

SOME HERETICAL THOUGHTS CONCERNING THE IDEAL COMMERCIAL AVOCADO

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For the desirable characteristics of an avocado fruit, our best source of knowledge is the handlers. It is they, after all, who have to do the actual selling - who persuade the steely-eyed wholesale buyer that he should give up considerable amounts of money in exchange for the fruits that we have grown.

The buyer finds most other fruits cheaper than the avocado prices that we must receive if we are to meet our costs of production. We may insist that avocados are still a good buy. We point out their unique flavor and uses. We mention their unusually high vitamin and mineral content. I'm sold on that approach, and I find the handlers favorably inclined.

But the handlers in turn must deal with the buyer. And the buyer is more impressed by what shows. True, we can (and do) work through the eventual consumer to "build a fire" under the wholesale buyer. The consumer must be reminded of the exotic avocado flavor. She (the housewife who does the retail buying) must be informed of its remarkable nutritional qualities.

But the consumers keep building negative as well as positive "fires" under the buyer. And since his livelihood is just as involved as ours, the buyer is acutely conscious of his past experiences with our fruit.

So he (figuratively or otherwise) looks at the fruit that our handler is offering and says: "Too large!" (or "Too small." or "Too expensive" or "Too-some-thing-else").

Or, he harks back to a negative consumer reaction and says, "This variety didn't soften properly." Or perhaps it broke down too rapidly, or discolored around the seed, or something else went wrong. Even if the fruit offered only *looks* like a variety that produced consumer dissatisfaction, the buyer will be wary and our handler will suffer from guilt-by-association.

And the buyer has other criteria than just consumer preferences.

In our modern day of produce standard standardization, variation in size and shape and general appearance is uneconomic for the handlers. So the buyer may conclude that, even if a few consumers would prefer a smaller (or larger) size, or some other "atypical" avocado, his firm can make more money selling somewhat fewer avocados but of one or a very few types.

In all of this, the buyer reacts directly on our handlers. Their job quickly makes them experts on the ideal commercial avocado. They are on the firing line, while we growers

are manning the supply depots to the rear. If we want a profitable avocado industry we must listen carefully to the experiences and advice of our handlers.

Granting all of that, it nevertheless seems to me that shipper experiences must be critically analyzed in terms of the long-range good of the industry. For the very factors that make their advice so invaluable — their sharply competitive situation season after season and even month after month, with a difference of a fraction of a cent per pound decisive — makes it necessary for them to emphasize immediate or short-range returns rather than the possibilities several or many years hence.

Present handler experience must be the solid base for all thinking concerning avocado breeding aims. It seems to me that the future greatest good of the industry may require that we make some logical extrapolations from that base. Some tentative suggestions follow.

Larger Size

The latest official written recommendation appears to be that of the Variety Improvement Committee of the California Avocado Society (Loren J. Mead was then the Chairman), in a mimeographed list of avocado desiderata dated 1956. This recommended a size of 6-12 ounces.

A few weeks ago, at the most recent meeting of the C.A.S. Variety Improvement Committee, the highly expert J. S. Shepherd raised the lower limit a bit by recommending an 8 to 12 ounce size range.

This is still considerably smaller than the preferred size in most regions where avocados are consumed on a large scale, such as Hawaii, Cuba, Puerto Rico, and Florida. The fact that the market prefers relatively small California avocados has at least six explanations.

In the first place, production in this state has increased over the past four decades from almost nothing to about fifty thousand tons per year, making it necessary to reach a rapidly widening circle of consumers — most of whom were totally unfamiliar with the fruit — with a product that adult consumers seldom consider to be very-palatable when they first taste it. Smaller fruits make possible lower prices and so easier introduction.

Associated with this is the high price relative to most other foodstuffs that California avocados have commanded until recent years. Again, smaller fruits sold by the piece meet less price resistance.

With most buyers consuming only a small amount of fruit at each meal, and since the cut pulp surface tends to discolor and deteriorate quickly, large fruits may result in waste.

