PRINCIPLES OF CHEESE-MAKING.

The following extract from the Report of S. L. Goodale, Secretary of the Maine Board of Agriculture, on the manufacture of cheese, contains much information touching the principles which are involved in that business:—

Having secured cleanliness in all the appurtenances belonging to the dairy—having before us pure milk in clean vessels, the next points are, the degree of acidity, and the temperature at which it should be set, i. e. the rennet added to it.

When milk is drawn from the cow it is sometimes alkaline, sometimes neutral, and sometimes acid, oftentimes in summer, never acid so as to taste sour, but sufficiently so as to exhibit an acid reaction to a delicate test. As soon as exposed to the air there commences a spontaneous conversion of the sugar (of which milk usually contains from 4 to 5 per cent.) into lactic acid. The chemical composition of these two substances, as determined by analysis, is the same; yet they are very different substances, to our sense of sight and taste, and the difference is supposed to be due to the transposition of the elementary atoms of the sugar.

Some hold that cheese is best made from new milk. It is true that when too much changed only a hard, sour cheese can be made from it. It is also true that those cheeses which bear the highest reputation and command the highest prices, beth in this country and in Europe, are not made wholly from new milk, but from evening and morning milk mixed. From all the evidence presented, I entertain no doubt but the latter is the better practice; or in other words, that it is desirable that the conversion of milk sugar into lactic acid should have made some progress. The precise degree of progress which is best is not definitely known, nor have we at present any easy method of measuring it with precision, but practically it is found that if milk be kept for 12 hours at a temperature of 65 deg., and the morning's milk be then added, and the whole properly warmed, the best results follow, and the due separation of the whey is more easily effected.

In the Cheddar method, which from its advantages both in the saving of labour and superiority of product, is rapidly displacing older methods of cheese-making in England, sour whey is usually added, but this is unnecessary in this country, at least in most cases during the summer months, because of the higher temperature which here prevails, which insures more rapid progress towards acidity, and more caution is required that it do not progress too far than not far enough. Mr. McAdam, a skilful practitioner and teacher of this method, says: when the temperature of the cold milk is 95 deg. or upwards, no sour whey ought to be used, the acid then being present in a sufficient degree without it. When the temperature is higher, every operation of the process needs to be accelerated, until the curd is taken out and salted; for when too much acid is present, it affects the curd so as to render the cheese hard, and give it a sour taste."

The temperature of the milk when the rennet is added is next to be attended to, and is a point of great importance. It has been found by experiment that milk coagulates soonest when at a temperature of about 115 deg., but when curdled at so high a temperature the product is much injured. The proper temperature, as determined by experience, is usually from 85 to 88 deg., and the whole range admissible, under the varying conditions which sometimes occur, is not more than 10 degrees, namely, from 80 to 90 deg. If set below 80 deg. the curd is long in coming (unless an excess of rennet is added, which is highly objectionable,) is too tender, and the separation of the whey is attended with greater labor, and, unless extreme care is used, with loss, also. If it be set at a temperature above 90 deg., the curd assumes a toughness which is objectionable, and the cheese made from it is hard and of inferior quality.

How shall the proper temperature be determined? My answer is, by the use of a thermometer, and in no other way. The answer given by the practice of a majority of dairymen and dairy-women is, by the feelings, by the judgment, by the verdict of a practised hand; and doubtless they honestly believe those to be sufficient, and may ridicule the use of a scientific instrument to determine so simple a matter.—But the truth is that feelings, though very useful in their place, are not to be depended on to determine temperature. Our bodies are unconsciously affected by too many disturbing causes to afford a trustworthy index to slight differences. Tell a man suffering from fever and ague that he is no warmer now, when seeming to be on fire, than he was a little while ago, when shivering under a heap of blankets, and unless he is assured of the fact by means of other evidence than his own sensation, he will believe you to be laboring under an egregious mistake; he may likely enough take you for a fool, and perhaps exclaim, "Don't I *know* when I'm burning and when I'm freezing!" and yet the fact is as you stated to him, and easily demonstrated by the introduction of the bulb of a thermometer beneath the tongue or under the armpit. A very simple experiment will satisfy every one that the sensation of cold or heat is not always, even when in perfect health, in consonance with the fact. Take two basins partly filled with water, one as hot as you can comfortably bear, and the other as cold. Plunge a hand in each, and after a little while pour one into the other and put both hands in it; one hand says the mixture is cold and the other says it is warm.