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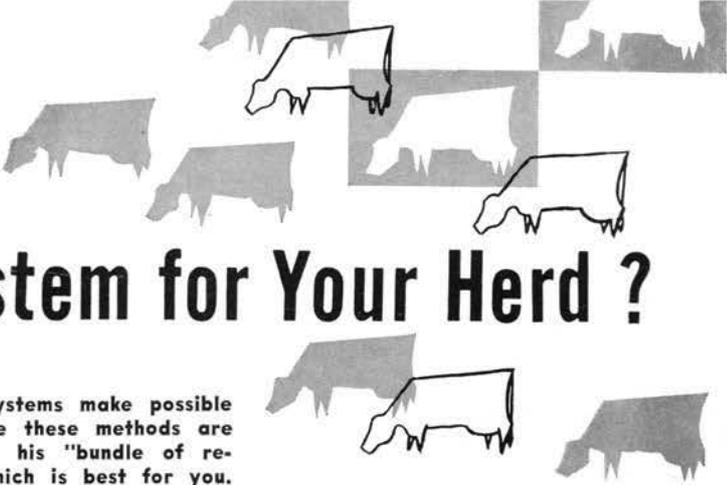
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# What Milking System for Your Herd ?

New techniques in dairy housing and milking systems make possible larger herds with limited labor. How desirable these methods are for an individual operator depends mainly on his "bundle of resources." Here are some guides in deciding which is best for you.

by Randolph Barker, Earl O. Heady and Floyd Arnold

THIS IS a time of greater specialization in farming. There's been much talk and speculation recently about the trend toward highly specialized commercial farms. But this development probably is still some time away for Iowa. In fact, Iowa farms may never become completely specialized because soil, climate and markets call for some diversification in both crops and livestock. New technology, however, is encouraging larger enterprises—even on farms which will continue to be diversified.

Let's look at how some of these changes might affect dairy farming in Iowa. We studied dairy farming in particular for two reasons: (1) dairy farmers have been seriously affected by the cost-price squeeze and (2) there has been a growing interest in techniques to greatly expand dairy herds. We examined systems adapted to commercial dairy herds of the conventional type—rather than single-enterprise herds or "cow pools."

Getting the most return from your labor is the key to most successful dairy operations. Labor makes up a greater portion of the total costs for dairying than for

other livestock enterprises. So dairy farmers have felt the pressure of the farm labor shortage. Labor and capital costs have risen more rapidly than the price of dairy products. Dairy farmers, caught in this cost-price squeeze, have to be alert for ways to increase returns to labor.

There are several possibilities for increasing labor productivity in dairying. Improved breeding and feeding practices have resulted in a steady rise in production per cow and per man. Labor-saving devices have allowed herd sizes to expand. New techniques in housing, milking and feeding make it possible for one man to handle an increased number of cows.

Our study was aimed at learning how some of these new dairy techniques affect milk production costs and returns to labor.

## What We Did . . .

We analyzed costs and returns over a wide range of outputs for four Grade A loose-housing systems: (1) a four-abreast, stanchion parlor, (2) an elevated, side-entry, three-stall parlor, (3) an elevated, side-entry, six-stall parlor and (4) a 12-cow herringbone parlor. These were compared with a conventional stanchion barn operation. It was assumed in the study that the farm operators were investing in new dairy buildings—new barns, new parlors.

The curves for loose housing in

the charts which follow represent a combination of the three-stall and herringbone systems. The three-stall parlor was taken as typical with herds up to 40 cows. Beyond this, costs and returns for the herringbone parlor were used. This single curve for loose housing is compared with the stanchion barn.

A production level of 12,000 pounds of milk per cow and a price of \$3.75 per hundredweight for Grade A milk were used for the purposes of the study. While the production techniques studied are within the reach of a good farm manager, they're better than those now used by most dairy farm operators in Iowa. We used just one production level and price so that we could compare the five different milking systems. In actual practice, both of these elements may vary considerably among farms, and low-producing herds will raise the cost of production per cow.

## What We Found . . .

**Herd Size:** When herd size is increased, the cost per hundredweight of milk drops over a broad range of output both for loose housing and for conventional stanchion methods, as chart 2 shows. This decline is due mainly to the spreading of fixed costs—costs which don't vary with herd size—over a larger number of cows. Between 15 and 35 cows, the cost per hundredweight of milk drops about 75 cents under conventional

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stanchion methods and slightly more under loose housing. With herds larger than 35 cows, costs decrease more gradually.

As the herd size is expanded, more labor is needed to handle the cows and to raise grain and forage. Often it would be profitable to hire additional labor, but dependable hired help is scarce. In our study we set an upper limit of two full-time men and one summer hand. Few Iowa operators employ more than this.

