

Address on Dairy Farming.

Concluded from last month.

As the country increases in wealth and population, manufactures are to increase to an extent of which we have now no example in anything, except in the making of agricultural implements and cotton cloth. Farming and lumbering are ordinarily the first employments that engage the attention of the early settlers of any country; but as wealth increases, and the population multiplies, the next move is in the direction of manufactures. What surplus money there is in a new country is almost sure to be invested in paying for land, until the large tracts belonging to the Government and to corporations are secured. Farm-buildings are the first erected, then arise the machine-shop, the foundry, and the factory. To manage the lathes, forges and spindles, require many laborers, who become consumers of dairy products. We in the North-west have passed through this first stage of development, and are just entering upon the second. Rock and Fox Rivers will soon be used for other purposes than turning the wheels of a few grist-mills, and affording water for the stock that feed along their banks. As the cotton-fields advance westward, and the sheep leave the rocky hill-sides of the East for the vast plains so long occupied by the buffalo, new Manchesters and Lowells will spring up at every spot where the falling water has so long sung its song of welcome.

Other minor causes are now operating, and will probably for years longer continue to operate, to favorably influence the demand for dairy products, and to keep up their price. For instance, since the first settlement of the country, pork has been the leading article of meat diet for a large number of inhabitants. Hogs were so quickly bred and so easily fattened, that their flesh was afforded at an almost nominal cost. With the advent of the war, however, this was changed. Every regiment of troops that went to the field under either flag, required the slaughter of a large number of swine. This great demand for pork continued for several years, and we have not yet recovered from the effects of this wholesale slaughter.

Fat of some kind seems to be a necessary part of the diet of every people, though various are the forms in which it is eaten. The people on either shore of the Mediterranean use the oil of the olive, while our fellow-citizens in Alaska delight to revel in the oil of the seal and the blubber of the whale. In the place of sweet oil or fish oil, we have used the fat of the hog; and while the price was low and the trichinae were unknown, this formed our chief article of oleaginous food. Now there is a disposition to substitute butter for it, both from the growing prejudice against the use of pork, and from its higher price as compared with former years.

As to cheese, we all know how it is gaining in favor. No longer regarded as a mere condiment and appetizer, it is fast beginning to take its place among the substantial articles of common food. We are fast learning what the people of Europe and Asia found out so long ago, that a cheaper and better article of diet could be obtained from the milk of animals than from their flesh. Cheese has very many things to commend it as an article of food, apart from its containing so large an amount of nutriment. It does not require to be cooked as meat does; hence by its use there is the saving of fuel and the greater saving of time spent in its preparation. There is no loss in bone, and nothing is wasted by its being burned in the oven or scorched on the gridiron. No chemist, no physiologist, and, for that matter, no steward of any large boarding establishment, has ever tested the value of cheese as compared with meat, at the respective prices they now bring, who has not given preference to the former on the score of economy.

For these and many other reasons that might be given, there would seem to be no cause for the prophecies of some modern Jeremiahs in relation to the coming destruction of our interests. I am well aware that a few years ago the profits of the hop-field and sheep-walk were greater than those of the dairy farm; and to short-sighted men the prospects of the former looked brighter than did those of the latter. But because these interests have failed from perfectly natural causes, let no aspiring Gibbon think himself warranted in preparing to write the "Decline and Fall" of American Dairying. The demand for hops was always limited, and a few countries, at most, were sufficient to supply the entire amount that was needed for all the breweries this side of the Rhine. As to wool, the fleeces produced in this country came in competition with those used on four great continents, not to mention an island larger than the United States, where the expense of raising sheep is almost limited to furnishing them with a supply of salt and water.

STATE AID FOR DAIRY IMPROVEMENTS.

