Miller is one of the best flavored fruits we have and is rich in oil content, but its productiveness still remains doubtful. The Hartley, a new sort that is attracting considerable attention, is a large fruit, possibly too large to serve best the market conditions, and has not yet been fully tested. As summer and fall varieties we have the Taft and the Dickinson, both of which are among the best known and tested varieties. The Taft, season, May to October, is probably the best proven of all of our avocado varieties and may be recognized as a standard sort. The Dickinson, which is a very fine quality fruit, with thick, brittle shell, has retained a large part of its fruits this year in good condition up to the first of October, and a number of fruits have been preserved in good condition up to the last of October and are now, October 31, on exhibit in our fruit show. The Walker, or Walker prolific, should probably also be mentioned in this class. It is very prolific but not of very high quality. It, however, could scarcely escape mention, owning to the fact that the original tree has been one of the best paying trees in the state up to the present time.

As a late fall variety, the Sharpless has this season assumed a prominent place. The original tree has this year produced a fine crop, and a large part of the fruit has held on the tree in good condition well into December and some of it into January. It is a large fruit, averaging about one pound in weight, and of very good quality, with a comparatively small seed. The flesh shows some fiber, but not sufficient to be objectionable, and the skin is thick and brittle. As this fruit ripens, it gradually becomes a dark purple in color.

In the case of the Mexican types much advance has also been made, but the season covered is as yet more restricted. We now have the Chappelow, season, July to October; the Northrop, the Carton, the Topa-Topa, and other midseason sorts ripening from September to November. The Ganter and Harman are catalogued as having the period of ripening extending into December. From the few observations I have been able to make thus far, they do not appear to be appreciably later than the Northrop and the Carton.

It will be apparent from the foregoing discussion that already we have varieties giving almost a continuous succession of fruits through the entire season. It must be remembered by the reader that these varieties are mentioned primarily to show the range in variation in season of ripening, the names of the most prominent varieties being given in each class. The knowledge of varieties is yet too meager to justify a recommendation of any particular variety at the present time.

The experience with other types of avocados, such as the West Indian varieties and varieties from Hawaii, has in general been rather unsatisfactory, owing to their greater

tenderness. In does not appear, however, that the trials up to the present time have been sufficiently extensive to justify us in the conclusion that all varieties of these types will prove unsatisfactory. We must continue our search for improved varieties in all directions.

With the large number of new and almost unknown sorts being planted, it is highly important that growers make a specialty of keeping records of the pick from the different trees, in order to secure a basis of judgment of the variety. The following is a record of the yields of the original Chappelow tree during fifteen years, with other interesting data.

TABLE 1.

Record of Production, Original Chappelow Tree.

(Data furnished by Mr. Wm. Chappelow, of Monrovia)

Date	Total No. of fruits	Price per fruit	Price received net for fruit	Main Crop ripened
1902	300	10	$ 22.00	September
1903	380	10	32.00	September
1904	605	10	54.00	August
1905	575	25	130.00	August and Sept.
1906	235	30	65.00	September
1907	465	25	85.00	August
1908	1200	15	140.00	July and September
1909	260	25	60.00	August
1910	285	25	66.00	October
1911	1023	25	250.00	July and October
1912	350	25	76.00	September
1913	20 (freeze)			
1914	3215	18-25	404.00	September and Oct.
1915	1723	25	199.70	
1916	2861		218.00	Sept. to middle of Dec.

The above table not only shows the total yield for each season but also the months when the main crop ripened. It is exceedingly interesting to note that apparently the main crop season shifted in various years, showing a range from July to December during the 15 years.

Table 2 on the following page is a similar record of the Wagner avocado for the years 1915 and 1916.

This data shows very clearly a range of ripening season from March to June for the Wagner variety as illustrated by the original tree, but the budded trees might be found to vary slightly. Records similar to this should be obtained for all original trees and a few budded trees of each of our varieties.

It is also important to urge at this time the growing of further seedlings from seed taken from the best varieties as it is in this way that new and improved sorts are almost wholly produced. Much of our advance in the direction of better varieties will doubtless come through importations. In all of this development the keynote should be "safety first." No variety hereafter should be generally sold or offered for sale until it has been fruited for several years in California and is known to be promising in comparison with our known best sorts.

TABLE 2.