The major single United States market, Los Angeles (Sullivan, 1947), has always favored small fruits because of the strong Mexican influence in that market.

Over the past 30 years, a variety with fruits that average only about 10 ounces, the Fuerte, has accounted usually for about two-thirds of the total California crop. The excellent quality of this dominant variety has served to popularize the avocado and, at

the same time, to prejudice consumers in favor of a Fuerte-like fruit.

The American housewife is more calorie-conscious, and the American diet more varied, than in most neighboring countries. Both situations favor a smaller avocado fruit size.

And the restaurant trade, which might have been expected to lead the way toward larger fruits, has usually found it simpler to standardize on a necessarily smaller size for all of its needs.

These various explanations indicate that the present market preference for small California avocados is only partly inherent in present circumstances. In part, it reflects previous conditions. In part, it represents merely an historical accident.

Larger fruits have economic advantages: their cost per pound for picking and handling are lower; the proportion of waste skin to edible flesh is lower; the proportion of waste seed to flesh averages lower in the larger California varieties; proportionately less work is required of the homemaker to prepare larger fruits for such purposes as salads.

Each of these advantages was of little importance when the avocado was a costly luxury food in the United States. Each assumes steadily greater importance as the avocado becomes a food staple.

Hence, it seems to me that a somewhat larger fruit size may be preferable. How large? Handler experience will of course be the ultimate test. I would think that the MacArthur and the new Reed varieties might exemplify a useful size. Even the average Nabal size could have a place.

It may be desirable to market fruits of at least two basic sizes, as represented by the Fuerte and the Nabal respective averages. Rada (1953) concluded that "marketing various-sized fruits is one means of increasing avocado sales, inasmuch as consumers have different size preferences."

This would conflict with the desire of retailers to standardize on one size with as little variation as possible (Bouchey, 1956). But a bimodal size situation with perhaps only four important varieties would at least be a great improvement in standardization over the present situation of numerous, diverse varieties.

Consumer resistance to large size because of cost could conceivably be reduced by switching from piece to weight selling, at least for the larger fruits. The approach will become more feasible when new varieties with heavier and more consistent yields make it possible to reduce production costs per pound.

A nation-wide sample of homemakers in 1957 was asked what size fruit each would choose. Nine times as many expressed a preference for "large" as for "small" fruits (Hochstim, 1958). In part, this probably reflects piece selling with one price for fruits of different size.

However, an actual test of the relationship between avocado size and amount of fruit purchased, with fruit priced according to size, was made in the fall of 1958 in Philadelphia (Brooke, 1959). The three tested sizes averaged 11, 14, and 18½ ounces. They were priced so that cost per ounce was nearly identical; the smallest size was very slightly cheaper per ounce. Yet total purchases in weight proved also nearly identical — with the smallest size selling actually very slightly less fruit.

These results do not agree with those generally obtained by the major California handlers (Sosnick, 1962). Presumably the reason is that the Philadelphia consumers are more accustomed to the larger Cuban and Floridian fruits, while the important markets for California avocados are used to the Fuerte standard. So the indication is that the more economical larger sizes are discriminated against largely because of lack of familiarity.

Even with the Fuerte, fruits in the 8 to 12 ounce range do not necessarily bring the highest return per pound. For example, the 1960-61 records of the Calavo marketing organization show that, in the fall when volume was low and prices high, small fruits (under 6½ ounces) usually brought a higher return than medium-sized fruits (6½ to 12 ounces), and the large fruits (over 12 ounces) returned least on a weight basis. But over the main Fuerte shipping season this was reversed: for each of 11 shipment pools, beginning December 25, 1960 and running to March 15, 1961, the largest fruit size obtained the highest price on a pound basis. Evidently, when prices are moderate, even Fuerte consumers prefer a larger size.

Hass fruit weight averages a little less than that of Fuerte. The smaller Hass sizes are encountering marketing problems.

Moreover, as trees age, average fruit size declines — which means an increasing future problem re small Hass fruits. The figures that I have heard indicate that Hass nursery trees are now outselling all other varieties combined. A variety with larger than the "optimum average" fruit size could provide a useful marketing balance for the expected increasing proportion of below-optimum Hass fruits. And small Fuertes will be an added consideration indefinitely.