In view of the great amount of capital invested in dairying, and of the important relations which this department of industry bears, not only to general husbandry, but to the whole community, in furnishing some of the most essential articles of human sustenance, I believe the period has arrived in the fullness of time, when we are justified in asking aid from the

several State governments for the better prosecution of our work. The sheep-grower has his wool tariff; the wine-grower his wine tariff; while encouragement in one way or another, is afforded to almost every branch in industrial occupation. The proceedings of agricultural and horticultural societies are published by money appropriated by the State, to meet which every milk-pail, cheese-press, cream-pot and churn-dash is taxed. We do not object to this; but we do not after all see why the orchardist, wine-dresser, corn-raiser, and stock-breeder, should not, in their turn, contribute to help us in carrying on our investigations, and in spreading the information thus gained, before the people at large.

We have State geologists, entomologists; and Illinois has a horticulturist. This is well; we would not have it different. We would only add to the number a practical and scientific dairyman, who understands what is now known of the arts that pertain to dairying, and whose scientific attainments are such that he can investigate the obscure causes of some of the failures that now trouble us. Pear-blight, root-rot, and noxious insects are all bad, and so are floating curds, tainted cheese, and rancid butter.

Old as are the arts of making the butter and cheese from milk, there are still many things pertaining to them, about which we are but slightly acquainted, or are in entire ignorance. Dairying in age may be compared to an old man; but in true knowledge and advancement it may be likened to a little child. Who can explain the mysterious connection which exists between heat, "animal odor," and the souring of milk? Who knows the composition of the envelop that surrounds the globule of fat which forms the basis of cream? Is any one certain of the causes of the solubility of casein in the water of milk?

Long ago some one "did up" the science of milk and its various ingredients, in very few words; and the theories that were then put forth have come down to us almost unquestioned. It was stated that the envelop of the butter globule was casein. It is plain to my mind that it can not be, because the casein in newly drawn milk is in a state of solubility, and we are at considerable difficulty to coagulate it for the purpose of making cheese. Coagulated casein is rendered soluble by means of an alkali, as soda. But you can not make butter from cream by putting soda in it. Mr. Arn Id, in his paper on the Action of Rennet, which was read at the late meeting of the dairymen's Association, exploded the doctrine that had so long been held, that rennet only played the part of an acid in neutralizing the free alkali that is in milk. The doctrine was questioned several years ago by Mr. Goodale, of Maine, though he brought forward no theory that accounted for the coagulation of milk in cheese-making.

There are many unsolved questions that pertain to the manufacture of butter. What constitutes the color of butter is something of a mystery. That it is not dependent on any organic principle contained in the milk, seems evident from the fact that two samples of butter made from the same lot of cream will not have the same color. Butter we have been told, becomes rancid because it contains a small amount of casein, say from one to three per cent. But if we add to this cheesy matter, we are greatly troubled to keep it from becoming rancid; while cheese, which is nearly all casein, may be preserved for years by means of less than two per cent. of salt.

If we have found out, after I know not how many thousand years, how a piece of the stomach of a calf acts to change milk into curd, I am glad of it. It places the science of cheese-making so much in advance of the science of butter-making; for I think that no one knows how the churn-dasher acts to change cream into butter. We are told that the globules of oil that go to form butter "are inclosed in a thin film of caseous matter," and that by the action of the churn-dasher these minute coverings are ruptured, their fatty contents come out, aggregate, and form a mass of butter. Now, if this is exactly as stated, why is it that the operation of churning varies so much in regard to time; requiring at one time only a few minutes to bring about the desired results, and at another time requiring almost as many hours; and that, too, under circumstances as nearly alike as it is possible for the ingenuity of man to have them? Again, if churning consists merely in breaking this film of casein or any other kind of matter, why is it that this covering for the several globules is not broken in the order they are acted upon? Or why is it that after beating, splashing, thrashing, thumping, and splattering these globules for an uncertain length of time,—only that it is pretty certain to be unlike in point of duration to that of any previous time,—these coverings suddenly if not unexpectedly fall asunder, and give us the reward of our very monotonous labor? Similar questions to these have been propounded before, but as they have not been answered, it is well to ask them again.

