

IMPROVED REAPING, THRASHING, AND BAGGING MACHINE.

Necessity has truly been the mother of some of the greatest inventions. The requirements of the various fields of labor have been wonderful developers of man's ingenuity. This fact is most apparent in the vast harvest fields of North Dakota and California, where the sickle, and the cradle, and the flail, for so many centuries wielded by tillers of the soil, would not, even in the hands of an army of men, have been adequate to the requirements of the hour.

Here may perhaps be found one of the most, if not the most, distinctly American invention ever made, in the combined reaping and thrashing machine. A few years ago, a progressive farmer in the vicinity of Merced, California, not satisfied with the slow progress of his header and thrasher when operated separately, set his wits at work to devise a combination machine that would do the work of the two with one motor.

The result of his labor was a ponderous affair weighing eight tons and costing him \$3,000. It did not work satisfactorily, and he rebuilt it at an expense of \$5,000. This machine operated satisfactorily, but it required thirty powerful mules to push it. These mules were attached to a "push beam" fifty feet long and nearly as large as a ship's spar.

This cumbersome machine was so arranged that it

the speed with which the New England farmers prepare their grain for the market.

As the machine advances, the knives in the cutter bar clip off the heads of the stalks. These fall on a broad endless canvas belt that carries them to the cylinder or beater of the thrasher, which removes the grain from them. It drops through a series of sieves over and among which a rotating fan keeps a strong current of air moving. This removes the dust and chaff, and the grain pours in a steady stream through a trough into sacks which are sewed up and dropped on the ground to be picked up by teams that follow the thrashers. The work of each machine for the day, in an average field, is 950 sacks. Besides the mules it requires three men at a cost of two dollars a day each to operate each machine.

Butter and Cheese Microbes.

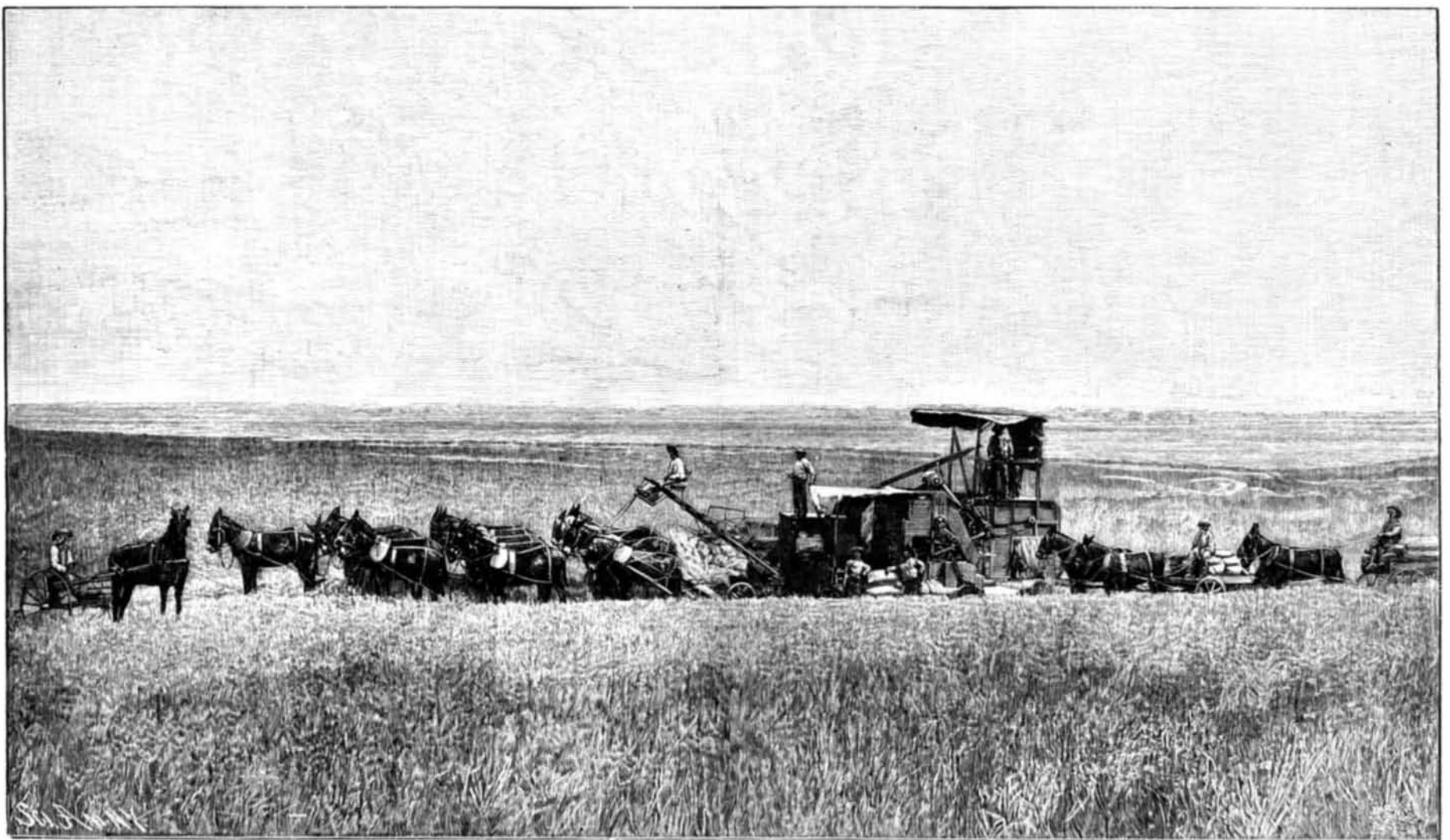
In its relations to the operations of the dairy, the study of bacteriology has only just begun; but already, in so far as the work of bacteria has been looked for where it might be expected, it has been found. It has for a long time been known that milk is a most efficient means of transporting infectious diseases; as we now know, this is because its chemical composition adapts it so well for the nourishment, while in transit, of the microbes which are the actual carriers of the diseases. But their work is not all of