In any case, the decline of fruit size with tree age means that one should select a little larger than optimum size when examining young seedling trees for possible commercial value.

However, large-fruited avocados in California are of chiefly Guatemalan ancestry and so are less hardy to heat and to cold (Hodgson, 1947), and to low humidity (Oppenheimer, 1947). If population growth forces California avocado production into areas that are less favored climatically, it would be somewhat more difficult to develop new varieties with large fruit size as well as greater hardiness.

To evaluate the relative importance of these various opposed forces is not easy. Nor can future trends be predicted with certainty. In selecting from our seedling progenies, we favor fruits that are in the upper Fuerte range, with a projected mature commercial tree average fruit size of 10-12 ounces. We also select for further testing good seedlings that have somewhat larger fruits. And, as a hedge against unanticipated future developments, we even select a few of the best smaller-fruited seedlings!

A More Round Shape

Shape is analogous to size, in that the Fuerte standard may not be most desirable for the industry in the long run. In fact, the situation is more clear-cut with respect to shape, for here there is no intrinsic reason why the Fuerte type should be preferred by consumers. The Fuerte fruit is obovate to pyriform; that is, it has a neck with somewhat

of an incurving or concave form.

Round fruits are easier to pack. They have a lower skin: pulp ratio. These again are not important considerations for an expensive luxury fruit; both become of concern for a staple food.

Still, it may be questioned whether or not they are together consequential enough to compensate for the handicap of a non-Fuerte shape. Hodgson's (1947) belief that "the California avocado industry would do well to capitalize on the enviable reputation in the markets established by its major variety, Fuerte" is as sound today as ever.

But because of its poor bearing record, the Fuerte will probably have to be replaced. A change from green to black fruit color is of greater marketing consequence than a change from pyriform to round shape; the present market acceptance of the black Hass variety shows that major switches in consumer purchasing can be made, and the Hass "has itself helped to prepare the consuming public for high quality avocados of differing appearance" (Bergh, 1961).

Results from consumer surveys have been inconsistent. In the study in Dayton, Ohio (Manley and Godwin, 1960), the interviewed home-makers were each shown photographs of three shapes: round: Fuerte-type pear; and the more squat pear shape represented by the Florida variety, Lula. Only 12% of the homemakers sampling had no preference, and nearly all of the remainder preferred one of the pear shapes. But an evaluation in Philadelphia (Brooke, 1959) of actual purchases from two adjoining bins with fruit of equal size and price showed that round fruits outsold pear-shaped ones by about 20%; the difference was not statistically significant. Differing results in different cities indicate that any existing shape preferences are due to prior familiarization. Since about 75% of all American homemakers had not purchased avocados during the year preceding a recent survey (Hochstim, 1958), and only 5% served them as often as once a week - compared with 13% who had never even heard of them -- it is evident that the United States represents still a largely undeveloped market for avocados. Hence, it seems desirable to introduce new consumers to the advantageous round or ovate-round shape, if such a fruit is available in a variety that is in total economic potential the equal of any other variety in California.

If a round-fruited selection appears to be superior to any alternative variety in over-all market rating, apart from shape, we would consider such a seedling worthy of thorough testing by the trade.

Certainly, the high esteem in which Fuerte is held by present markets is a valuable asset to the California avocado industry. But, from another point of view, the very virtues which have made the Fuerte so outstanding have perhaps caused too much emphasis to be placed on such an irregular-bearing variety. This may have resulted in too high a proportion of Fuerte plantings in the past. It may also result in too much circumscription of variety improvement in the future. The choice may be between slightly higher profits in the short run and much higher profits in the long run.

In our seedling operations, we regard any shape from round to ovate (egg-shape) as perfectly acceptable. Hence, we regard such round-fruited varieties as Nabal or Murrieta Green as favorable examples. We like the Reed shape, also such ovate-fruited

types as Hass or Bacon -- actually, egg-shaped avocados are generally "obovate," in that the greatest thickness is toward the distal end of the fruit. Variations of the basically ovate shape are exemplified by the nearly elliptical fruits of Anaheim, another acceptable type.