For every stroke of the flail on the threshing-floor, some peas, or beans, or grains of wheat fly from their ruptured coverings; and why should not some particles of butter thus appear at every stroke of the churn-dasher? That the production of butter is not obtained by

the direct action of friction or pressure, seems certain from the fact that it is necessary to have due regard to what is known as the proper temperature of the cream. It is also a well known fact, that butter may be produced from cream by simply inclosing it in a cloth and burying it in the ground. This practice is quite common in France, and Mr. Flint, of Massachusetts, states that his experiments in this direction have been highly successful, and that the butter produced was very satisfactory, if we except it was wanting in color.

In view of the fact, then, that there are so many unsolved problems of a scientific nature connected with the manufacture of butter and cheese, as well as so much to be learned as an art, before we can reach the highest point of excellence, is it not evident that every means should be resorted to, in order that we may produce better articles of food, and at the same time add to the material wealth of the country? No individual dairyman should spend his time and money in making these necessary investigations, even if he has the means and scientific attainments to enable him to prosecute these researches. Nor is it to be expected that scientific men, whose purses are seldom very long or over-filled, and whose time is required, like other men's, in obtaining a livelihood, should devote themselves to making investigations that shall benefit the whole community, they perhaps deriving the least advantage from their own labors.

It is plain that we can not expect much aid or comfort from agricultural colleges, as most of them are now managed. The treasures of too many of the former are drained in appropriating "citizens' purses for agricultural horse-trots" at the annual fairs, to do anything to advance the cause of dairying, except to offer a prize or two for butter and cheese. As to some of our so-called agricultural colleges, the learned members of their faculties are too much absorbed in teaching a few city boys the languages and literature of some extinct nations, of whom nothing remains but their superstitions, to have any time to devote to such unpoetical and mundane affairs as making butter and cheese. To them it is a slight matter whether the immense capital invested in dairying shall produce large or small returns; whether the cheese that is eaten is nutritious, or whether the butter in the market is sweet or rancid. Graver questions engage their graver minds; questions of such absorbing interest to the farmer, of such vital importance to the dairyman, as whether the Greek should be pronounced by quantity, or by the written accent; or whether some word in one of Sophocles' tragedies actually existed in the original manuscript, or has since been supplied.

UTILIZATION OF WASTE DAIRY PRODUCTS

Until very recently the hog has been almost the only medium by which the dairyman has converted the waste products of the churn and cheese-vat into substance of commercial value. This animal, whose propensity for wallowing in the mire is well known, and whose uncleanly habits are proverbial, is fortunately possessed of an appetite for less dainty food than most creatures. He is not only the scavenger of the farm, but the converter of waste articles into those of real worth. There are, however, grave objections to keeping in the vicinity of a cheese or butter factory a sufficiently large number of hogs to eat the great amount of whey and skim-milk which is produced. Cleanliness in everything, air included, is an essential condition to making prime butter and cheese; and, as we all know, cleanliness is almost incompatible with the pig-sty. We can not prevent milk from absorbing odors; and if the stench of the hog-yard, and not the fragrance of clover-blossoms, abounds, our butter and cheese will suffer in consequence.

Apart from the fact that swine are useful to convert into food substances that would otherwise go to waste, I question if it would be economical for dairymen to keep them, at least in large numbers. We are north of the latitude in which hogs are most profitably kept. They can not be put in good condition for the market on whey and skim-milk alone; we must resort to corn at last to finish the fattening. Now the dairy farmer needs all his land for raising crops for his cows—they are his legitimate source of wealth. The grass of his pastures, the forage of his meadows, the corn and grain of his cultivated fields are all needed for his cows. These crops pay him better when changed into milk, than when converted into pork. The loss of feeding these latter products to hogs instead of to cows, may be more than counterbalanced by the gain in saving the milk derived of its butter and curd; but there is, after all, a loss in this attempt at compensation.