Yields of Original Tree, Wagner Avocado

(Data furnished by C. F. Wagner, Hollywood)

1915 Crop		1916 Crop	
Date	No. of fruits	Date	No. of fruits
March 20	8	February 1	1
April 1	8	22	1
2	2	23	1
8	6	March 1	3
13	130 (limb broke)	15	2
23	36	16	1
24	15	21	3
30	6	24	2
May 1	3	25	15
2	1	27	2
6	25	29	7
13	25	30	3
18	25	May 1	4
25	37	2	3
June 3	30	3	2
7	15	4	40
16	25	7	37
18	20	8	3
23	25	9	4
..	..	10	25
..	..	12	1
..	..	25	26
Total crop.....	442		186

Planting Problems.—The most fundamental problems regarding planting are yet in large measure a matter of guess-work. The commercial avocado orchards that have thus far been planted usually have the trees placed from 25 to 30 feet apart. The Chappelow, which is 22 years old, has a spread of about 60 feet; the Challenge tree, 19 years old, 38 feet, (Fig. 1); and the Taft, 16 years old, about 35 feet. One would judge from the nature of the avocado tree that a low spreading form of tree is to be preferred. Evidently thus, the distance of the trees in a twenty-five year old grove should not be closer than 40 to 60 feet. Whether a method of pruning can be found to keep them successfully within this size remains to be seen.

Certain varieties, such as the Lyon (Fig. 2) and the Perfecto, and the Carton that show a marked tendency even in budded trees to grow tall and columnar, not spreading to any great extent, will doubtless allow of closer planting. The original Dickinson seedling is also an erect, columnar tree with little spread, (Fig. 3), but young, budded trees seem to be as broadly spreading in habit as many other varieties.

It appeals to the writer that in planting avocados at the present time in commercial orchards, it would be a wise plan to follow one of two methods: first, to plant the trees in squares, 50 to 60 feet apart, with a filler tree in the middle of each square that can be taken out when the trees become so large as to interfere; or second, to plant the trees 50 to 60 feet apart and interplant with a supplementary, shorter lived tree crop, such as apricots, peaches, persimmons, fejoas, or figs. (See article on "Planting Plans" in latter

part of this report.)

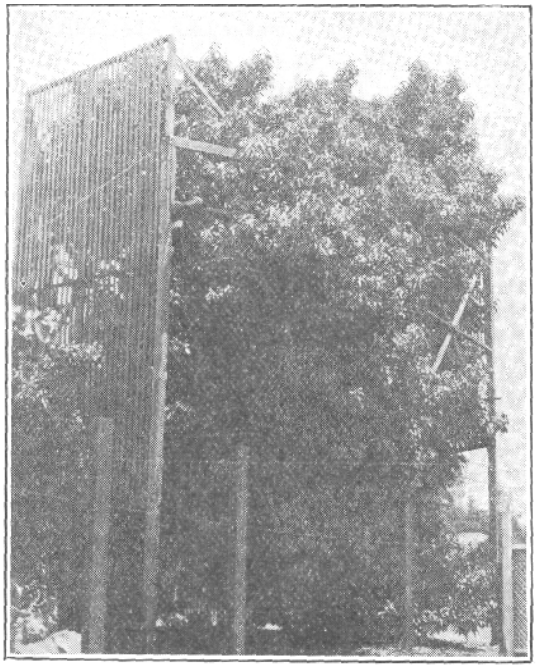

Figure 1.—Original tree of the Challenge avocado, Hollywood, Cal. Forty feet high and 38 feet spread. (Photo by H. J. Webber)

If trees are grown too close together so that they interfere, the trees will grow tall, and all of the crop will be developed in the uppermost branches rather than on the lower branches where they are desired.

Shaping the Trees.—The best avocado trees we now possess have been allowed in large measure to develop without any guidance. Like Topsy, they have "just growed," and thus we can derive considerable instruction from a study of these trees as to the different branching types and their desirability from a commercial orchard standpoint. The character of branching of the original seedling tree of a variety must not be taken as any sure indication particularly of the character of branching of the bud progeny, although it is much harder to make certain trees spread out than others. There is a certain variation between varieties in the natural branching habits. It is probable, however, that the main differences, good or bad, in the branching of the original seedling trees, is in considerable measure accidental and capable of great modification under the guiding hand of man. That young avocado buds may be trimmed and shaped to considerable extent has been fully demonstrated, I judge, as will be brought out in the papers presented at this meeting.

