House Packing Western Lettuce

changing methods of harvesting head lettuce in the Salinas district create problems for operators of packing houses

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The following brief article is based on a detailed study by the same authors to be published as a mimeographed report of the Giannini Foundation of Agricultural Economics.

About 89% of the 1955 lettuce crop in the Salinas–Watsonville–Hollister area—the Salinas district—was field packed in cartons and vacuum cooled. House packing in wooden crates with the lettuce between layers of crushed ice accounted for the remaining 11%.

Three years earlier—in 1952—only about 20% of the lettuce harvested in the same area was field packed. This shift—resulting from the adoption of the vacuum cooling process—eliminated the need for direct icing; made it feasible to substitute a corrugated paper carton for the wooden crate and pack in the field rather than in a centralized packing house.

The shift to field packing leaves the industry with considerable excess capacity in its centralized packing facilities. The extent of this excess can be judged by a review of the 1955 shipping season—total number of days on which some type of lettuce was shipped. These shipping data reveal that the volume of ice-packed lettuce varied from none to 46 cars per day—as compared with up to 335 cars per day in 1951—and averaged approximately 20 cars. On 28% of the days 10 cars or less were ice packed, while on 79% of the days 30 cars or less were ice packed

With this volume and distribution of daily shipments, the entire season volume of ice-packed lettuce could have been processed through just two packing plants with a capacity of 630 crates per hour, with each plant operating a total of 1,110 hours for the season. Of the total season hours, less than 5% would be overtime. Similarly, three plants, each with a capacity of 420 crates per plant hour, could have processed this same output in the same number of total hours and with no change in the per cent of overtime hours.

Continuing demands from certain markets for ice-packed lettuce, as well as the need for field cleanup after field packing crews have finished their harvest, make it reasonable to assume that a limited amount of lettuce will continue to be ice packed, perhaps with a level of volume and seasonal distribution similar to that observed in 1955. Therefore, it would be interesting to know how the costs of ice packing operations under these conditions could be minimized.

An analysis of packing house operations shows that total unit costs—which include the direct costs of labor and container materials, ice, electric power, and equipment repairs as well as the fixed costs of buildings and equipment—decrease as scale of operation and hours per season increase. For example, with a 1,280-hour operating season—applicable to the Salinas district—and ouput rates of 210, 420, and 630 crates per plant hour, estimated total unit packing house costs per crate are $1.50, $1.44, and $1.42. Similarly, with an output rate of 420 crates per plant hour, estimated costs with a 640-hour operating season are $1.48 per crate, as compared to $1.44 with a 1,280-hour season. These estimates are based on the assumption of efficient organization and operation of the plants, using the wage scales and agreements prevailing in 1954. They do not include administrative and selling costs, but these probably would not vary greatly over the range of plant sizes considered.

Economies of large scale operation are almost exhausted when plant output reaches 630 crates per hour. Economies resulting from extension of the operating season beyond 1,280 hours—so that fixed costs of buildings and equipment are spread over a larger season volume—are relatively small. In fact, extension of the length of season beyond this level would probably require some overtime work, and the premium wage rates involved would probably increase direct costs more rapidly than unit fixed costs were reduced.

The results presented above would be appropriate to firms considering new plant construction. With present conditions in the Salinas district, as well as in other places in the western lettuce producing region, the immediate short run problem is not one of constructing new plants, but rather the optimum utilization of already existing and overcapacity packing house facilities.

In this situation, availability of existing plants means that the effects of fixed costs for equipment can be ignored—at least until plants and equipment are worn out—and the problem can be considered in terms of direct costs only. If fixed costs are deducted from the figures given above, the direct costs for plants of 210, 420, and 630 are $1.46, $1.41, and $1.39 per crate.

