cream into butter; the amount obtained from a given quantity of milk; and the quality of the butter, all managed under circumstances as nearly alike as possible. The difficulty of raising cream and making good butter in cold weather is well known to all who have paid any attention to that branch of the farmer's business.

The result of our experiments in 1841 induced the belief that heated or scalded milk produced the greatest quantity of cream and best quality of butter: but the comparative experiments now made, and the results, confound us. The process of scalding milk is troublesome, and the milk after the cream is removed, is poor and of but little use, except for the pigs. Although we are much disappointed in the result, we take great pleasure in making it known. The object is interesting not only to those who make farming their business, but to every family whose situation and circumstances make the keeping of this valuable animal, the cow, practicable: it is important not only because cows supply the market with milk and butter, but because they contribute so much to substantial domestic comfort and convenience.

Experiments correctly made and fairly tested form the data on which improvement should be founded. Exactness is important to one's character and usefulness. There is a satisfaction, too, in knowing what we do. For this reason we were very particular to weigh the milk when taken from the cow and strained into the pans, to note the temperature when setting for cream; to weigh the cream before churning; to note the temperature while churning; the time employed in churning; and the weight of the butter after having been thoroughly worked.

Agriculture must be considered as one of the exact sciences, and we shall never know whether our progress in it is forward or retrograde, until we have done with *guessing*. But, methinks I hear you say, "it is troublesome to be exact." We answer, the trouble is not so great where the habit is once formed; and is very much more than compensated by the satisfaction experienced in doing it.

The result of the experiments are as follows: The night's milk of five cows, commencing on the 5th of January, and ending on the 9th, was subjected to the following process. As soon as the milk was drawn from the cows it was strained into tin pans, and weighed, and amounted to 70¼ lbs. After standing twelve hours, boiling water was introduced in an under pan, made for the purpose, which is sufficiently deep to hold about the same quantity of water as there was of milk, the top of the under pan fitting closely to the upper part of the other; the under one nearly straight on the sides, the other flaring, by which means sufficient room is left to retain the steam. From the 70¼ lbs. milk, after standing in a room, the temperature of which was from 50 to 55, thirty-six hours, 6¼ lbs. of cream was taken from it. This cream was churned in a temperative of 60 degrees, and produced 3¼ lbs. of butter—time churning 17 minutes.

On the 11th of Janurary, we commenced setting the milk for cream in the usual way, from the same cows in the same room, in a temperature ranging from 48 degrees, to 56 degrees; after standing forty-eight hours it was skimmed. It was so managed that the same amount of milk, (70¼ lbs.) was used, which produced 14 lbs. cream, in which unavoidably remained considerable milk. This cream was subjected to the same process and temperature as the former, (60 degrees,) and produced the same amount of butter, and occupied 12 minutes in churning.

Now, there may have been some ounces difference in the two parcels, as our steelyards mark nothing less than ¼ pounds, but we were particular in noticing the movement of the beam, and did not discover any material difference.

From the above experiments we have arrived at the following conclusions: That when the milk room is cold, say 30 degrees, it is most advantageous to scald the milk, but when the temperature does not fall below 48 degrees, little or nothing would be gained by adopting it. There is so little difference in the quality of the butter that it would be difficult for the nicest taste to distinguish which was made the one way or the other. The color too, is so similar that it would be supposed both rolls were made from one churning.

C. N. Bement.

Three Hills Farm, Janurary 20, 1844.

[From the New England Farmer.]

DANA'S PRIZE ESSAY ON MANURES.

SECTION SECOND.

Shovelling over the Compost Heap.

The above remarks (Section 1st), may be called our compost heap. It must be well shovelled over, You must, reader, before you cart it out and spread it, understand well what this compost contains. Now just let me turn over a few shovels-full, and fork out the main points to which I wish to call your attention.

1st, That all plants find in stable manure every thing they want.

2nd That stable manure consists of water, coal and salts.

3rd. That these, water, coal and salts, consist in all plants of certain substances, in number fourteen, which are called—1. Oxygen; 2. Hydrogen; 3. Nitrogen; 4. Carbon; 5. Sulpher; 6. Phosphorus; 7. Potash; 8. Soda; 9. Lime; 10. Magnesia; 11. Alumina or clay; 12. Iron, 13. Manganese; 14. Chlorine, which last, as we have said, forms about one-half the weight of common salt. And if you always associate with the word chlorine, the fertilizing properties of common salt, you will, perhaps, have as good an idea of this substance as a farmer need have, to understand the action of chlorine

4th These fourteen substances may be divided into four classes: 1st, the airy or gases, oxygen, hydrogen, nitrogen and chlorine. 2nd, the combustibles carbon, sulphur and phosphorous. 3rd, the earths and metals, lime, clay, magnesia, iron and manganese. 4th, the alkalies, potash and soda.