The Fuerte fruit we regard as often longer and more necked than would be ideal.

Smaller Seed Size

The argument has been advanced that the typical American housewife of today is no longer sufficiently price-conscious to notice or really care about the relative seed size in the avocado that she has purchased; that in our affluent society such basic concerns of the depression years as cost per edible unit and proportion of discarded waste are no longer important motivations.

Certainly there is evidence of this major change all around us, including the amount of food that ends up in our garbage cans. And the trend will doubtless continue --as "creeping opulence" moves the American standard of living ever upward.

Moreover, doubtless there is many a housewife who (consciously or subconsciously) is glad for a large enough seed cavity to hold the added foods that she wishes to place therein, when that is the way that she is serving avocados.

And there is doubtless truth to the suggestion that large avocado seeds may actually increase sales: by causing the edible portion to be finished sooner, and so causing the "avocadophile" to make an additional purchase sooner.

But I am not fully convinced.

In the first place, millions of Americans are still on a poverty level. Present political, economic and sociological trends do not indicate that we as a nation will soon take the steps necessary to solve this problem. Such people are especially in need of the high nutritional benefits of the avocado. True, such people (except for those of Mexican-American derivation) are unlikely to ever buy avocados. But one of the two major reasons for this is their high cost per edible unit — the very factor that is the chief argument against large seed size. The second major reason, lack of familiarity with the avocado, is perpetuated by this same high cost. I would like to hope that by developing new varieties with increased (edible-portion) production per acre I can reduce the production cost per edible unit, thereby simultaneously strengthening the economic position of the avocado grower and making it possible for additional Americans to benefit from eating this remarkable fruit.

Also, I am not convinced that all affluent Americans are that indifferent to relative food costs. My own "homemaker" has established for herself an upper level of 12c per pound, with 15c as the exceptional limit, when purchasing fresh fruits or vegetables -- with the actual edible portion the determining factor. (This would of course rule out avocados for us. but we eat large quantities of my seedling fruit as part of breeding work taste testing — most of these seedlings being quite edible, although some are not very palatable. If I should for any reason leave my present work, we would have to "bend" our 150 limit for at least an occasional avocado!)

It is dangerous to judge others by oneself. But in my circle of acquaintances there are housewives who do careful comparison shopping and give more or less careful attention to such matters as proportional waste.

Nationally, rumblings of discontent at the high cost of food is heard periodically. (The shrinking proportion actually received by the farmer is another matter). Some housewives have even organized buyers' strikes.

Referring specifically to the avocado, a nation-wide survey (Hochstim, 1958) asked homemakers, amongst other things, to specify what they found objectionable about the avocado. Many factors were mentioned, with the flavor (or alleged lack of it!) a major complaint — which is natural when such an exotic fruit is being introduced to people of all ages. But the chief complaint leveled against the avocado by users was its expensiveness. This is aggravated when the housewife cuts upon the fruit and observes a large body of refuse, the seed.

In fact, with some people seed size may have an importance beyond its actual monetary cost. They are bothered by the very thought of how uneconomic it is to transport refuse clear across the country -- especially when the size of that refuse is so large when compared with, say, a plum or peach pit, or some grapefruit seeds.

In any case, I am convinced that the average American housewife is more price conscious than a simply disregarding of avocado seed size would imply. Whether from deeply-ingrained feelings of stewardship, or from less altruistic concerns with her own self-image as a good homemaker, or from simple motives of self-betterment, I think that she has a concern with "getting her money's worth" that we dare not ignore.

When a housewife purchases an avocado with a big seed. I think that there may be less chance of her purchasing another avocado sooner (because she has used up the first one) than that she will have greater reluctance to make the next purchase (because of the various unfavorable ramifications of large seed size).