any one species of bacterium as that one which exclusively produced the flavor of the one kind of cheese or of the other. The most he could establish was that the solubilizing of the curd was effected by one or more kinds, and the production of the flavor by one or more other kinds. A great amount of work remains to be done in this special field alone.—*Pres. Caldwell's address, Am. Chem. Society.*

Gold Waste of Value.

When the American Waltham Watch Company moved to new quarters in May last, they left behind a snug fortune in the old buildings in Bond Street, this city, in the shape of minute particles of gold among the old rubbish and in the cracks of the pine flooring. The precious metal has been reclaimed, however, by the Irvington Smelting and Refining Works, at Irvington, N. J., in the form of bars of yellow gold. The total value of the gold reclaimed is between \$65,000 and \$67,000. The gold recovered must have accumulated since 1879, when the factory was occupied by the firm. An average of 350 gold watch cases were turned out every day, each case weighing from twenty to fifty pennyweights. The gold was valued at eighty cents a pennyweight, and during a year it was estimated that more than \$500,000 worth of gold was used in the manufacture of watch cases.

The water in which the workmen washed their

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could be steered by a man whose title was "helmsman." It required four men besides the mules to operate the machine. The cutting bar was twenty-two feet wide and the harvesting capacity of the machine was forty-eight and a half acres a day. The expense of operating this machine was, of course, large.

The ideas brought out in the construction of this machine were valuable, and inventive minds at once set to work to improve upon them, which they have done so successfully that, as compared with the bulky Merced machine, there are now combined reapers and thrashers that are compactly built and which are easily operated by seventeen horses or mules.

The amount of work that one of these machines is capable of performing in a day will seem incredible to those persons who have never seen them in operation; and to those agriculturists who have never seen anything swifter in operation than the cradle and the horse power thrashing machine, the sight of thirty-five of these monsters working at one time in a single field of wheat, as is frequently the case on the great Dalrymple farm in North Dakota, would be an astonishing revelation.

In one day of ten hours, seventeen mules will draw a combined reaper and thrasher twenty-three miles. The machine cuts 2'69 acres to the mile, which makes it capable of harvesting 61'87 acres a day. This would mean, in a year when the yield was fair, about 1,900 bushels of grain. This grain is garnered at the rate of 190 bushels an hour, or three and one-sixth bushels a minute, which is indeed a wonderful improvement in

this baneful character. Two illustrations must suffice; cream must undergo a certain change, called its ripening, before butter of the best flavor can be produced from it. The microbe that causes this change has been, at least to a large extent, separated from many others in the milk, and it is claimed that the pure culture of it can be practiced on a large scale in the dairy; the directions for this operation were first given by Weigmann, in 1891, with seed to be obtained from some bacteriological institute, and the use of this pure culture product is specially recommended at certain seasons of the year when it is particularly difficult to make good butter.

Again, in the ripening of cheese we should naturally look for the action of microbes. Several investigators have taken this matter up, but by far the most careful research was made by Adametz, and published in 1889. He identified twenty-eight species of bacteria in ripening cheese, and a very large number, 850,000, in a gramme of a hard cheese (*Emmenthal*), and 5,600,000 in a gramme of one of the soft cheeses. Two distinct kinds of change take place in the ripening of the cheese: the conversion of some of the insoluble casein of the fresh curd into a soluble and more digestible form; and second, the development of the flavor, by which one kind of cheese is distinguishable from another. If the curd is sterilized at the time when it is ready to be put away in the ripening room, and is there protected from infection, neither of these changes takes place; the dependence on microbial co-operation is thus established. Adametz was not able to identify

hands, the mats on which they walked, and the towels with which they dried their hands and faces were carefully preserved, and at the end of every month were strained or burned and the residue afterward smelted and refined. About \$1,000 a month was saved in this manner. Every summer parts of the flooring were taken up and smelted, and sometimes as much as \$7,000 was realized in this way.

To obtain the gold concealed in the cracks and crevices in the old building, wagons were especially made to cart the old material from the factory to the smelting works, and every stick of wood in their premises was taken away. The planks of the floors were sawed into small pieces and then burned. The ashes were subjected to a chemical wash and the gold extracted.

The Volcano of Kilauea.

Dr. Sereno E. Bishop, in the September number of the *American Journal*, gives an account of a recent visit to this remarkable mountain. He says: The conical form of Halemauau has become very distinct, and is strongly appreciated in the ascent to it on nearly every side. The volcano will soon be very accessible for tourists. The Hilo road is perfectly graded and rolled, and will probably be completed in a few months, when the drive to Kilauea will be one wholly of pleasure. The new hotel is a superior one, with lodgings for 70 guests. Plans are in progress for improving the walk over the lava. The whole is now in the hands of an active and enterprising corporation.