The natural branching of the Mexican and Guatemalan types of avocados, with which we are most concerned, is apparently of nearly the same general habit, but marked differences are shown by different varieties. In the Guatemalan group, the Taft is a particularly good spreading tree. This is shown by the original seedling and by the budded trees. The Lyon in the original tree is a tall, columnar tree, somewhat resembling a Lombardy poplar in habit and while this habit is doubtless over emphasized by the original seedling, still the budded trees of the Lyon show strong tendency to grow upright in this

form. The Perfecto is a tall, upright grower in budded trees, and judging from the original seedlings, the Carton and the Dickinson varieties might be assumed to be of similar shape. These latter varieties, however, in budded trees examined in various places give evidence of producing spreading trees similar in shape to the Taft. In some cases, as in door-yards, the tall, upright habit of growth may be a decided advantage, and trees of this shape can doubtless be grown closer together in grove plantings than spreading trees. Other peculiar characters may be exhibited by certain varieties. As an illustration, the Atlixco shows marked tendency to develop spreading candelabra-like branches. It is too early to say which of such characteristics are desirable or undesirable. It is important that growers carefully study such characteristics exhibited by the different varieties.

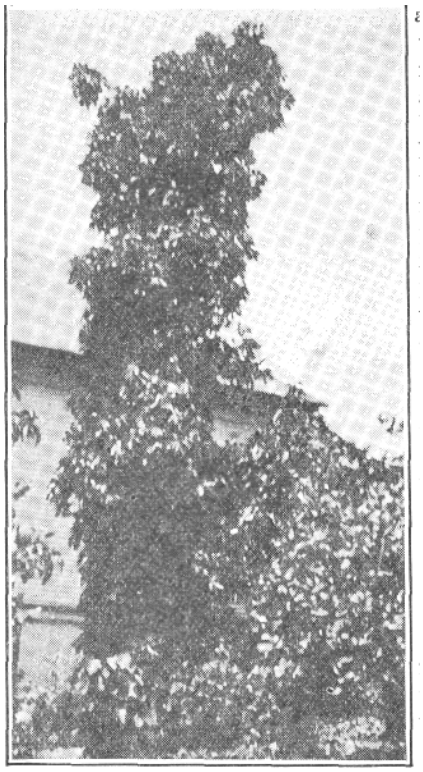

Figure 2.—Parent tree of the Lyon avocado. (Photo by H. J. Webber)

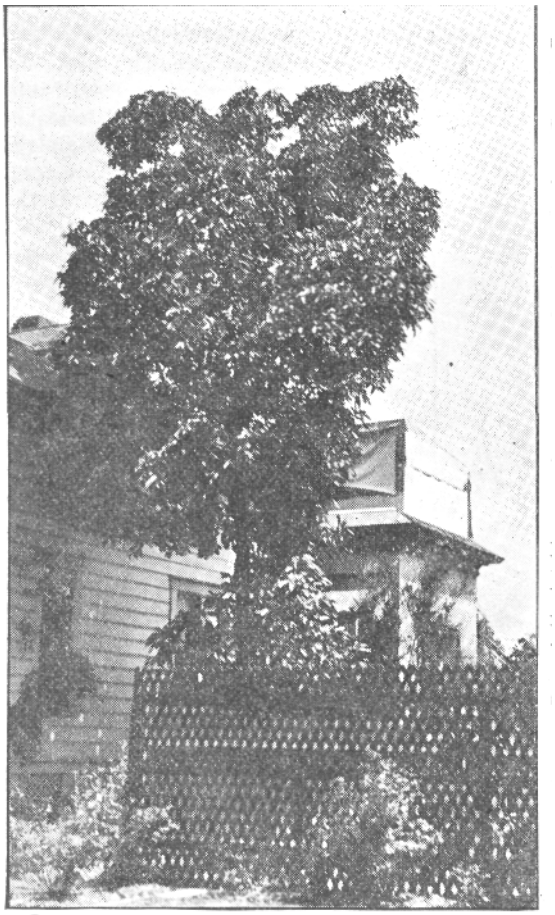

Figure 3.—Parent tree of Dickinson avocado at 679 West 35th Street, Los Angeles, Cal. (Photo by H. J. Webber)

The shaping of the young tree is apparently a very important matter and is certainly largely within the control of the grower. A study of the branching of a considerable number of trees including that exhibited by various original seedlings representing varieties has led the writer to the conclusion that the most desirable shaped tree is very wide, spreading, and low in height. The most satisfactory branches, it has seemed to me, are those that originate low down on the trunk and spread out at a wide angle. Such branches are easily supported by permanent props from the ground, and the fruit is borne near the ground,

where is can easily be picked. Fine branches of this kind are observable on a number of old trees in the state, and particularly on the original Taft tree.