You may be surprised that I have not turned up ammonia, but this exists in plants as hydrogen and nitrogen.

5th. The term salt includes a vast variety of substances, formed of alkalies, earths and metals, combined with acids. Fix well the meaning of this term in your mind, and remember the distinction pointed out, that some salts are volatile, and act quick in manure, and others are fixed and act slower.

6th. When plants die or decay, they return to the earth or air these fourteen substances. Those returned to the earth from mould, which thus is composed of carbon, salts, and water, is natural manure.

7th. Mould consist of two kinds, one of which may be, and the other cannot be dissolved by water. Alkalies put it into a state to be dissolved, and in proportion as it is dissolved it becomes valuable as a manure.

8th. If then manure contains only water, carbon, and salts, any substance which affords similar products, may be substituted for it. Hence we come to a division of manures into natural and artificial. The consideration of these is the carting out and spreading of our compost. And we shall first consider in detail the natural manures. That is, those which are furnished us by the dung and urine of animals, and the manure or mould formed by the decay of animal bodies or plants. These are truly the natural manures, consisting of water, mould, and salts. This is all that is found in cattle dung. This been premised, we may divide manures, reader, for your more convenient consideration, not by their origin, but by their composition. We may divide manures into these three classes: First, those consisting of vegetable or animal matter called mould: Secondly, those consisting chiefly of salts; and, thirdly, those consisting of a mixture of these two classes. And beginning with the last first, we will now proceed to their consideration.

SECTION THIRD.

Carting out and spreading.

The general chemical information set forth in the preceeding section, will be of no service to you, reader, if it conducts you not beyond the result arrived at in the close of the last section, that cattle dung is composed of water, mould, and salts.

You want to know what salts, and how they act. If you understand this, you may be able to say beforehand, whether other things, supposing their nature understood, can take the place of the mould and salts.

The mould, then, of cattle-dung, as all other mould, contains the following substances:—

The water consists of oxyen and hydrogen.

The mould consists of carbon, oxygen, hydrogen, nitrogen, and ammonia.

Thus it is seen that the mould contains all the substances found in the first class into which the elements of plants were divded. The salt contain the sulphur, phosphorus, and the carbon as sulphuric, phospohric, and corbonic acids, and the chlorine as muriatic acid or spirits of salt.

The acids formed of the elements of the fourth class of the substances entering into plants, are combined with those of the second and third classes, namely: the potash, soda, lime, clay, magnesia, iron, and mangenese. Here, then, we have all the elements of plants, found in cattle dung. Let us detail their several proportions. We have all that plants need, distributed in cattle-dung, as follows:—

In 100 lbs. of cattle-dung, are,	
Water,	83.60
Mould composed of hay,	14.10
Bile and slime,	1.275
Albumen, a substance like the white of an egg	.175
Salt, silica, or sand,	.14
Potash, united to oil of vitriol, forming a salt,	.05
Potash, united to acid of mould,	.07
Common salt	.08
Bone dust, or phosphate of lime,	.23
Plaster of Paris,	.12
Chalk, carbonate of lime,	.12
Magnesia, iron, manganese, and clay, united to the several acids above,	.14
	100

SECTION FOURTH.

Of the action of Mould in Cattle-Dung.

Here then, we have cattle-dung with its several ingredients, spread out before us.

We have now to study its action. We need here consider only the salts and mould. The water is only water, and no other action than water. The mould includes the hay; for that has, by chewing, and the action of the beast's stomach, lost so much of its character, that, mingled with the slime and bile, &c., it more rapidly decays than fresh hay would, placed in similar circumstances. During this act of decay, as you have already learned, the volatile parts of the mould are given off in part. These escape as in burning wood, as water or steam, carbonic acid, and ammonia. In consequence of this slow mouldering fire or decay, the manure heats. Here, then, we have three very decided and important actions produced by the vegetable part, or mould of cattle-dung. First, carbonic acid is given off; second, ammonia is formed; third, heat is produced. Let us now consider each of these, and their effects.

First, the great action of the carbonic acid is upon the soil, its earthy parts. It has the same action on these, that air, rain, frost, have; it divides and reduces them. It not only reduces them to powder, but it extracts from the earth potash and the alkalies. This is a very important act, and shows why it is necessary that decay or fermentation should take place in and under the soil among sprouting seeds and growing roots, in order that they may obtain from the soil the salts they want.

If well-rotted manure contains abundance of these salts, ready formed in its mould, then there will be less necessity of this action of carbonic acid. But here again it must be remembered, that this abundance of salts, ready formed in mould, can be produced only at the expense of great loss by fermentation of real valuable parts. For,—

Secondly, the next great action of the mould of cattle dung is, to produce or form ammonia.