

whom are agriculturists ; but we hope a change will take place very soon.

REMARKS ON MANURES.

BY J. E. TESCHMACHER.

[The following report and remarks were made by J. E. Teschemacher, Esq., at several meetings of the Legislative Agricultural Society, New York, during the month of January last.]

FIRST EVENING.

The important, vast, and almost inexhaustible subject of manures had always divided itself, in his mind, into three great considerations:—

1st: On the nature of the crops required to be raised.

2nd: On the nature of the soil from which these crops were to be obtained. And

3rd, and the most important: On the nature and application of the manure itself.

It was necessary to condense into the briefest form what he had to say on all these considerations.

Every one knows that if clover was wanted, a large quantity of lime, and also sulphur, was requisite ; if tobacco, potash and soda. In England, after many years cultivation of wheat, all the barn-yard manure that could be heaped on the ground would not raise any more until bone dust was added, and with this many acres hitherto considered barren had given excellent crops. The size and quality of turnips have been found to be much benefited by the use of the soluble phosphate of lime (vitriolized bones).

One question then is, what does the crop we require abstract from the soil during its growth and progress to maturity? This question is answered by the various analyses of crops, which are to be found in every agricultural treatise. But another, and a much more important question, now arises—What part of the ingredients of these crops puts most bone and muscle in the animals which feed on them? Also, can we by particular manures increase in these crops the quantity of these ingredients? Part of the first question has been answered by Liebig's last treatise. We knew, before Liebig was born, that the bones of animals were chiefly formed of phosphate of lime ; but we did not know, before the publication of this last treatise, that the phosphate of other alkalies formed essential parts of the flesh and blood of animals ; this he has there completely and satisfactorily proved. In the lime districts in Switzerland the cattle are much larger than in those where lime is scarce in the soil. The great test of the quality of a crop then is, its nutritious action on the animal ; this is of more importance than its appearance, or even weight. Now, it is evident that by offering as food to these crops a manure abundantly

supplied with these ingredients, combined with others ensuring a luxuriant growth, we enable them to obtain a maximum thereof. It would take too much time to enter into the details of numerous experiments made by him on this subject ; the result of them is a difference of thirty per cent. in these ingredients, dependent on the difference of the manure. Thus, if the ashes of wheat contain thirty-five per cent. of phosphates, the difference of manure will increase this to forty-five per cent. Hence, the consideration on the nature of the crops is of much interest.

Consideration on the nature of the soil.—All soils are composed chiefly of sand (silica), cl^1 (alumina and silica), lime, magnesia, some organic matters, sources of carbonic acid, and a few oxides of metals ; these ingredients in various proportions. The stones accompanying the soil have the same composition, and suffer annually some small disintegration ; from such disintegration soils are formed.

Sand (silica), besides lightening too stiff a soil, is chiefly of use to strengthen and stiffen the stems of plants, enabling them to resist the wind ; for this purpose, it must be dissolved by contact with an alkali (potash or soda). These are usually found in clay (alumina), which, as an ingredient of the soil, or of the compost heap, is invaluable, although it never enters into the organization of the plant. When the chemist analyzes a mineral containing alumina, it is almost impossible for him to wash it free from the alkaline substances which he has used in his analysis, or which were originally combined with it. It grasps and retains them with the most invincible obstinacy. Clay, in its natural, original state, is formed from the disintegration of feldspar, and is therefore always combined with notable portions of potash and soda.

The president had spoken highly, but by no means too much so, of charcoal, as an absorbent of the useful part of manure—ammonia. He himself had experimented many years with this substance in various ways, and could amply confirm all the president had said. Clay appeared to him, however, more retentive than charcoal—certainly, more so as regards potash and soda—and may be had where charcoal is hardly to be procured. Clay, then, well pulverized by frost, is a most valuable addition to the compost heap ; and a soil containing a fair proportion of clay may by manuring be rendered the most permanently rich of any. A light soil, besides permitting the ammonia to be drawn up into the atmosphere by the heat of the sun, also allows the valuable salts of the manure to be easily leached through by heavy rains ; and a soil with too much clay does not permit them to mix freely, so that the roots of the crop can obtain easy access to their nourishment. The farmer who studies the nature of his soil, while manuring liberally, will be able to manure much