

Stock affinities are also likely to prove important in their utilization.

Disease resistance, especially resistance to scab, is still to be tested under different climatic conditions. Co-operative tests to determine the influence of these factors have been arranged in typical citrus soils and areas of Florida. These tests within a few years, we believe, will show which variety or varieties will suit local conditions and which, if any, other possibilities for growing on a commercial scale.

Dr. David Fairchild: I wish to announce that I am a tangelo fan, and I would like to tell this. When Dr. Swingle and Dr. Webber established the citrus garden at Little River, I didn't dream I would be dragged into the game as tester of 4736 crosses that grew there in that remarkable citrus collection, but I had permission from Swingle or Robinson to give him a report on these fruits. I think Mr. Brooks, I am not quite sure, joined this party. There were three of us walked down one row and up the other. It took us two days, and we were there from early in the morning until late in the evening, and I am very proud of the fact that I succeeded in tasting the other two fellows out of it and remained at my capacity to absorb. It was a very amusing experience, and I thought when I came here this

winter I was through with testing but there arrived a box of twenty-five new ones, and it took me a week to test them, and I assure you gentlemen that its time that you took these seriously. I don't mean in a commercial sense as outlined in the discussion this evening with regard to the amount of acid and alkalinity, but in your own gardens. The taste of the tangelo is to me more interesting than the taste of any other citrus fruit. I know there are a good many people that don't agree with me, but that doesn't make any difference. I can assure you that as a breakfast fruit and as a drink the tangelo is something you have got to figure on. If you are going into the market with something new Mr. Robinson has presented you with something new, with which you should begin by planting a tree or two in your own yard and getting acquainted with it. I have a collection on my place at Coconut Grove. The game of testing these, and becoming familiar with their uses is a strongly interesting game.

Mr. Brooks, Miami: I want to say that I think you will all agree with me why the work that Mr. Robinson has done is of such great interest to others than myself. If there is anything we like to do it is to have a look-in on something new, and with Mr. Robinson's trips here it has always been with great profit, when it has been my pleasure to hear him. I am sure you have all found the same thing of Mr. Robinson's work, and his reports of his work.

GRAPEFRUIT EXPORT

By Mark Hyde, Refrigeration Engineer, Jacksonville, Florida

Yesterday, in my paper on grapefruit distribution I endeavored to develop that the immediate future threatened crops twice as great as can profitably be marketed under present methods of distribution; whereby the industry loses the whole of the summer demand, both at home and abroad. I also went on record that, were the grower, packer and refrigeration engineer to work together, the problem of over-production, or more properly under-distribution could be solved by

picking the choicer portions of the crop prior to April and holding for a summer outlet.

Gentlemen, if you do this, it will be the greatest step forward the grapefruit grower has ever taken. If you don't, there is no hope on the horizon, and I've spent too many years analyzing marketing problems, and the last five years on this one problem alone, not to know whereof I speak. You can, through summer distribution, double the tonnage now possible of profitable

sale, or you can sit idle and let Texas cater to summer demand at home, and South Africa abroad, and, by establishing their brands when the public actually wants grapefruit, so establish their prestige as to further weaken your winter demand.

No jobber or retailer is very keen on any brand he cannot guarantee steady delivery of; no buyer can be educated to insist on such a brand, and its advertising is mostly money thrown away. You have no conception of the research lengths to which South Africa is going to overcome the evils of on again, off again marketing—and she is rapidly solving them in the hopes of so serving England and the Continent her grapefruit will become the standard. The Strachan Shipping Company, since 1927, has been a firm believer in the feasibility of building a splendid export outlet, were direct sailings from Florida to Europe possible and provided. Our president, Mr. Frank Strachan, in that year deflected a fleet of refrigerated English ships from a profitable apple movement to an experimental season between Jacksonville and Liverpool. His belief that fruit shipped direct would arrive in so much better shape than possible by rail to New York and water over, was justified to the extent that the first two trial cargoes of 5,000 boxes each topped all competition by twenty-five cents per box; and a total of seven cargoes, amounting to 37,000 boxes, found a profitable market. This in the face of no reduction via New York, and no advertising whatever in England.

On the strength of this, and without the guarantee of a single box for the next season, he invested several hundred thousand dollars to provide specially refrigerated fruit vessels operating under the American flag, and the 1928-1929 season saw 250,000 boxes handled direct. Still, with no reduction via New York, no advertising and no summer movement. Last year, the fly pest reduced the tonnage to 56,000 boxes, although ten times this amount could have been absorbed as profitably abroad as it was at home.

