

analyzing the whole milk and the skim-milk. The practical question becomes still more complicated from the fact that it is only necessary to know what is the most profitable temperature for setting the milk, but also the most profitable length of time.

Let us now utilize the first table again, both the whole milk and the skim-milk being analyzed, in order to show the percentage of the milk fat, at the stated temperature and times, which passed into the cream :

Temperature Fahr.	Length of time of setting expressed in hours.									
	8	16	28	40	52	64	76	88	112	136
35		42.3	48.0	50.9	52.7	53.9	56.7		76.1	81.1
38	30.3	42.1	50.4	52.5	62.0	67.4	71.7		78.2	83.6
43	28.6	43.8	50.3	63.3	63.3	67.4	73.2	74.8	78.9	82.2
46	30.3	42.6	53.9	58.7	63.5	70.3	75.0		79.9	83.2
50	38.3	46.3	57.2	64.4	67.0	72.6		78.9	81.6	
59	43.5	55.0	66.4	73.1						
68	55.0	61.1								
77	53.0									
86	53.3									

This table is the real practical one and proves beyond doubt that the higher the temperature the greater is the percentage of fat removed from the milk to the cream, the result also being accomplished in a much shorter time.

The cause of these effects is not far from reach. It lies in the condition of the casein of the milk, and connected therewith, the greater viscosity of the milk serum at low temperatures. In other words, the denser the liquid the greater is the resistance offered to the ascent of the fat globules, and the thinner the liquid the less is the resistance. The higher the temperature the thinner is the fluid through which the globules pass when rising. These conclusions, however, have reference to equal periods of time in setting; we should add that the milk will keep longer at low temperatures, so that when time is a factor, more profitable results may perhaps be obtained sometimes by setting at low temperatures.

Such are the results of investigations made in Germany, but our Canadian dairy authorities are ruled largely by a set of dairy philosophers in the United States. Investigators on the continent of Europe draw their conclusions from practical tests, while it is the tendency of the American philosophers to lay down theories, make deductions therefrom, and then attempt to establish them by experiment. The danger in the latter method is, that when the dairyman once bears the reputation of being a philosopher, he finds himself strongly inclined to twist the experiment into conformity with his theory.

The Americans started their investigations on the theory that the temperature during cream rising must be constantly changing, because thereby the differences between the specific gravities of the butter fat and the liquid through which it passes becomes widened. It is true that the fat rises because it is specifically lighter than the water and the other constituents of the milk, the specific gravity of fat being 93, that of milk 1031, and that of the fat free solids 1.6. The American theory assumes that the fat, under the influences of heat and cold, expands and contracts more than the water or the other constituents of the milk, so that by lowering the temperature, thereby widening the differences between the specific gravities, the cream will rise more rapidly and perfectly. The German investigators take no cognizance of this theory, it being utterly lost in the fact that the resistance offered by the

denser state of the fluid under low temperatures is too great for the adoption of the cool setting system. It is generally admitted that at high temperatures the milk should be set in shallow vessels; but the American dairy philosophers also talk about deep setting at low temperatures, which is absurd according to the Kreusler experiments above quoted. There is probably nothing more scientific and practical than the old shallow pan system which our farmers' wives used many years ago, which many of them still use, and which all would still use were it not for the overbearing conduct of our dairy philosophers.

There is another noteworthy point connected with the changing temperature theory. The investigator Prandtl found that changes of temperatures during the setting of milk produced a retarding influence on the rising of the cream, owing to the presence of currents in the liquid. From the facts and principles already laid down, the conclusion may be drawn that the temperature of all parts of the milk should be kept as near the same temperature as possible; and in the Kreusler tests this rule was strictly observed by immersing the vessels in water baths at the stated temperatures.

Another Word about the Soil Exhaustion Question.

A correspondent criticises us for insinuating, as he thinks, that the manure should not be credited to the stock in making statements of the debits and credits. In our editorial article (page 137), to which he refers, we were speaking entirely of summer conditions, when the grass eaten by the cows was not, and could not be, debited, and consequently it would not be fair to credit the manure. The subject is a vast one and volumes could be written on it, so the reader should stick closely to the conditions and not ask us to unduly lengthen our articles by repeatedly urging precaution against possible misapprehensions. Winter conditions are quite another question; the food can then be charged against the stock, and then, of course, the manure should be credited. We thought all our readers could easily see this point.

