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

R. V. Enochian and F. J. Smith

The following brief article is based on a detailed study by the same authors to be published as a mimeographed report of the Gianinni 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 output 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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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 re-
quest—took approximately equal propor-
tions 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
carcases. In both years a larger proportion
of the Suffolk cross wethers was con-
sidered 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 were found to be remarkable and
equally 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 differ-
ences 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

<table>
<thead>
<tr>
<th>Year</th>
<th>Type</th>
<th>No.</th>
<th>Weight/7/21/52 Elk Grove</th>
<th>Weight/8/18/52 Elk Grove</th>
<th>Gain 28 days/Elk Grove</th>
<th>Total/day</th>
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<tbody>
<tr>
<td>1952</td>
<td>Corriedale</td>
<td>49</td>
<td>72.5</td>
<td>8.6</td>
<td>31</td>
<td>81.1</td>
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<td></td>
<td>Suffolk</td>
<td>35</td>
<td>88.8</td>
<td>8.3</td>
<td>30</td>
<td>97.1</td>
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<td></td>
<td>Suffolk</td>
<td>48</td>
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<th>Gain 28 days/Elk Grove</th>
<th>Total/day</th>
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<th>Type</th>
<th>No.</th>
<th>Weight/7/27/34 Elk Grove</th>
<th>Weight/8/4/34 Elk Grove</th>
<th>Gain 28 days/Elk Grove</th>
<th>Total/day</th>
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<td>1954</td>
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<td>80.3</td>
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<td>Suffolk</td>
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distribution of the volume of shipments
presented earlier, it is difficult to visu-
alize 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 condi-
tions.
Therefore, many plants would pre-
sumably 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 75.

Thus, under present operating condi-
tions, considerable economies could
probably be realized through the consoli-
dation of packing house operations in
two or three plants, since the typical
existing packing plant in Salinas is de-
signed for a capacity of 420 crates per
hour, consolidation of packing opera-
tions into three plants of this size would
probably be most feasible from the stand-
point of approximating a minimum-cost
situation for the ice-packed output.

The comparison of costs in different
sized packing plants was considered in-
dependently of field harvesting and haul-
ing operations. Studies of these oper-
ations 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-

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 propor-
tions of both types of lambs—in
the first sorting—there were undoubt-
edly 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
lamb carcasses yielded 50.2% while the Corriedale
cross yielded 50.1%.

It is evident from these trials that Suffo-
k 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.

D. W. Cassard was Assistant Professor of
Animal Husbandry, University of California, Davis, when these studies were made.
W. C. Weir is Associate Professor of Animal
Husbandry, University of California, Davis.
D. T. Torell is Associate Specialist in Ani-
mal Husbandry, University of California, Hop-
land Field Station.
J. F. Wilson is Professor of Animal Hus-
bandry, University of California, Davis.
the indicated savings through consolidation.

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ing Service, U.S.D.A.

LEMONS
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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 simulta-
neously, it has the burden of maintain-
ing some appropriate relationship between the percentages—and corre-
sponding 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 de-
creased, 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 effect of the stabilization pool price—
with respect to its impact on market de-
velopments—depends not only on the availability and current market price of free tonnage of California lemons but also of lemons from other states and im-
ported 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 sta-
bilization pool percentages—and corre-
sponding volumes—and prices is unique in its actual or potential impact on mar-
ket prices. In view of the practical oper-