Assuming that the total volume of shipments is spread over a fairly large number of shippers, and given the daily

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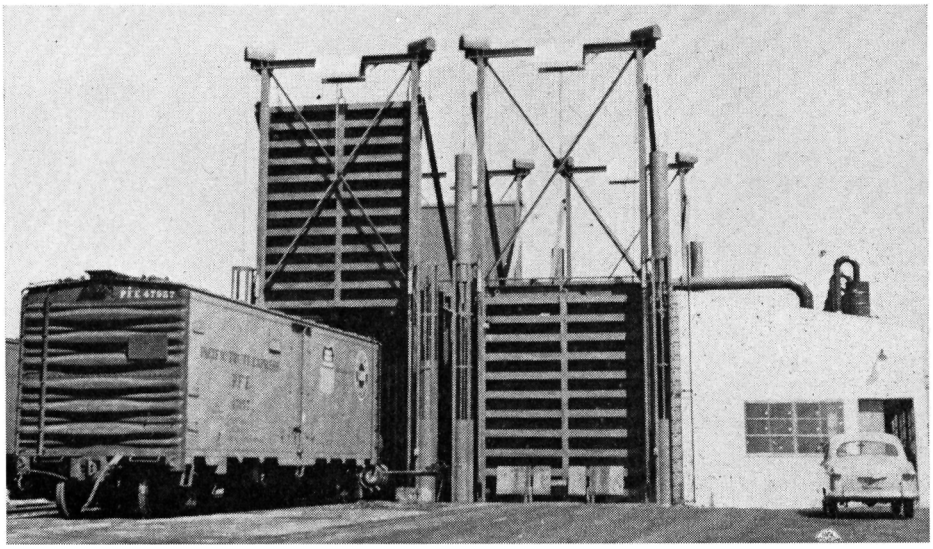
Vacuum precooling of field packed lettuce applied to loaded refrigerator railroad car.



LAMBS

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to differ about as indicated by these groups.

Each year of the study the lambs were sorted for slaughter by a commercial packer buyer. In 1952, the buyer—at request—took approximately equal proportions of the two types of lambs. In 1953 and 1954 the buyer sorted out the lambs considered fat enough to produce U.S.D.A. Choice or U.S.D.A. Good carcasses. In both years a larger proportion of the Suffolk cross wethers was considered ready than of the Corriedale cross type.

Statistical analysis of the differences in weights and gains showed them to be highly significant. Averaging the three years' results together, the Suffolk cross wethers gained about 1.2 pounds per month faster than the Corriedale cross wethers.

Wether lambs of the Suffolk cross outgained the ewe lambs of the same type. Because the Corriedale cross ewe lambs were kept for replacements at the station, gain and weight statistics are not available for comparison. Difference between sexes in the Suffolk cross lambs was significant in the first two years but not in the third. Averaging the results of the three years together shows that the wether lambs gained about 0.6 pound more per month than the ewes. There was a slight tendency for the ewes to be more uniform in weights and gains than the wethers, but the differences were not significant in most cases. When the weight gains made by lambs of different starting weights within the different groups were compared, they were found to be remarkably uniform. Within each group, the smaller lambs gained at the same rate as the larger lambs.

The table to the left gives weights and gains for the remaining lambs after the first load was slaughtered. It took 28 days in 1952, 39 days in 1953, and 28 days in 1954 to get the remaining lambs fat enough for slaughter. While differences in initial and final weights for this period remain significant in most cases, the gains of the three groups did not differ significantly.

Second Pasture Period after First Load Was Slaughtered

1952	Type	No.	Weight 7/21/52 Elk Grove	Gain 28 days at Elk Grove		Weight 8/18/52 Elk Grove
				Total	/day	
Corriedale cross	wethers	49	72.5	8.6	.31	81.1
Suffolk cross	wethers	35	88.8	8.3	.30	97.1
Suffolk cross	ewes	48	83.4	7.7	.28	91.1
1953	**Type**	**No.**	**Weight 6/26/53 Elk Grove**	**Gain 39 days at Elk Grove**		**Weight 8/4/53 Elk Grove**
				Total	/day	
Corriedale cross	wethers	38	79.0	7.4	.19	86.3
Suffolk cross	wethers	39	81.8	8.1	.21	90.6
Suffolk cross	ewes	53	74.4	7.4	.19	81.6
1954	**Type**	**No.**	**Weight 7/27/54 Elk Grove**	**Gain 28 days at Elk Grove**		**Weight 8/24/54 Elk Grove**
				Total	/day	
Corriedale cross	wethers	52	80.3	5.6	.20	85.9
Suffolk cross	wethers	35	85.5	6.5	.23	92.0
Suffolk cross	ewes	19	79.8	5.6	.20	85.5