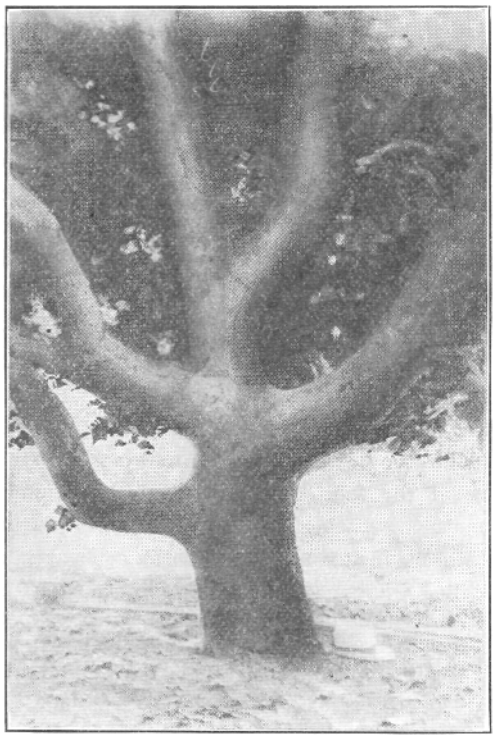

Figure 4.—Trunk of original tree of Northrop avocado, showing good arrangement of the branches. (Photo by Vaile and Webber)

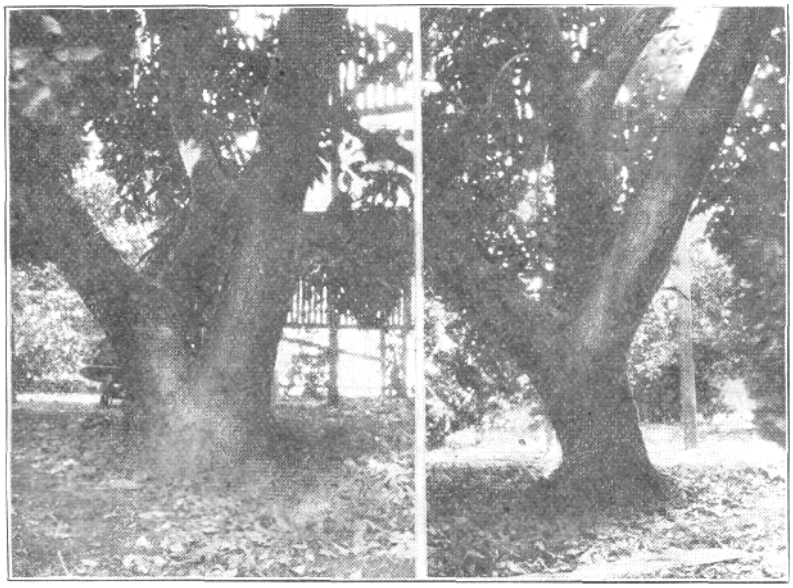

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Figure 5.—Two views of trunk of original tree of Royal avocado, with left branch of (a) in front, in other photograph (b). Right-hand branch in (a) not divided low enough. (Photo by H. J. Webber)

An almost ideal heading or primary branching, as shown in an old tree, is illustrated by the trunk of the original Northrop tree (See Fig. 4). This begins to branch about 2 feet above the ground, and the main divisions of the trunk are all within 5% feet of the ground. The

original tree of the Royal (Fig. 5) splits into two main trunks almost at the surface of the ground, and one of the main trunks branches again low down, while the other reaches a height of about 10 feet before branching again. The original Lambert, while a well shaped tree, shows heading rather too high, the four main branches springing from one point about 7 feet above the ground (Fig. 6). A very strong low-branch-trunk is shown in Fig. 7, which is a tree in which the branches have sprung from inserted buds. The original tree of the Sharpless has two main, branches that do not rebranch until they reach a considerable height, forming a poor shaped tree from which it is difficult to pick the fruit and which lacks sturdiness. This character is apparently entirely due to the fact that the tree was not shaped when young.

Judging from his study of branching, it seems to the writer that the tree should be led to throw out some branches rather low down, probably not more than 2 feet from the ground, and that the trunk should be headed at a height of not over 6 feet.

It would appear also to be important, as in citrus trees, to develop the branches so far as possible from points on the trunk at different heights, no two branches being opposite each other, in order to give greater strength.