In making our seedling selections, we operate on the principle that "the smaller the seed, the better." However, this factor is not given undue weight: a seed proportion comparable to Fuerte or even somewhat larger is not in itself sufficient cause to reject a seedling.

Richer Flavor

In an article prepared for publication a couple of years ago, I suggested that the very rich California avocado flavor (preferred by most of us who really know the fruit) might actually be a barrier to its introduction amongst the majority of the "unfortunate-uninitiated" in these United States. "There may be a place for one or more varieties with a more delicate, nut-like flavor — with a less buttery taste, and perhaps fewer calories."

Most adults tasting the avocado for the first time find its unique flavor somewhat unpleasing. Hence a less strong flavor can make it initially more palatable, whether eaten straight or submerged in appropriate other foods.

At the time that the above views were first expressed. I did not know that anyone else was thinking along similar lines -- those views seemed to be the heretical ones. But

recently such experts as Jack Shepherd and Frank Gilkerson have expressed rather similar views — that a rich avocado flavor is not a necessity and may even hurt sales. As I paraphrased Mr. Shepherd's comments at the most recent C.A.S. Variety Committee meeting: "A rich flavor will delight us who are accustomed to eating avocados, but may repel the person trying one for the first time — a milder flavor may be easier to introduce to the majority of potential consumers."

So now if I wish to be heretical I have to "reverse the field" and argue the other way again!

I think that a good case can be made for the opposite point of view. Nor is this illogical or mere contrariness. For a "heresy" has been well described as a truth so exaggerated and one-sided as to lead to error. In all of life — and certainly in growing and selling avocados - it is important to keep all aspects in mind, and not to over-emphasize any one side. Since the case for milder avocados is now well presented, let us look at the opposite side.

In the first place, many people who are not at first impressed favorably with the taste of avocado, object not to any strong flavor but in fact to the reverse: too bland a taste. They express a desire for more sapidity.

These two viewpoints may not be as opposed as they seem superficially. A savor can be definite and pleasing without "coming on too strong." Hence my earlier description of the possibly advantageous milder flavor as "delicate, nut-like."

This can be illustrated by contrasting the Emerald variety with our Yama seedlings. The Emerald as grown at Riverside commonly has so strong a taste that even avocado connoisseurs find it too much. Many of our Yama seedlings are also far from bland, but their sapidity is a highly pleasing blend including anise overtones.

I believe that this Yama flavor would be more successful in attracting and holding avocado consumers than, say, either the rich taste of Hass or the bland taste of Zutano — although the former is surely to be preferred to the latter. How successfully this savor can be incorporated into commercial avocados for later in the season we do not know. We will certainly try.

On a more basic level, beyond the original introduction to a new consumer, and beyond what can be profitably sold in a developed market right now, future consumer enthusiasm requires superior quality. I doubt that the usual flavor of the Zutano or even Bacon varieties is such that they make a good foundation for a permanently prosperous avocado industry.

In this respect, I feel that flavor is akin to seed size — repeat sales will inevitably be helped by higher quality.

True, flavor is a much more subjective factor. So the ill effects of relative insipidity may have more exceptions and delayed manifestations. In the long run I'm afraid that the consequences may be more harmful to the industry. Maximum consumer satisfaction is the cornerstone of any enterprise.

The question arises as to how important pleasing flavor is in comparison with the other fruit desiderata. Over a half century ago (Brackett, 1907), it was stated that "formerly

quality in fruit was the chief consideration and fruit was grown for local markets. Now appearance, productiveness, shipping and keeping quality are the cardinal points of the compass of commercial fruit culture."

Certainly the emphasis on these last four properties has increased in recent years. This has been a necessary result of modern fruit marketing methods. Indeed, the avocado is an excellent example.

But it is my opinion that the unavoidable tendency for quality to become relatively less important as other requirements assume greater importance should be consciously resisted. Inferior quality has less direct consequences when producer and consumer are more separated in space and time, but I believe that the consequences are just as inevitable.

There is a difference here between short-range and long-range advantage. We emphasize the long-range view. Hence, flavor and other quality factors are major considerations in our seedling evaluations.

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