Slaughter Data

Year	No.	Carcass Yield %	% in Carcass Grades			
			P*	C*	G*	U*
1952						
Corriedale cross	169	48.0	17.1	73.5	8.8	0.6
Suffolk cross	283	52.6	50.0	47.0	3.0	0
1953						
Corriedale cross	59	52.2	0	64.0	32.0	3.0
Suffolk cross	201	50.9	0	68.0	30.0	2.0
1954						
Corriedale cross	92	48.7	0	48.9	50.0	1.1
Suffolk cross	169	49.4	0	68.6	31.4	0

* P-Prime, C-Choice, G-Good, U-Utility.

Slaughter data showed that when fed until fat, the yields of the two types of lambs were the same. Although Suffolk cross lamb carcasses graded slightly higher, the difference was not great.

In 1952 when the buyer took equal proportions of both types of lambs—in the first sorting—there were undoubtedly many Corriedale cross lambs slaughtered too early. In the other two years when more of the Corriedale cross type were fed for a longer period, there was less difference in the carcass grades.

Averaging the carcass yields for 1953 and 1954—when slaughter conditions were comparable—the Suffolk cross lambs yielded 50.2% while the Corriedale cross yielded 50.1%.

It is evident from these trials that Suffolk cross lambs from whiteface ewes can be expected to gain a little faster than Corriedale cross lambs, but if both are fed to satisfactory degree of finish, the carcass value of the two types will not be very different.

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distribution of the volume of shipments presented earlier, it is difficult to visualize individual shippers enjoying many of the economies of large scale output. While it is probably true that they could approach the higher optimum output rates for a small number of hours, and for a limited number of days during the shipping season, considerable difficulty might be encountered in mobilizing crews willing to work under such conditions.

Therefore, many plants would presumably operate at considerably less than the typical capacity rate of 420 crates per hour. If realized output was as little as 210 crates per hour, the differences in direct costs per crate, as compared with plants of 420- and 630-crate output rates would be 5¢ and 7¢.

Thus, under present operating conditions, considerable economies could probably be realized through the consolidation of packing house operations in two or three plants. Since the typical existing packing plant in Salinas is designed for a capacity of 420 crates per hour, consolidation of packing operations into three plants of this size would probably be most feasible from the standpoint of approximating a minimum-cost situation for the ice-packed output.

The comparison of costs in different sized packing plants was considered independently of field harvesting and hauling operations. Studies of these operations have not revealed any substantial economies of scale. Thus, the addition of harvesting and hauling costs—while affecting the level of total costs per crate—would not affect the relative costs among packing plants of different sizes.

The cost comparisons in this study are based on the assumption of separate lo-

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AVOCADOS

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biotin. The sum of moisture and fat in most of the samples was fairly constant —about 91%—so that the differences in vitamin content may be considered valid even though total solids varied.

Avocados as a source of thiamine compare favorably with nearly all fruits and vegetables, with fish, milk, and eggs, and with all meats except pork. Avocados are exceeded in thiamine content chiefly by the whole grains.

As a source of riboflavin avocados are exceeded in concentration chiefly by evaporated milk, cheese, liver, and other organ meats. They are equal or superior to most other fruits, vegetables, meat, fish, cereals, and legumes.

Avocados contain more niacin than most fruits and vegetables, milk, cheese, and eggs, but less than most meats, fish, whole grains, and some legumes. The fruit appears to be in the middle range of all foods as a source of folic acid, but data are not numerous or consistent enough as yet to make valid comparisons. This is true also of pantothenic acid, vitamin B_6, and biotin.