For the past four seasons, including the present, this movement has been highly unprofitable to the water interests, owing to its irregularity and shortness, yet Mr. Strachan has gone ahead and spent another \$50,000.00 in research work to

prove that fruit could be held for Summer distribution and that when held, a profitable export promised. I mention all this that the industry may see to what extent the water interests have co-operated in the past, and to show how they have anticipated, with no guarantees, your need, and, to reiterate the statement recently made by our Vice-President, Mr. R. W. Graves, at Washington, "as the business develops, the grower may feel every assurance facilities to care for it will be provided."

How best the grower, water interests and foreign distributor can co-operate to make export the success it promises has been my study from the beginning. Four trips abroad, the last covering from November to April of this year, with five seasons of storing fruit in blocks of ten to over fifty cars a season at representative warehouses in the United States, Canada and England, have naturally permitted the gathering of a fund of useful information, all of which is available to the industry free of obligation of any sort; and the balance of this paper will be occupied with as much of that data as time permits.

THE ENGLISH GRAPEFRUIT MARKET

After a full survey with Independent and Exchange Brokers, representing over ninety per cent of the imported tonnage of citrus from Florida, I feel conservative in estimating the English demand, backed by an export brand and advertising, will absorb within two years, fortnightly, direct cargoes to the south of England and monthly to the north of England, of 16,000 boxes each from December to March—with average returns of sixteen shillings; and weekly cargoes to the South and fortnightly to the North of the same capacity from March to July inclusive—with average returns of twenty shillings. The market will show a consistent rise in volume and price right through July, reaching a peak about August first—at which time South African grapefruit, an Empire grown product comes in, and policy dictates Florida step out. And this tonnage should be possible of doubling or trebling inside five years if the three interests referred to co-operate as they should.

Florida starts exporting just as the English climate becomes too cold and disagreeable for any

demand but hotel, restaurant and the fancy trade. From November to late February temperatures range between thirty and forty-five degrees; with a majority of the days dark and disagreeable from rain, snow or fog.

The average English home is not furnace, or centrally heated as in America. The family dresses and washes in cold rooms with cold water; and nature demands a hot, heavy breakfast. Grapefruit has no place on such a menu, and has, so far, failed to reach the enormous markets offered by the poor and middle classes.

Another factor tending to discourage either a good demand or price is that early grapefruit from Florida are of the seedy varieties; low in juice and sugar content. Due to being picked early in the season, with no opportunity for sun curing the rind, this fruit, when held over a few weeks at low temperature, develops a disfiguration known as 'Storage Pit.' The combination of an unattractive surface artificially colored, and a sour juiceless meat logically results in curtailed demand.

Seedless fruit has a tough, fully cured rind from a long winter on the tree, has a high sugar and juice content, and is the best variety for export. Yet, if this fruit be left on the trees after March, it grows too large and becomes over-mature for summer distribution; and so to date the export market sees but little of Florida's good fruit. The only accountable reason for the happy growth of the movement to date is that Florida seedlings are about on a par in juice and flavor with the South African product that goes off the market as the former comes on.

In years, such as the current, when no late bloom fruit blossomed and the season came in early; seedless varieties reach oversize for export before that demand even opens, and the season's movement becomes a failure unless arrangements be made for picking and assembling such fruit before it reaches oversize.

English brokers are shrewd enough to realize that high returns on early arrivals create a wave of enthusiasm promising good volume later; and growers may receive fictitious returns at the beginning to insure later over-shipping, and to win their season's favor to brokers with none but their own personal interest at heart. This condition

often arises in November and December, and leads shippers so benefitted to refuse aid to any propaganda tending to limit too early a movement of under-ripe, artificially colored fruit.

The market is controlled by thirty-three receivers in port cities, who, through their associations, handle the entire distribution to over 4,000 major retailers. These, in turn, are interlocked for mutual protection by their association.

The costs of producing and marketing grapefruit in England show that sales at sixteen shillings (\$3.82) are more attractive for 80's and smaller than domestic markets offer.

Summary of Costs:

Growing, allow per box	\$.50
Picking and Packing .....	.70
Transportation to Jacksonville .....	.25
Pre-Cooling at Jacksonville .....	.12½
Wharfage at Jacksonville .....	.04
Transportation to England	1.00
Insurance .....	.03

American Costs	\$2.64½
Port Charges, London .....	.12
Cartage to Covent Garden .....	.06
Porterage at Covent Garden .....	.06
Average Jobber's Margin, 7½% gross .....	.30
Average Distribution Costs to Retailers .....	.12

English Costs	\$.66
Total Costs	\$3.30½

From the above figures it is obvious that under the poorest of export market conditions growers are assured growing costs. Nor should the benefit accruing home markets from elimination of off-sizes be overlooked.