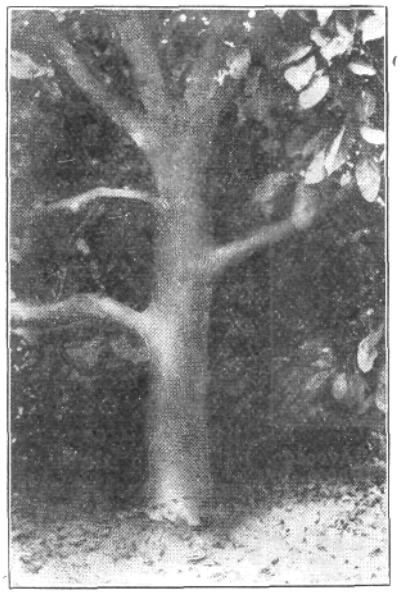

Figure 6.—Trunk of original tree of Lambert avocado with 4 main branches springing from one point about 7 feet from ground. (Photo by H. J. Webber)

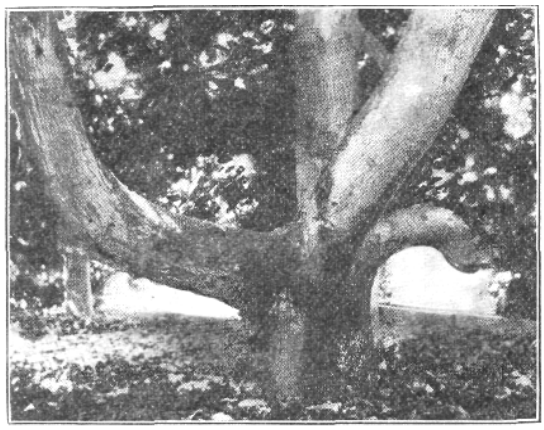

Figure 7.—Large, budded tree of Challenge avocado, branching very low, but satisfactory. (Photo by H. J. Webber)

Cultivation and Irrigation.—Little can be said regarding cultivation and irrigation, as we are here again confronted with inexperience. I have introduced this subject primarily to bring out one factor of the problem. The spread of the trees is such that in a mature orchard a large part of the surface will be covered and shaded. The land under such wide spreading trees must in a dry country receive attention. It would seem certain that it must be irrigated if good results are to be obtained. It cannot well be cultivated, as the limbs would interfere, and furthermore experience seems to show that it is far better not to mutilate and disturb the roots. It thus seems to the writer that orchards should be planted with the expectation of irrigating under the trees by the basin method, keeping the soil mulched instead of cultivated. The falling leaves from the tree provide naturally a considerable amount of mulch, which probably may profitably be supplemented by the

addition of some other material, such as, alfalfa hay. The practice of mulching in citrus groves is rapidly gaining in favor, as a method of soil treatment, and judging from preliminary studies it apparently serves to keep the soil in excellent physical condition. It is a practice especially adapted to the avocado and can probably be recommended for trial as safely as can any other practice with avocados.

If the method of mulching under the tree, with basin irrigation, is to be used, it may be desirable to know this when the grove is being planted, in order that the arrangement of the basins may be considered and the trees planted accordingly. If the land is sloping, as will frequently be the case, large, spreading trees of this sort may require four or more basins at different levels. In such cases the basins might possibly be better put in when the trees are planted or at least while the trees are still young, so that no large roots may be injured by leveling the soil in the basins.

The majority of groves that have thus far been planted are irrigated by the furrow method, as in the case of most citrus orchards. Much difficulty will certainly be experienced with this system, as the trees attain maturity, because the soil cannot be satisfactorily wetted under wide spreading trees by this method. If furrow irrigation is to be used, it would seem that permanent furrows that would not be disturbed by cultivation would require to be run under the trees.

Considerable has been said of the drip system of irrigation, where the water is supplied by a faucet placed near each tree, from which a small stream of water is allowed to run continuously and sink into the soil. This method cannot give a uniform moisture condition over the large area covered by the roots of the tree and will probably be found to give a very un-uniform root development. In a deep, loose soil, the water from a single faucet dripping in this way would probably produce noticeable effect only on a comparatively small portion of the soil.

Every subject concerning the avocado that we introduce for discussion is a new one on which little information is available, and the problems discussed by the writer are introduced primarily to show again how little we know about them and to emphasize the importance of all growers recognizing that they are conducting an experiment that is of interest to their fellow growers. Every grower should keep careful notes of every operation performed in his groves and observe and record the results. Every grower should consider it has duty to co-operate with the other members of the Association by furnishing periodically carefully prepared statements regarding his experience and findings. By such cooperation we shall soon reach a condition of understanding where now we are in doubt.