It is plain that the avocado is in the superior group of foods as a source of both pantothenic acid and vitamin B_6. The fact that the fruit is eaten uncooked adds to its value as a source of the water-soluble B vitamins.

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cations for each of the plants. However, if all ice-packing plants were consolidated in a single location, additional economies might be realized. These have not been evaluated but could occur in the better integration of such operations as lidding, and ice and crate distribution facilities.

Consolidation in a few plants should also improve the opportunity for continuous employment which would be attractive to labor and thus help provide a fairly reliable labor supply. Also, contractual arrangements in regard to minimum hours and crew organization could be more easily met.

Certain administrative problems do arise with consolidation. Questions of labeling, coordinating field and house operations, decisions as to whose lettuce and how much of it will be packed in a given day, require considerable administrative skill. It is assumed that any increased administrative costs would be relatively small and more than offset by the indicated savings through consolidation.

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LEMONS

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tively stable. And, in terms of f.o.b. prices, those of lemon-juice products also compare favorably with other processed fruits. Yet, at both the consumer and f.o.b. levels, the prices of lemon-juice products have not been markedly more stable than those of other processed juices, excepting—perhaps—processed orange juice.

In the legislation on which the state lemon products order is based, one may interpret the term, price-stability, as pertaining primarily to grower prices and returns from processed lemons. During several of the years of the order's existence, grower on-tree returns from processed lemons were at higher than previous levels. However, the extent to which that was due to the order itself or due to the introduction and rapid market penetration of a new product—such as frozen lemonade concentrate—cannot be wholly untangled. Yet, it is likely that the effects of the order were substantial. Although higher grower on-tree returns from processed lemons were attained—if not maintained—substantial price stability to growers was not introduced. During that past five or six years, the relative variation in on-tree grower returns from processed lemons has not—on the average—been markedly less than in earlier periods.

Whatever the reason, significant price stability to growers for processed lemons has not been a result of the lemon products order. But the validity of price stability as a goal in itself might be questioned, because price stability—itself—often can be attained only through the creation of other and less attractive types of uncertainty.

To growers, processors, and distributors, a more rational goal than price stability is income maintenance and growth. It is true that—when oriented to price—the order's operation does have an impact on income. However, with income maintenance and growth as a direct rather than indirect orientation, a more basic objective is established.

In the question of interrelations between the stabilization pool percentages and prices, the stabilization percentages by themselves tell only part of the story. The actual tonnages, resulting from the application of the percentages, are more meaningful as influences on product prices and the flow of lemons into processed products.

During the first year of the order, there was a rough tendency for the stabilization pool percentages and prices to trend in opposite directions; but such tendency did not continue. In the following years no unique or consistent pattern of relationship prevailed between the stabilization pool percentages and prices.

Supply and Price Effects

Control over both stabilization pool percentages and prices gives the Board a different type of influence than if only the percentage or only the price were controlled. Yet, if the Board can change the percentage, or price, or both simultaneously, it has the burden of maintaining some appropriate relationship between the percentages—and corresponding volumes—and prices of the pool.

When the stabilization pool percentage is decreased—with no revision in the projected crop or total volume available for processing—the effect is to ease the supply situation in lemons for products. This increased supply, by itself, tends to depress the market value of processing lemons and, in more or less time, the market value of lemon products. But if the pool stabilization price is increased, while the stabilization percentage is decreased, the price effect tends to dampen the supply effect.

Since the stabilization pool percentage can only be decreased or maintained at its initial level, lowering the stabilization percentage eases the short-run—within the marketing season—supply situation. However, the order does permit the Board to raise or lower the stabilization pool price. Raising the pool price tends to raise the market value of processing lemons. Lowering the pool price tends to lower their market value. But the effectiveness of the stabilization pool price—with respect to its impact on market developments—depends not only on the availability and current market price of free tonnage of California lemons but also of lemons from other states and imported supplies. Only when the Board does, in fact, regulate the flow of lemons into processing, does the stabilization pool price have full meaning and impact.

Every permissible combination of stabilization pool percentages—and corresponding volumes—and prices is unique in its actual or potential impact on market prices. In view of the practical oper-