

exposed to their influence, and we made a heap of bones and earth, moistened, to soften the bones and cause a more rapid disintegration of them when covered up by the soil. The following diagram shows the action of the carbonic acid upon the three-lime phosphate in bone:

Composition of Tri-calcio phosphate	Re-Agents Employed	Products of Decomposition
Phosphoric Acid	Water	Bi-calcio phosphate
Lime		
Lime		
Lime		
	Carbonic Acid	Carbonate of lime

The three-lime, or tricalcio phosphate, contains about 46 0/10 of phosphoric acid, and consequently 54 0/10 of lime.

Voelcker's analysis of bone-dust is as follows:

Moisture.....	12.06
Organic matter.....	29.12
Phosphate of lime and magnesia bone-earth.	49.54
Carbonate of lime.....	6.99
Alkaline salts, common salt, &c.....	1.91
Sand.....	0.38

100.00

Containing nitrogen.....	3.69
Equal to ammonia.....	4.49

It will be, perhaps, useful to compare the values of farm yard dung and bones. Dr. Madden, whose analysis of bones, though thoroughly trustworthy, must have been taken from a sample very poor in nitrogen, gives the following result: one ton of bone equals, as regards:

Organic matter.....	1	ton	farm-yard	dung
Soluble matter.....	1	"	"	"
Easily dissolved.....	2.9	"	"	"
Nitrogen	3.9	"	"	"
Saline matter.....	5.0	"	"	"
Earthy phosphates.....	18.3	"	"	"

Therefore, if all the various degrees in which bone-dust is superior to farm-yard dung be added together, one ton of it is equal to thirty tons of dung. I need hardly repeat that the organic matter is only valuable in proportion to the amount of nitrogen it contains, except as a mechanical agent for lightening the land.

Next month I hope to enter on the subject of the great discovery of Liebig: the manufacture of Superphosphate of Lime.

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SHEEP SHEARING.

It may be taken as an axiom in economics, that the more completely finished for the use of the consumer any article is when it leaves the manufacturer, the higher proportionate price will it fetch. For instance; cotton yarn is much dearer in proportion than the rough cotton as the bale leaves the press in its native country; and it is clear, from this consideration, that the labour expended on the cleansing, teasing, and other manipulations it undergoes, with a proper addition to the price of the article, goes on accumulating, until at last the purchaser of a printed calico dress pays for the whole.

Thus, I have often wondered why the farmers of this province are so fond of shearing their sheep in the unwashed state. To begin with, it will be said that the wool is washed afterwards: true enough, but shearing a sheep with a dirty skin makes rough work, and moreover, wool washed off the

sheep's back is deprived of its *yolk*, and when dry feels harsh, and is in an unfit state for certain processes of manufacture.

In the year 1862 I superintended the washing of 60 sheep for the late M. Amable Demers, of Chambly. The affair was very simply managed: the sheep were penned in a temporary fold, by the side of the "petite rivière de Chambly;" a large tub was kept full of water into which each sheep was plunged



Fig. 1.

and thoroughly washed, the dissolved *yolk* acting as a soap; and after ten days, passed in a clean pasture, the sheep were shorn, so much to the satisfaction of the proprietor and the manufacturer (Mr. Thomas Willett), that the former presented me with a two year old fat wether in acknowledgement of my assistance. I say, that the sheep were kept in a *clean* pasture, because it is well that there should be no roads or earth-banks for them to soil themselves against. The practice of tub-washing, as distinguished from pool-washing, has long been in use in Yorkshire, England; and was the invention of Raspail, a French chemist, who observed that "when the wool is washed this soap (*yolk*) is dissolved, and takes the salts with it. Hence it follows that the water that has been used in this process becomes, at each repetition, better adapted for the purpose." Stephens, in his "Book of the Farm," objects to the practice, but he seems never to have tried it, and as a set off to his opposition, I think the fact that in England tub-washed wool always brings from a half-penny to a penny a pound more than pool-washed wool will be sufficient.

Sheep should not be washed until the water has attained a temperature from 56° F. to 60° F. After washing, they should wait ten days or so, before shearing, as the wool must not only be thoroughly dry, but the *yolk*, the natural oil of the wool, must return into it again, and the new wool should have risen from the skin, before the old is taken off. Disregard to this particular renders shearing difficult, and certainly injures the appearance of the fleece. Generally speaking, one may wash the first week in June and shear in the second: if the water of small streams be used, it will be found warm enough by that time.

"The *yolk* being a true soap, soluble in water," says Lucocq, "it is easy to account for the comparative ease with which the sheep that have the natural proportion of it are washed in a running stream." The composition of *yolk* was found to be, in the rough: soap of potash, carbonate of potash, acetate of potash, muriate of potash, lime, and an