

satisfactory to you because I do not know that they are altogether satisfactory to myself. I think there are various reasons for the fact, for fact it is. I think that possibly chemistry, biology and physics all play some part in this matter, but as practical farmers all we need is to realize is that this conclusion regarding fresh manure is correct. We do not seek to make our farmers scientific men; all that we want to do is to induce them to work on scientific principles, and to apply those principles discovered by experiment as far as they may be able. We trust they have confidence in our ability and in our rectitude and will accept this fact.

LOSSES FROM MANURE.

We have done a considerable amount of work of a very careful character with regard to the changes that take place in the rotting of manure; we have traced the losses which inevitably follow, and we have determined these losses under various conditions. We know very well, as everybody else knows who has done any experimental work on this important problem, that it is impossible to rot manure without some loss, even under the very best conditions. Further, we undertake to say this: that on the ordinary Canadian farm, and I believe we are conservative in this, that where the manure is not at once utilized by being put into the soil, or on to the soil, the farmer is losing one-third of the initial value of that manure. We have studied the various methods of rotting manure, and we have come to the conclusion that the losses are least where the manure is kept compact and protected from rain. These are the indispensable conditions. The more manure is opened up and turned the greater will be the bacterial activity and the greater will be the loss—the loss of organic matter largely and the loss of nitrogen; there are very serious losses in these constituents due to excessive fermentation. On the other hand, where the manure is not protected from rain, we have losses from leaching, and those losses are chiefly in potash and nitrogen. Taking it all in all, we doubt very much whether the farmer who does not spread his manure on his fields as far as may be possible when the weather and the condition of soil permit, who does not utilize his manure by getting it into the land or on the land as soon as possible, does not lose from one-third to two-thirds of the plant food originally contained in that manure. If he can get his manure on to his fields while still fresh he may return to his soil seven-tenths of the plant food taken from the soil by the growth of his crops. We have never discovered any method which will prevent loss. The changes begin immediately after voiding, especially in the liquid or urine portion, which is highly nitrogenous, and therefore easily susceptible to decomposition. It should be impressed upon our farmers that this liquid portion is much more valuable than the solid part, not merely because its plant food is soluble and immediately available. After the urine has been in the stable for a few hours you may notice that the atmosphere smells strongly, and if you were to examine it you would find it contained ammonia, derived from the decomposition of the urine. Just as soon as the urine is voided, if the conditions are favourable, bacterial life becomes active and ammonia is evolved.

It is not necessary to quote our work exclusively, but referring to the experiments of others who have worked more extensively than ourselves on this problem, it has been found utterly impossible to save all the plant food which is contained in manure, no matter what system of rotting is followed. The sooner, therefore, that it is got into the soil the better. It will be apparent that when manure is thrown out into the barnyards, and allowed to lie unprotected, the losses must be very large; and I am quite sure that I am well within the limits when I say that under such conditions there is from one-third to two-thirds of its plant food lost, apart from the loss of its humus-forming material by fermentation. So that brings us to the point that manure has no greater value than at the moment of its production; there is no doubt that its initial value represents its maximum value. Of course, we must be prepared to admit

at for certain purposes rotted manure is more desirable than fresh manure; these