The limited labor supply must be reallocated among enterprises before herd size can be increased. For example, more land could be diverted from corn to forage production. The reduction in returns to the cash-grain enterprise, however, eventually exceeds the increase in returns to dairy. So this reduction in farm income should be charged as a cost to the dairy enterprise.

Chart 1 shows how an increase in herd size (and its resulting reduction in the cost per hundredweight of milk) is accompanied by a sharp rise in the hourly returns to labor. For herds of fewer than 15 cows, the return is less than 50 cents an hour both for loose-housing and stanchion systems; with herds of fewer than 20 cows, the return is less than \$1 per hour for both. But, as herd size is expanded from 15 to 35 cows, hourly returns to labor are increased by well over \$1 for both systems. With 35 cows, the return per hour of labor is a third greater under the loose-housing system. The difference in return per hour of labor for the two systems increases with herd size—the

### Comparison of capital investment in the milking parlor and labor requirements for the milking operation in four parlor systems.<sup>1</sup>

Type of parlor	Investment			Labor, man-minutes/cow <sup>3</sup>
	Building	Equipment <sup>2</sup>	Total	
Four-abreast stanchion . . . . .	\$2,273	\$1,436	\$ 3,709	3.16
Three-stall . . . . .	3,576	2,275	5,851	2.61
Six-stall . . . . .	5,972	3,422	9,394	1.71
Twelve-cow herringbone . . . . .	5,445	5,122	10,567	1.09

<sup>1</sup>Adapted from: Information obtained from the Department of Agricultural Engineering at Iowa State, and from dairy equipment dealers and field survey conducted in central Iowa, 1957.

<sup>2</sup>Does not include bulk tank.

<sup>3</sup>Does not include preparation and clean-up time.

advantage being in favor of loose housing.

Returns to labor continue to rise steadily until a top limit is reached. This happens at 43 cows with the stanchion barn and at 58 cows with loose housing. Because of the limited labor supply, withdrawing labor from other enterprises results in a lower net farm income if herds are expanded beyond these top limits. This reduction in profit is charged as a cost to the dairy enterprise.

#### Loose Housing or Stanchion?

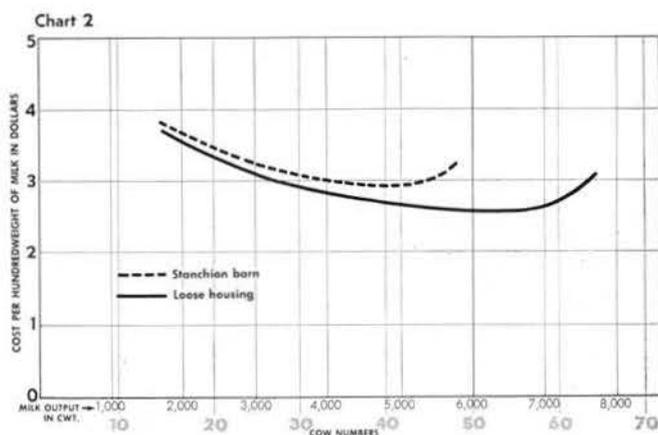
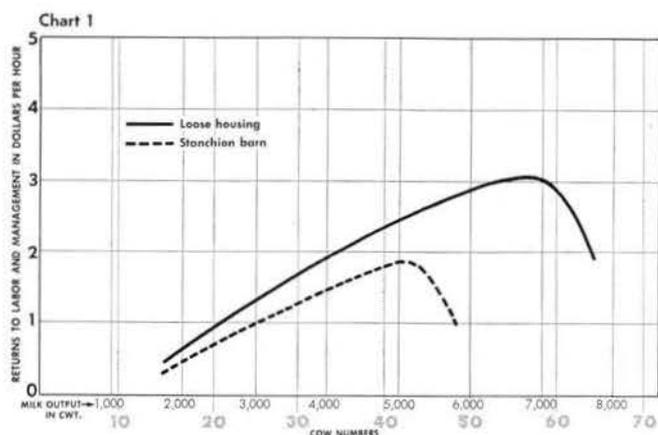
Loose housing normally allows a savings of both labor and capital. Labor is saved in the milking and feeding operation. And a smaller investment per cow is needed for housing and feed storage facilities. With very small herds of 15 cows or less, however, investment in loose housing often exceeds the cost of a stanchion barn because of the high fixed cost in the milking parlor and equipment.

As herd size is expanded, the cost advantage for loose housing increases. This is shown in chart 2. With 15 cows the difference is 10 cents per hundredweight; with 35 cows this cost differential has nearly doubled.