It has long been known to scientific men, as well as to others of enlarged intelligence, that the sugar contained in whey and the curd manufactured from skim-milk were of too great value to be fed to hogs. They have known that such a disposition of them was literally "casting pearls before swine." They have been perfectly well aware that crude casein could be converted into a substance of greater commercial value than the lean muscle of a dirty shote; and that sugar of milk could be used to better advantage than manufacturing hogs' lard. But how to do it was the question. We have had in this country but few skilled scientific laborers—persons versed in the arts of chemical manu-

facture, men who could change our dross and rubbish into substances of the greatest utility and the rarest beauty. We have sent our bones to Germany to be manufactured into phosphorus, our blood to France to be made into prussiate of potash; while the alkali of our ashes, and the silicious sand of our mountains, have travelled across the ocean, even to the land of Huss, to come back to us in the form of glass.

Fortunately for our reputation as a manufacturing nation, luckily for the cause of American dairying, I believe we are commencing to see the "beginning of the end" of this somewhat mortifying procedure. During the past season, a firm of chemical manufacturers in Chicago, have made over half a million pounds of pure casein from the curd of milk, that was entirely innocent of any trace of butter; and which if manufactured into cheese would have been of the kind "that pigs grunt at, dogs bark at, but neither of them dare bite at." This substance is largely used as a mordant in calico printing, and the demand for it is large and constantly increasing. The difficulty the firm spoken of has experienced, is in getting a supply of curds; and this is so, notwithstanding the fact that they have offered more for them than they are worth for feeding purposes. A portion of the article thus manufactured has been sold to print-works in our own country, and a part has gone where much of our pressed curds go—across the Atlantic.

The same enterprising gentlemen propose the coming season, if they can meet with suitable encouragement from cheese-makers, to engage in the manufacture of lactine, or sugar of milk, from the whey of our cheese-factories. They state that if this article can be put on the market at the price of other sugars, it will meet with a ready sale to persons who are engaged in the compounding of medicines. They state that for many such purposes it is greatly to be preferred to cane or grape sugar, and that the present high price of the article alone prevents employment. They propose to buy the crude, unpurified sirup, such as can be prepared by simply boiling down the sweat whey in an open vessel; then I presume, to complete the manufacture by means of the filter and the vacuum-pan. I commend this enterprise to the favorable consideration of this Association as one likely to supply a want long left by the manufacturers of cheese.

Colic in the Horse.

Colic (belly ache!) seldom, if ever, occurs in the horse except in connection with a loaded state of the bowels, or the presence of undigested food in the stomach. Hence the very first indication of rational treatment is the administration of purgatives to clear the digestive organs of their irritating contents. On this plan we strike at the foundation of the disease, and remove the causes of all the mischief, and relief is nearly certain to ensue. Whereas, on the ordinary plan of merely relieving the symptoms by the application of opium to deaden the sensibility of the parts to pain, the cause of the disease is over-looked and remains untouched, and obstinate constipation, is very likely to follow. Horses and cows are often lost in this way. At the very outset we should administer a good purgative by the mouth of the animal and have recourse to the use of injections by the bowel. The best purgative is a ball containing six drachms of genuine Barbadoes aloes, two drachms of ground ginger, and ten drops of oil of caraway; and injections of nothing but plain warm water should be administered, in two-quart doses, and repeated at short intervals for five or six times, as occasion may require.

The practice of forcing the horse to stand on his feet, or walk about, when laboring under a fit of colic, is almost inhuman. The same remark is also applicable to the plan of exercising the horse during the time he is under the purgative action of a dose of physic. He should be moved gently about before the medicine commences to operate, but never after. Do those barbarians who knock the animal about when enduring the pains of colic, or when suffering from the strong purgative action of medicine, ever think of what they are doing? If they were treated themselves on the same plan, under similar circumstances, they would soon come to their senses in regard to the management of the unfortunate animal which is placed under their charge.

A new method of testing a man's sobriety has been suggested. If he can distinctly pronounce "veterinary surgeon" he may consider himself as sober as a judge. The test is infallible.

"I can't bear a fool," said a lawyer to a farmer. "Your mother could," was the farmer's reply.