PROFESSOR JOHNSTON'S LECTURES,

AT CHESTER.

We now proceed to give the learned Professor's second lecture, as follows:—

Professor Johnston said he wished now to remark that his present address would embrace only a general outline of the various matters relating to the feeding of stock, leaving the minor points as subjects on which his audience must themselves institute further inquiries. The purposes for which animals were fed were two fold, viz.: that they might be sustained, and that they might be fattened and increased in size and weight, and also produce butter, cheese and milk. Now in order to sustain animals certain things were required; but before saying what those things were it would be necessary to enquire of what the body was constituted which required the sustenance. If they therefore took a portion of the body and burned it, they would find it to consist of two kinds of matter, combustible or organic matter, and inorganic or mineral matter. The larger portion which disappeared was the organic, and into the chemical constitution of that it would be their duty particularly to enquire. What then did the organic part consist of? Now they would observe that the piece of meat he held in his hand consisted of fat and lean, or organic substances, and the bone a mineral substance. If he were to wash the lean portion, he could ultimately remove the blood, which gave it a red appearance and it would then be of a white colour, and would have a fibrous appearance; hence the word fibrine was applied to it. And this lean, or muscle, on being submitted to chemical tests, would be found to consist of albumen, a substance nearly identical with the white of egg. If he took that muscle and burnt it, the portion of mineral matter that remained behind would only be about ½lb. in 100 lbs. In the bone, as he last night informed them, phosphoric acid and lime were present in large proportions; and were obtained from the plant on which the animal fed, that plant in its turn having received it from the soil. The question then arose with regard to the muscle and fat, does it get that ready formed from the plant on which it feeds, or is it formed in the stomach of the animal. The mineral matter existed in the plant, but it was not so evident how the muscle and fat were built up of what the animal eat. They could conceive that the bodies of carnivorous animals, which lived on each other, were constituted of the muscle and fat which they took into their stomach; but it was not so apparent at first sight that the same was the case with the herbiverous animals. If he took a portion of flour and made it into dough, and then washed that dough in water, he should obtain a milky fluid, and if left to subside, he should obtain a white powder, which was starch. If he washed the dough in a seive, a portion of it (the starch) would go through the seive, and the rest (glutinous sticky substance) would remain behind—hence the name given to it, gluten. Wheat flour, therefore, consisted of gluten and starch, and what was true of this grain was true of others in different proportions; and this substance was almost indentical in its chemical properties with animal lean. Then if they took linseed or rapeseed and subjected it to the pressure, they obtained oil from it; and all seeds, as wheat, oats, Indian corn, beans, and peas, contained oil in greater or less proportions, which oil was of a similar chemical composition to the fat, of the animal. In wheat the proportion of oil was from 2 to 4 in 100; in oats, from 6 to 8; in Indian corn, from 8 to 10. The general inferences to be drawn from these facts were, that the animal contained muscle, so did the plant (or at least the substance of it;) the animal contained fat, so did the plant; and, therefore, the deduction was clear that the hiberverous animal derived from the food which it eat the substance of which its body consisted. He had stated that if dough were washed it would produce from 50 to 60 per cent. of starch; but as there was no starch in the muscular part of the animal, and as nothing in nature was created without good reason, what purpose did it serve in the animal economy? In explaining this, it would be necessary to refer to some of the functions the animal was called upon to perform; and the two functions to which he referred, were respiration and digestion. He would now return to the question of what food should be used in sustaining and increasing the size of animals. It required then starch to sustain life; for animals could not live without breathing; it was also required that the food contain the substance of muscle, fat, and bones; otherwise the animal body would waste itself away. They must remember that all the animal received came out of the stomach again if it did not increase in size and in weight; if it did so increase then all the food was not rejected, and the process of fattening went on. Oats contained larger quantities of oil than any other grain grown in this country; linseed cake contained still larger quantities; as its subjection to pressure still left a considerable quantity behind, the proportion being about 12 per cent. Even bran contained 5lbs. per cent. which was more than wheat though less than oats or Indian Corn. If they wanted to fatten cattle, therefore, oil cake was the best adapted to the purpose; Indian corn came next, and oats followed. These were the principal kinds of food for the production of fat. But the muscle should be increased as well as the fat, and in oil-cake, nearly one-fourth part of the whole consisting of albumen, it was particularly available for that purpose. It was now an established principle in good practical feeding, that the several kinds of food should be adjusted to each other. If they feed cattle on one kind of food it would not be so beneficial as if fed on two; and if they used three kinds it would be better still, and more profitable. There were no doubt many circumstances which modified the effect of certain kinds of food