

silo and the outside wall, and drops the hay at any desired point, thus in no case does the hay have to be moved but a few feet, which means a saving of much labor in the mowing.

To successfully embody all of the above discussed advantages in a dairy barn is one of the large problems in milk production. In a careful study of the barn question it soon became apparent that it was impossible to embody all of the requirements advantageously in anything but a circular form of building, and the 60-foot round barn, which is here described, was built.

[Illustration: FIG. 4. SOUTH VIEW, SHOWING WELL LIGHTED STABLE.]

#### CIRCULAR CONSTRUCTION THE STRONGEST

The circular construction is the strongest, because it takes advantage of the lineal, instead of the breaking strength of the lumber. Each row of boards running around the barn forms a hoop that holds the barn together. A barrel, properly hooped and headed, is almost indestructible, and much stronger than a box, altho the hoops are small. This strength is because the stress comes on the hoops in a lineal direction. Any piece of timber is many times stronger on a lineal pull than on a breaking stress. Take for example a No. 1 yellow pine 2 x 6, 16 feet long, with an actual cross section of 1-5/8 x 5-5/8 inches. If placed on edge and supported at the ends, as a joist, the limit of safety for a load evenly distributed is 642 pounds, while the limit of safety for a load in the lineal direction of the same piece of timber is 12,800 pounds, or twenty times as great.

[Illustration: FIG. 5. IN COW STABLE, SHOWING SILO AND FEED ALLEY IN CENTER OF BARN; STANCHIONS ON RIGHT, MILK SCALES AND RECORD SHEET ON LEFT.]

All exposed surfaces of a round barn are circular, as both the sides and roof are arched, which is the strongest form of construction to resist wind pressure; besides, the wind, in striking it, glances off and can get no direct hold on the walls or roof, as it can on the flat sides or gable ends of a rectangular structure. If the lumber is properly placed in a round barn, much of it will perform two or more functions. Every row of siding boards running around the building serves also as a brace, and the same is true of the roof boards and the arched rafters. If the siding is put on vertically and the roof built dome-shaped, no scaffolding is required inside or out. These are points of economy in the round construction.

#### RECTANGULAR BARNs REQUIRE 34 TO 58 PERCENT MORE MATERIAL

In order to compare the amount and cost of material in round and rectangular barns, the following figures have been carefully worked out by an expert barn builder. Two comparisons, based on wood construction thruout, are made, in which round barns 60 feet and 90 feet in diameter are compared with both plank and mortise frame rectangular barns containing the same number of square feet of floor space, respectively. Since the most practical width of a rectangular dairy barn is 36 feet, its length will depend upon the number of square feet required in the barn.

[Illustration: FIG. 6. SHOWING CONSTRUCTION OF MORTISE FRAME BARN, END VIEW.]

[Illustration: FIG. 7. SHOWING CONSTRUCTION OF PLANK FRAME BARN, SIDE VIEW.]

Figures 6 to 9 are side and end views, showing the detail construction and size of the timbers of the plank frame and mortise frame barns here figured. The detailed figures of the lumber bills for each of these barns were carefully worked out, but are too voluminous for publication here. The total number of feet of each kind of lumber required is given in Tables 1A and 1B. Since the proportion of the different kinds of