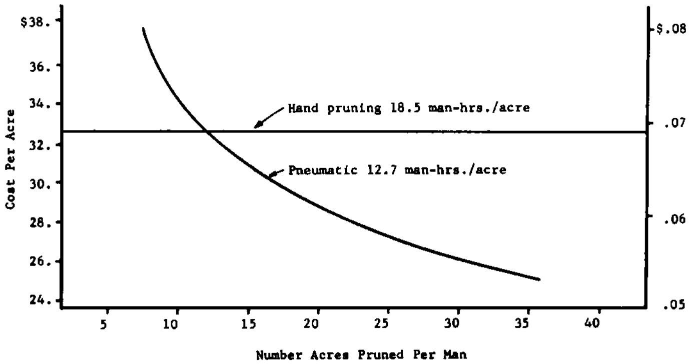
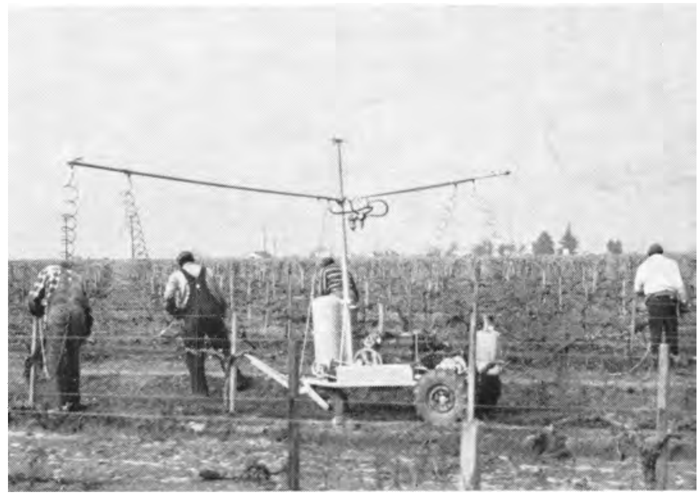
PRUNING COSTS AS RELATED TO ACREAGE COVERED IN SEASON—
HAND VS. PNEUMATIC



A comparison of pruning costs, based on the averages in the study, with the number of men per machine varying from 6 to 12.

A commercial four-man pruner in a Fresno County Muscat vineyard.



for the expenditure for a machine by calculating the investment per acre using a value of 23% of the initial expense divided by the number of acres. For example, an eight-row machine with an initial cost of $3200 would have interest and depreciation charges of $736 or $9.20 per acre, for 80 acres ($3200 × 23% ÷ 80).

With the addition of machine operating costs to this figure, a comparison with the cost of hand pruning might be made. While it is true that some of the operating costs, such as taxes and repairs, may not vary entirely according to the acreage, this is not an important factor in the analysis. Therefore, if we assume that the machine is going to last five years and that cash costs per acre, for all practical purposes, remain more or less constant regardless of the acreage pruned, then the total cost will vary according to the investment per acre. The minimum acreage is close to 15 per man—the break-even point. This would indicate a minimum of 60 acres for a four-man pruner or 150 acres for a 10-man machine.

The study clearly shows that, after all costs are considered, the use of pneumatic pruning resulted in higher costs in only one of the nine vineyards when compared with hand pruning. This occurred in vineyard No. 8; all the other vineyards showed a distinct dollar savings. The quality of the pruning work was not evaluated for any of the vineyard enterprises. It was acceptable to the growers involved though the standards of quality may have varied considerably among them.

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A comparison of 1x3x3-inch wafers and baled alfalfa hay for milk production

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IT HAS BEEN ESTIMATED that 100,000 tons of alfalfa were wafered in California in 1965. Each year for the past six years increased amounts of wafered alfalfa hay have been fed to dairy cattle. A new experimental wafering machine was tested in the summer of 1965. Windrowed alfalfa was picked up by the experimental wafering machine, sprayed with water, chopped, and channeled between two wheels. A smaller wheel with scalloped cutting portions operated inside a larger wheel to compress the hay into wafers about 1 × 3 × 3 inches in size.

Wafers from this experimental machine were compared with baled alfalfa hay in a feeding trial conducted in San Joaquin County. On June 1 and July 2, second- and third-crop alfalfa, respectively, was cut with a self-propelled swather. Six days later two windrows were baled and two windrows were wafered, alternating across a 40-acre field. Windrows on the sides and ends of the field were baled and not used in the trial. Samples taken at harvest time indicated that the moisture content of the baled hay varied from 11.5 to 14.1% and, for the wafered hay, from 9.8 to 15.3%. The wafers were delivered in a dump truck and stored in a bunker silo and baled hay was stored in a hay barn. On the basis of limited samples of stored wafers, fines amounted to 14% of the total weight.