It is interesting to note that at sixteen shillings wholesale for 96's and 126's, retailers can afford to sell at six cents (three pence) each, and allowing five per cent waste, net \$6.35 average per box; or sixty-five per cent margin. This is satisfactory to them and in line with their other fruit buys.

Three-pence, during the Winter, promises an attractive retail demand and the estimates given earlier should be exceeded.

During the summer an eight cent (four pence) average would also assure the estimate given as conservative.

Any thought that England offers a prospective dumping market for a large tonnage at prices below cost of production shows a gross ignorance of their protective policy. As long as Florida maintains an orderly marketing program from December through July, and at prices not disturbing to production costs of South African grapefruit, just so long may she expect enjoyment of their markets.

The present feeling in Florida that English receivers take too large a remuneration for services rendered is unjustified. Retail stores are invariably little more than cubby-holes. Most of them can handle not over two boxes at a time, no matter what the price inducement, and receivers must carry the bag. This, in turn, shows the need of bringing distribution into as few hands as possible; for, until it is done some receivers are certain to become weak-kneed with the arrival of every large cargo, and dump enough of their allotments to force a lower level for all.

SUGGESTED IMPROVEMENTS IN DISTRIBUTION SERVICE

The following suggestions, if adopted, would have a most beneficial effect: (a) Encouragement of an exclusive export pack and brand based on English Auction grading; not on U. S. No. 1's and No. 2's, as at present. The latter (No. 2's) are simply a mixed pack; which in many cases under English grading should be No. 1's, and the grower needlessly loses.

A standardized export brand for 80's and smaller only, should replace the dozens of brands now shipped—and all of which can be bought on New York Auctions. California ships but one brand of orange (Sun-Kist) and is successful in sales and receipts. South Africa, with over 600 brands of grapefruit, like Florida, is doing herself much harm; neither have any standardization and neither merit nor hold the Auction's confidence.

(b) The letters "U. S." or words "United States," should be given as little prominence on packages as the law permits. There is a strong educational campaign on in England to influence the buyer in demanding Empire Grown Products. Posters and newspapers preach it wherever one turns, and every effort to keep out of the lime-

light of this Government fostered campaign should be made. Florida now has a bad reputation, owing to suspected past dumping practices, and would receive scant consideration were she to force undesirable notoriety on herself. Fortunately, her season need not conflict with South Africa and I believe it policy to make it a point not to attempt interference by August deliveries of summer held fruit.

(c) Growers should be induced to reduce the present high bulge to not over two and a half inches, and eliminate the use of collars.

It is a physical impossibility to deliver a high bulge pack free of cut and bruised fruit along the top rim of the box. Juice from such fruit flows to the collars (made of soft absorbent paper) and from the collars is distributed along the upper side boards. These are stained and wet on arrival, and the refrigeration often blamed.

(d) Box covers should be of slat rather than solid board construction. Better ventilation, refrigeration and inspection facilities are provided, as well as a saving in first cost for covers.

(e) A proportion of every cargo should consist of half-box packages. These will prove a good week-end inducement to the buyer and should materially swell volume.

The use of slat covers on half-boxes of unwrapped fruit permits inspection of every piece without opening, and protects the retailer from returns.

(f) Tissue wrappers should be eliminated on current shipments. They retard refrigeration and inspection, and are strongly objected to by English retailers with stores too small to permit accumulation of waste. Buyers will not purchase sight unseen, and fruit is never displayed in the box; always on shelves and unwrapped. Shelves are usually the window itself;—that is all the average establishment consists of.

Savings effected in wrappers and collars would off set the added cost of two half boxes versus a whole one.

(g) The Spanish practice of using 120 pound, three cubic foot boxes, with two partitions, for smaller sizes merits a trial in Florida. The small retailer can handle not more than two boxes and prefers those as large as he can physically manipulate.

All these suggestions are self-evident. You can subscribe to them and still maintain your own identity; except the packing under one brand, and the agreeing not to permit that brand being offered for any but direct export movement. The success of export stands or falls by your decision here. Fighting hasn't accomplished much in the domestic dilemma; so why not profit by past experience and in this new venture deal a fresh hand and work together for the good of the whole?