Another correspondent does not believe that the value of the fertility sold from a grain farm amounts to \$358.93 yearly, or \$162.66 from a dairy farm, as stated in the same article. He concludes that science must be wrong in making such high estimates. All we have to say in reply is that science has nothing at all to do with these values; it is the practical farmers who establish the prices of the constituents of soil fertility, and not the scientists. If farmers persistently pay 18 cents per lb. for nitrogen, 8 cents for phosphoric acid, and 4 or 5 cents for potash, scientists cannot prevent them, and when farmers agree to pay less, then of course the figures representing the loss of their soil fertility will also be less. These constituents have market prices just like other articles which farmers purchase. These points are worthy of profound study by all farmers who aim at excellence in their profession.

Prof. A J Cook says he has repeatedly proved the efficacy of a strong solution of soft soap for the apple-tree bark-louse, if applied in early June, and again three weeks later. The trees put on new vigor when cleaned of the insects. Prof. Cook uses a cloth and scrubs the trunk and main branches by hand; or a stiff brush may be used.

The Soil Exhaustion Controversy.

We publish in another column a letter from "Subscriber" in reply to Mr. Shaw. In justice to the latter gentleman, we feel it our duty to state that we have received two letters from him on the subject, and it is just that we should explain why we have not published them. While we are desirous that none of our readers or correspondents should be wronged in any particular, yet we must also, in justice to ourselves and our readers, guard against being imposed upon.

Mr. S. appeals to our sense of justice, and imploringly desires us to publish his communications in full. We struck a sentence out of his letter in which he named a certain Government publication wherein his paper on "Robbing the Land" is published in full. He insists that we should give "Subscriber" and our other readers an opportunity of studying his paper. While we have informed "Subscriber" of this fact, yet we refuse—and have always done so—to give free advertisements to the so-called agricultural literature of the Government, for two reasons, viz.: (1) that a great deal of the literature is falsely reported, and (2) even if it were correctly reported, it would contain a great deal of worthless and unreliable information which no farmer should read, except probably those who are involved in agricultural booms. We might even assign a third reason, viz., that we don't wish to encourage such publications on the ground that the expense is a burdensome tax upon our farmers. Why, if we named the said publication, many farmers might procure it and might even believe in the doctrines preached by Mr. S. and his confederates.

In the second place, he urges that the main issue is our proof of the charge that he is a confederate of the Government, while we contend that the vital question is, can the fertility of the soil be maintained or restored by returns from its own resources? Nobody needs the said Government report to see that this is the issue, for he repeats the declaration in his article which we published in our last issue. If he had given his recipe for restoring fertility in the way he mentions, we would gladly publish it in the interests of our readers and of all mankind, and would freely advertise him as the greatest benefactor of humanity. With reference to his being a confederate of the Government, he stated (as published in our last issue) that if he were a confederate, he "would not be ashamed of the connection," and in a subsequent letter he says he has never been a confederate of the Ontario Government, "in any other sense than in the main being in sympathy with it."

Now these statements prove to our minds that this question is not one of great urgency, although we are willing to take it up in its natural order. His conduct in his writings indicates to us that his first desire is to get a free advertisement for his article, or for Government literature, as the case may be, and secondly that he wants to evade the main issue. If he is an agricultural authority, he must know that history, science, and practice are against his theories, and we suspect that he has recently had his eyes opened to this fact. If he is in sympathy with the Government, he should by all means confederate with it in the imposition of its theories upon the agricultural community. The fact of his paper on "Robbing the Land" now being a part of the Government literature, is surely ample proof that there was a confederacy existing between him and the Government on the land-robbing question; the remaining articles of confederation is another issue. We are strongly inclined to the belief that this confederacy had its source in the interests of a pack of live-stock speculators; but if the perpetrators of the boom plead ignorance as the cause, then we will not feel disposed to get into a wrangle.