Sixty high-producing Holstein cows in their second, or later, lactation and averaging 94.3 days post-calving (range from 26 to 149 days) were randomly assigned to one of two groups, after being paired according to lactation number, days in lactation, and previous and current production. One group was fed baled alfalfa

TABLE 1. DAILY FEED CONSUMPTION AND PRODUCTION PER COW

	Mean	Increase from wafers over bales
Consumption		
Alfalfa dry matter (lb)	36.09	0.19
Production		
Milk (lb)	58.40	0.54
Milk fat (%)	3.39	0.02
Milk fat (lb)	1.97	0.04
Milk, 4% FCM (lb) ...	52.84	0.74

hay and the other group wafered alfalfa hay. DHIA production records for the 60 cows during the previous lactation averaged 294 days, 15,377 lbs of milk, and 544 lbs of milk fat.

The groups were rotated at four-week intervals in a double-reversal design experiment so that each group received each type of hay. During the third four-week period each group received the same type of hay as in the first four-week period to evaluate the carry-over effects of the treatments. Data for the last three weeks of each of the three periods were used in the statistical analysis. The first week of each period was considered the adjustment period. Daily weights of baled hay fed were estimated by multiplying the average bale weight by the number of bales fed. Total and average bale weights were determined prior to feeding.

Amounts of wafers fed were determined by weighing a trailer load of wafers daily and feeding about one-half in the morning and the remainder in the evening. Enough baled and wafered hay was fed to insure a surplus which was weighed back weekly. Samples of hay fed, and refused, were collected weekly for dry matter determinations and chemical analysis. The modified crude fiber content also was determined for estimation of the total digestible nutrient content of each form of hay fed.

Each pair of cows was fed equal amounts of concentrate twice daily in the milking barn, based on the milk production of the higher producing member. The cows were fed an average of 21 lbs per day of a commercial concentrate mix. Milk was weighed twice daily to the nearest pound and one-day composite samples were taken once weekly for milk-fat determinations.

Consumption of dry matter and production of milk, milk fat, 4% fat-corrected milk, and milk-fat percentage were all slightly higher on the wafer treatment, as shown in table 1. None of these apparent differences was statistically significant at the 5% level of probability. Five cows and their pair-mates were removed from the trial because of mastitis and other health problems. Production data on these cows were not included in the statistical analysis.

Results of the chemical analyses are summarized in table 2. Dry-matter content of the wafers, as fed, was 1.9% ($p < 0.01$) higher than the baled hay. Baled hay was higher in modified crude fiber content than wafered hay but the difference was not statistically significant.

The cows readily accepted the different forms of hay when abrupt changes were made at the beginning of each period and were observed to select wafers over fines when both were available. They attempted to break a portion of the wafer off before actually eating it. The size appeared to be too large for most cows to get entire wafers in their mouths. This resulted in an accumulation of a high proportion of fines in the manger. (Fines as used here refers to disintegrated and broken wafers.) After all wafers had been eaten, the cows were observed to eat the fines, perhaps selecting the lighter, stemmy portions of the fines to a limited extent. This was indicated by the higher protein and lower fiber content of the *refused* wafered hay, compared with the *offered* wafered hay.

Cows receiving the baled hay were observed to select the more palatable portions of the hay, leaving considerable amounts of stems and dirt mixed with small particles of leaves. The gain of 6.3% in ash of the refused baled hay compared with the hay offered was indicative of the amount of dirt in the baled hay. On an ash-free basis, refused baled hay was lower in protein than fed baled hay (20.6% vs 21.3%) and higher in crude fiber (35.4% vs 33.3%).

In contrast to the results of this trial, hay dry matter consumption and milk production were significantly increased by feeding smaller-sized wafers in two other feeding trials comparing baled and wafered hay conducted at the University of California. As measured by the crude protein and crude fiber content, the quality of alfalfa in one trial was similar to that used in this trial, whereas alfalfa in the other trial was of higher quality.

Oregon workers have reported no advantage in consumption or production with a 3-inch round wafer when compared with baled hay. Similar results were obtained with a 4-inch flat wafer in a field trial in Riverside County, California. The wafers fed in this trial may have been too large for cows to consume as readily as smaller wafers. Quality of hay also may have been a factor because selectivity was possible with baled hay, but not with wafers.

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TABLE 2
COMPOSITION OF FEED OFFERED

Feed	Total dry matter*	Crude protein	Ash	Crude fiber	Modified crude fiber	TDN @ 90% DM
	%	% of dry matter				(%)
Baled alfalfa	91.6[a]	19.0	11.0	29.6	30.7	49.3
Wafered alfalfa ..	93.5[b]	18.8	11.0	29.5	30.1	49.8
Concentrate	91.8	16.6	9.1	10.3		

COMPOSITION OF FEED REFUSED

Feed	Dry matter	Crude protein	Ash	Crude fiber
	(%)	% of dry matter		
Baled alfalfa	89.9	17.0	17.3	29.3
Wafered alfalfa	89.6	19.6	13.7	26.7

* Values with different superscripts are significantly different ($p < 0.01$).