The Exchange has a splendid sales organization abroad in the house of S. B. Moomow & Co. The group of Independents who have furnished the bulk of the tonnage also have a splendid outlet in the house of Roberts Brinning & Co. Both operate on the same lines and both are protecting the shipper to the limit of creditable salesmanship; That side of the triangle offers no difficulty, and there are only two other sides—grower and transportation company.

So far, every Independent I've talked to, (referring to four of the largest,) has been agreeable to the formation, and participation in, an export company for accomplishing this purpose, as well as putting over an advertising program and such other precautionary measures as promise success to export. The Exchange management assures every co-operation and, so, Gentlemen, this side of the triangle also promises solution.

Were such a Company formed, the majority of export tonnage would come under its control, and limits could be set on every broker on every auction as to the amount of fruit he might offer each day; as opposed to present practice, in which every grower whose fruit reaches more than one broker (and most of it does) becomes his own competitor by the token if either broker is weak, he undermines the market for that brand.

Such a Company would control all 80's, and smaller packed under its brand, and, through its advertising power, build a demand so great in Europe, New York would be eliminated as a factor in breaking export markets. Other brands picked up on New York auctions at sacrifice sale would find themselves so penalized in competition with the established brand as to be unprofitable.

All 96's and smaller should be exported or processed. Under no circumstances should they reach New York, where there is no local demand, and their only hope an export sale on the auction. For example: when any well-known brand, reaches twenty-five shillings in London, and can be purchased delivered in small lots for twenty shillings through New York, the entire market on all brands is needlessly weakened; where a control would see such sizes were unobtainable at New York. The idea of one brand known purely as an export article opens a splendid opportunity for competition against all comers; no matter how strongly they may now be established through advertising.

An essential feature to the success of export is an advertising program starting in England and spreading over the Continent by its own momentum within a few years. This can only be accomplished by such a Company as proposed.

The writer spent several days selling grapefruit over the retail counter in both the rich and poor districts this Winter and found a serious mistake has been made in trying to educate the public to eat a grapefruit, no bigger than an orange, from the rind. This idea evolved in America for the use of 64's and larger. Such fruit can be halved and the exposed hearts neatly cut from the rag, but a 96 or 126 looks like hash, no matter how expertly the cutting be done; and the housewife's answer when pressed to buy was invariably the same,—“I can't be bothered.”

She is asked to buy a grapefruit knife at two to three shillings in order to eat something she knows nothing about and has no interest in—just the contrary—for its a foreign product. With a knife it takes an amateur five minutes to prepare a fruit, and after her good man has forked out the splinters of meat he must to get any food at all, pick up the already mal-treated rind in his hands and squeeze the juice in a spoon; with the natural result—part on his waist coat, part in his eye, and a bit in the spoon. The next time she “Can't be bothered.”

The average Englishman has never heard of any way of eating citrus fruits except in the form of juice. The rich drink theirs, the poor suck theirs. They are hard to change, especially where the suggested change is obviously stupid. When,

I demonstrated the simplicity of halving a 96 and squeezing the juice out by means of an ordinary glass burr into a tumbler, and produced an equal amount of juice to that obtainable from four cheap Spanish oranges, yet produced in one quarter the time and possessing greater health giving properties and a better flavor, all for three pence, or less than the oranges cost, buyers were instantly sold. Store managers, plainly antagonistic before the demonstration, became keen boosters after it—for it is easier for retailers to handle one fruit than four, when profits are equal.

Present advertising is obviously all wrong and must be corrected if the consuming public, represented by the poor and middle classes, is to be reached. To date, it may be said not over one per cent of this class have ever tasted a grapefruit, and the other ninety and nine must be won through channels acceptable to them.

The Spanish orange is not Empire grown and you need fear no odious legislation from public comparisons. The rind of this orange is brittle and often cracks before the juice is all removed. It is difficult to gather the small amount it does contain without messing the fingers.

Only through an export company could financing the growing and packing of such a tonnage be arranged. The fact it put up but one brand, and that to agreed specifications, and nationally advertised, would justify banks, the Farm Board, or interests forming part of the triangle itself in aiding.

The probability of the growers getting together is good. Our Company is on record as to its desire to do its share in financing an advertising campaign and co-operating in every way to the success of the venture thus closing the triangle. The Roberts Brinning Company is on record as to its intent to match the growers in any retain up to five cents a box for advertising. Their Director will be in Florida in May to remain as long as necessary to place before every interested grower all information relative to the project.

In closing, Gentlemen, the plan I've laid before you opens the only path to salvation. It shows the way to develop a large tonnage, not only profitable to the grower but of such magnitude it should open a way to lower water rates, and I as-

sure you the water interests would like nothing better.