In addition to lowering costs, loose housing permits the handling of up to a third more cows with the same amount of labor. The lowest cost per hundredweight is \$3.45 with 43 cows using a stanchion barn and \$3.10 with 58 cows under loose housing.

Lower cost per hundredweight under loose housing means a higher return to labor. In chart 1, the maximum hourly return is \$1.92, with 43 cows, for the stanchion-barn system and \$3.08, with 58 cows, for loose housing. These figures are for typical types and sizes of equipment. The peak on the curves would be different for other sizes and types of equipment.

Results indicate that Grade A dairy farmers who adopt loose housing—and have a large enough herd to make the high cost of investment worthwhile—can earn a return to their labor comparable with city wage rates (about \$2.25 an hour at the present time). These computations are for techniques which assume a fairly efficient level of management. But, in terms of ability required, these management practices are well within the reach of most farmers.

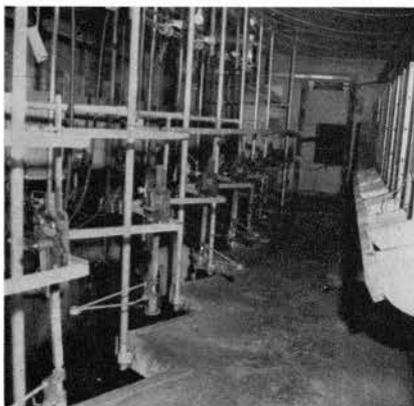




Loose housing can be combined with mechanical feeding processes such as an auger silage feeder to save labor.



With a loose housing system, cows often feed directly from a bunker silo.



This six-on-a-side herringbone parlor allows a saving of time in milking.

**Parlor Milking Systems:** We didn't try to analyze all possible parlor milking systems but only those that might show meaningful cost and production differences. The four parlor milking systems studied differ in the amounts of capital and labor required as shown in the table. Changing from the stanchion parlor to the herringbone parlor makes it possible for a single operator to handle a larger number of cows—but requires a greater capital investment.

The four-abreast stanchion parlor shows the lowest cost up to 34 cows. This system combines the stanchion-barn techniques of milking with the labor saving feeding methods of loose housing. Because of its low capital requirement, the stanchion parlor is particularly well suited to small dairy farms. It may also serve as a "stepping stone" in the process of converting and expanding the dairy enterprise.

Between 34 and 41 cows, the three-stall parlor offers the least cost per 100 pounds of milk produced. In terms of cost and labor efficiency, there's little difference between the three-stall and four-stall elevated parlors. In most milking parlors of this size, the increase over conventional stanchion methods in number of cows milked per hour is slight. Instead costs are lowered largely through labor saved in feeding and through lower capital needs.

Herds above 50 cows are rare in Iowa, but they may become more common. For these farms, the six-stall or the herringbone is the lowest cost system. These two parlors require a large outlay in fixed capital, but they save a considerable amount of labor. The most efficient of these parlors is the six-on-a-side herringbone. Under this system, over 50 cows can be milked in an hour.

There are, however, a number of disadvantages to handling cows in the herringbone system. For one thing, it's difficult to give individual attention to cows. To relieve the "time pressure," herringbones have been developed with five, four and even three cows on a side. These smaller parlors may become more popular than the

original six-on-a-side system. But if you're concerned with increasing labor productivity, new technology should be considered in terms of its effect on production per man as well as production per cow.

### The Meaning . . .

Iowa dairy farms will tend to become larger in the future because of growth to take advantage of the cost economies offered by larger-scale dairy production. In many cases this will mean combining larger quantities of land and capital with the available labor supply. Those who find it difficult to increase acreage will look for other ways to allow an expansion in herd size. One answer is to purchase part of the roughage or grain supply. Another alternative is to purchase replacements. Per-cow land and labor requirements would be reduced in either case.

While stanchion barns will have a prominent place in the immediate future, there's a definite cost advantage for loose housing—particularly with large herds. There'll probably be a gradual shift in the direction of loose housing as herd sizes increase and as old facilities wear out and are replaced with new buildings and equipment.

Loose housing and parlor systems have their greatest advantage where a specialized dairy enterprise is being established and new buildings must be constructed. On many dairy farms, however, the conventional stanchion barn will last a long time. If there's no desire to expand beyond the capacity of the present barn, it may be to your advantage to continue using the present system while improving management through better feeding and breeding practices.

In weighing the decision to invest in new housing methods, consider your complete bundle of resources. If you are "long on labor" and "short on capital" it may be best to use scarce capital elsewhere on the farm rather than change the housing system. It may be profitable to take a lower return on labor and invest instead in more and better cows, more fertilizer or other alternatives.