

be brought to me for the purpose. This will, I think, meet the case in point. If the powers that be would take this into consideration and pass a bye law so as to cause owners of dogs to either keep them properly secured both by day and night or have them emasculated, they would confer a great boon upon agriculturists, and particularly to sheep owners.

APPLICATION OF CHEMISTRY TO AGRICULTURE.

Translated for the Mark Lane Express.

FROM A LECTURE BY BARON JUSTUS VON LIEBIG,
AS DELIVERED AT A PUBLIC MEETING OF THE
ROYAL ACADEMY OF SCIENCES, IN MUNICH, NOV.
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This day, when Bavaria celebrates the anniversary of the birth of its king, the Academy of Sciences meets to express its wishes for the well-being of the monarch. To the sentiments of joy, fidelity, and devotion which burst from the whole population of Bavaria, are added from our Academy those of a profound and respectful recognition for the protection accorded by the king to science. True, all classes do not comprehend what analogy exists between their well-being and the protection given to science. It will not, therefore, be out of place to take a glance at the development of the agricultural profession, showing how powerful is its influence, and how far it has extended.

No profession has felt less than agriculture the influence of the progress of the age; in none had the old routine been more firmly rooted, or the obstacles to amelioration been more powerful. If we picture to ourselves the task that agriculture had to accomplish, if we examine the state in which it was 33 years ago, it seems that the accomplishment of that task was altogether impossible without a radical change in its mode of operation. The task it had to fulfil was the production of meat and bread, necessary for a population ever growing; and we can easily comprehend the extent of it. In the States of the Union of German Customs, Hanover and Oldenburg excepted, the population has increased since 1818 little more than 1 per cent.; while there were in these States, in 1858, nearly two millions of men more than in 1848. Taking it at the lowest estimate, and allowing for the sustenance of each man 1 kilogramme of rye, or its equivalent, per day, we have per head and per year 365 kilogrammes of rye. Therefore, in 1858, the population of the Union of Customs consumed 7,250,000 metrical quintals more than in 1848, and 29,000,000 more than in 1818; and if the population continues increasing in the same proportion, the consumption of rye in 1871 will be nearly 25,000,000 metrical quintals more than

in 1851. When we consider that the cultivable surface of the earth cannot be much enlarged, the satisfying of such an enormous excess of wants, increasing daily, seems to be an exigence which it is almost impossible to provide for.

Let us suppose that in the last ten years of the past century the population of Europe had increased at the same rate that it has done since 1818, we should have seen in the course of two generations a state of things equal in horror to those which existed in the middle ages. For agriculture such as it was then, and indeed has been till within the last few years, was entirely without the means of furnishing food equal in proportion to the increase of population always growing. As it is with certain kinds of beasts, when the want of nourishment is felt, the strongest attack their more feeble neighbours, and fight till they have devoured them, so it is with us; but only amongst people the most savage does one devour another, whilst in more civilized nations hunger creates a cruel thirst for blood, which seeks to satisfy itself by domestic revolutions or foreign war; and the great battles at the end of the last century and the beginning of this appeared then as natural phenomena destined to re-establish the equilibrium between the production and consumption of alimentary substances.

In the last twenty-five years of the past century, agriculturists had no idea of the true causes of fertility in the soil, and of the exhausting of it by culture. Besides the sun, dew, and rain, the cultivator knew comparatively nothing of the conditions of development in a plant. Many thought that the earth merely served to furnish the plant with a solid space in which it could vegetate. It had been known for many centuries that by carefully cultivating the surface of the soil the produce would be increased, and still more by using the excrements of animals. They thought that the action of stable dung was produced in some incomprehensible way which art cannot imitate just as the food acts that passes through the body of man. They thought that on every farm, with sufficient cattle, they could produce by means of a certain succession of crops, mass of manure so great that there would be no end to its production; that the raising of the produce of the earth depended upon the labour and ability of the man in the culture of his fields and the suitable choice of the crop he put in them. One fact that might often be observed was that one man would ruin himself on a farm, whilst another would make money by it; that the produce of the farm increased or diminished according to the man that cultivated it; and thus was formed the belief that increased produce depended upon the will of man, and that he could, if he only knew the art of doing it, transform into fertile meadows sandy plains apparently sterile.