The present rate of one dollar to England was established only after a series of conferences with interested growers and only after their assurance it would encourage growth of the export movement. A full fruit cargo of 16,000 boxes provides less than one-third the income a vessel must earn to make the round trip profitable. To date, there have been no profits; but a seven to eight months movement through a port providing sufficient common cargo to make up the balance does promise a cheerful prospect for better rates. Jacksonville is the only port in Florida offering, or possible of offering, such a tonnage and, if we are to best serve the grower, we plead for his co-operation in our efforts to establish that port as a base. It alone guarantees success of the venture, and any efforts to divert or divide the tonnage with other ports can result in naught but expense to all, and retardation of the movement.

Member: I would like to ask the question about those collars you speak of. Isn't that fading mostly due to the colored collars; couldn't that be avoided by the use of white collars?

Mr. Hyde: Yes, it can be avoided by the use of white to some extent, but when you stand on the piers, at Liverpool, and see the competitive fruit unloaded, with no collars, no matter how carefully you handle this, its subject to stevedor labor. Its packed seven high, and the easiest way an Englishman can handle the top row, and next to the top, is to put it on his shoulder and walk to the hatch and let it go on over. The box with a cleat will stand that smash, but the collars are invariably torn. You might have 1,000 cases to be piled on the pier, and it is there subject to survey and inspection before it leaves the pier. Even if those collars are white they are a rather sorry looking cargo in comparison to fruit from Spain or California without collars.

Member: I would like to ask if there is any chance of getting ventilated fan boats direct from Jacksonville over there, so we might ship like from out of New York.

Mr. Hyde: Yes, there is every chance of getting those, but our whole thought has been an extension of the season into the summer months, and the only fruit that would move would be out of cold storage, and couldn't travel when loaded above the ship. Your movement is going to be South Africa. There is nothing in the world to stop us from giving you ventilated service, but I think you will find you will be penalized more than sufficient to offset that.

Member: One reason why I made that suggestion was because I notice this season, particularly with our anthracnose, and on my shipments arriving in Glasgow, Liverpool or London, I noted considerable more damage from anthracnose on refrigerated shipments than on ventilated shipments where the Temperature wasn't lowered and raised on the other side. When it arrives at the other end there is very little difference, but after the fruit comes out of the refrigeration and has set around in the auction room, I have had some rather distressing results on some of that fruit that had to set around.

Mr. Hyde: Were you present when the fruit was removed from the ship?

Member: No, but I had surveys made of it.

Mr. Hyde: Your fruit was probably picked a little too early. It was artificially colored, wasn't it?

Member: No, it was fully ripened fruit.

Mr. Hyde: The last cargoes I saw unloaded showed none of that storage pit whatever. The late fruit that is overmature and there is danger

of stem-end rot must be carried as close to the frost line as possible but with fruit that has been thoroughly sun-cured on the tree, there is no danger of that. My experience is that your early fruit that is good enough to go over there should be delivered in absolutely sound condition on about a forty degrees temperature mark, without your having any trouble whatever. A lot of you gentlemen will specify when your fruit goes in cold storage the temperature you want it pre-cooled at. Lots of cold storage people tell me their orders are to precool at thirty-two degrees.

Member: It is just in the past few weeks, particularly in the ridge section, that we have had this anthracnose develop. It develops sometimes even in New York shipments, but it seems when you bring it down under refrigeration that way it seems for some reason or other to break down on the other end, more so than straight ventilated shipments. We have had stuff in the house that we have picked and some of the worst, and treated it, and it stayed up in apparently good shape, and when we put it under ventilation, and it set around the office it had to be sold right now.

Mr. Hyde: I have seen that quite often, but I have seen none at the time of discharge from the ship. It has been developed later, due to weakness of the fruit, and I believe it stood up longer on account of the refrigeration than otherwise, and I think you are still better off. You are going to have competition with South Africa on the Temperature basis.

REFRIGERATION WORK IN THE EXPERIMENT STATION

By A. F. Camp, Agricultural Experiment Station, Gainesville

One of the outstanding needs of the citrus industry in Florida has been the extension of the marketing season. We have been faced with the necessity of marketing an ever increasing volume of fruit in a period of seven or eight months. This not only crowds the market badly but leaves several months during which Florida citrus fruits are not placed before the buying public. The

problem is further complicated by the fact that many of our varieties of citrus fruits have a very marked and comparatively short ripening period and must be shipped within that period. In addition to this we have for several months a very large market for citrus fruits within our own state which we cannot supply. As a result we have periods when, in large crop years, fruit is