

evaporate the moisture, and dry to the same temperature before weighing, so as to ensure having the same amount of moisture on each occasion of weighing; but, when the sample is weighed at this temperature, it readily takes up moisture from the air in the process of weighing, and we find that, unless we get the accurate weight immediately, it will gain weight so quickly that, in the case of using a very small sample, our percentage of loss will be very far out. We should prefer (if the oven is used) to leave the sample in the air for a few minutes after drying, so as to get it the same temperature as the balance or scales would be, and then to weigh it. By this means we could ensure getting the weight accurately, without it taking up moisture during the process of weighing.

Having stated at length the receipts and methods adopted by several authorities, we will give a complete analysis, as found by the above method, viz.:—Drying the sample in a copper oven, and then allowing it to take up moisture from a room, at a temperature of 62° F. before weighing, and then subjecting it to test, and again drying in the oven to evaporate the moisture, and allowing it to again dry in the air before weighing it to ascertain the loss.

Weight of cloth = 80 grains.

After treating with the caustic soda = 2.67 grains, or 33½ per cent. cotton

Wool dissolved in the process = 5.33 grains, or 66½ per cent wool.

Warp weighed 1.14 grains.

After treating, .40 grains, or 35 per cent. cotton.

Wool dissolved, .74 grains, or 65 per cent. wool.

Wet weighed 3.4 grains.

After treating, 1.05 grains, or 31 per cent. cotton

Wool dissolved, 2.35 grains, or 69 per cent. wool.

In the above example, there is either more wool in the wet than in the warp, or else some of the short fibres of cotton have been lost in the working, owing to there being less twist in the wet. If we take the warp and wet together, we find the proportion of cotton 32.2 per cent. against 33.5 per cent. in the cloth, so that there has evidently been a slight loss in separating the warp and wet from the cloth.

BUILDING AND EQUIPPING A COTTON MILL.*

The main building of a cotton mill should not be over three stories high, with weaving shed connected by means of a fire-proof covered run, said run on hallway being located near the elevator. The shed should be at least twenty feet from the main mill, with a fire-proof wall for end, said wall caps to be made of iron or stone to protect it from the weather.

The shed should be constructed with a saw tooth roof for the purpose of diffusing light; the main building constructed on any of the well-known plans, but I should prefer the Lockwood style of floor beams, with the exception that the intermediate beam be carried to the centre of double window frame, and there supported by an I beam extending down to the window stool. This will give the beam a strong support, and not in the least unsightly. I

would advise the use of steel I beams. There would be no shrinkage in them to allow machinery or floors to settle, and the only objection I know of to their being used is that they might sag in case of fire; but who would not rather run that risk, which is but a minimum with our well protected mills by first-class systems, than run the risk of shrinking beams and settling floors.

The power house should be located conveniently to the mill, also conveniently to the railroad, so as to have the least amount of handling of coal. I would advocate the steam engine and electric generators as the prime movers and carry the power to motors in mill, the said motors to be located on the ceiling over the spare floor in the centre of the rooms in long mills, and at the ends in short mills; the motors located far enough below the ceiling to be handily oiled and operated. Each main line should have a separate motor, and each long counter-shaft should also be drawn by a separate motor, having all switches located on the wall, convenient so that the overseer or secondhand could operate easily in case of danger or accident, by the use of electricity. The extra heavy shafting, pulleys and belting are all done away with, and the fire risk reduced, as the power can be isolated from the main buildings.

Picker rooms to-day, I think, have reached the standard of perfection, and I strongly advocate the opening of cotton one week in advance before it reaches the feeders attached to the picking machinery. This opener should be connected by a short trunk, of not less than 10 feet or over 15 feet in length, to the first breaker. From breaker the cotton should pass to intermediate lapper by doubling four into one, thence to finisher with same amount of doubling. This will insure every time an even, clean lap, providing you have given the fans an ample dust room, with at least three square feet of outlet to each fan. It is but six or eight short years ago that cotton manufacturers complained that first-class carding engines were not built in this country, but to-day there is no need of any such complaint, because the machinery manufacturers have built, at a great expense to themselves, a carding engine equal in all respects to any made in the world. Now, have the manufacturers of cotton done their part?

You buy an expensive and accurately made machine that is built to be adjusted, to a few thousandths part of an inch and set it on a floor that will settle and give more or less each and every day with the weather. You expect this finely made machine to do good, accurate work. If you want good, first-class carding, set your carding engine on a foundation made as firm and solid as you make the foundation for your steam engine. You will then not only get extra good carding, but the repairs for your cards will be reduced to such a small amount that you will hardly know that you have any in your mill. Carding rooms should be located on the ground floor.

Drawing frames, although the simplest machines in the mill, are about the most important and have given the machinery manufacturers no small amount of trouble and expense to perfect, but that has now passed over and a first-class machine may be had. Fly frames should be located with cards and drawing and have equally as good

* Paper read by Malcolm Campbell, Woonsocket, R.I., before the New England Cotton Manufacturers' Association.