sampled, and analysed. The constituents determined in the food and litter on the one hand, and in the dung on the other, were dry matter, ash, and nitrogen.

In the case of sheep no litter was used; the animals were kept in lots of five, on rafters, through which (but with some little loss) the solid and liquid excreta passed on to a sheet-zinc flooring at such an incline that the liquid drained off at once into carboys containing acid, and the solid matter was removed two or three times daily, and also mixed with acid. The constituents determined in the food and manure were dry matter, mineral matter, sometimes woody fibre, and nitrogen.

In the case of pigs, individual male animals were experimented upon, each for periods of three, five, or ten days only. Each animal was kept in a frame, preventing it from turning round, and having zinc bottom, with an outlet for the liquid to run into a bottle, and it was watched night and day, and the voidings carefully collected as soon as passed, which could easily be done, as the animal never passed either fæces or urine without getting up, and in getting up he rang a bell, and so attracted the notice of the attendant. The constituents determined were, in the food and fæces, dry matter, ash and nitrogen and urea.

The loss or expenditure of constituents, by respiration and the cutaneous exhalations, has not been determined directly, that is, by means of a respiration-apparatus, but only by difference, that is, by calculation, founded on the amounts of dry matter, ash, and nitrogen, in the food, and in the (increase) fæces, and urine.

Independently of the points of inquiry above enumerated, the results obtained have supplied data for the consideration of the following questions:

1. The characteristic demands of the animal body (for nitrogenous or non-nitrogenous constituents of food) in the exercise of muscular power.

2. The sources in the food of the fat produced in the animal body.

3. The comparative characters of animal and vegetable food in human dietaries.

SUPPLEMENTARY INVESTIGATIONS.

In conjunction with the late Prof. Way, an extensive investigation was undertaken on the application of town sewage to different crops, but especially to grass. The amount, and the composition, of both the sewage and the produce grown, were determined; and, in selected cases, the composition of the land drainage-water was also determined. Comparative experiments were also made on the feeding qualities of the differently grown produce; the amount of increase yielded by oxen, and the amount and composition of the milk yielded by cows, being determined. In this inquiry part of the analytical work was performed at Rothamsted, but most of it by Professor Way in London.

The chemistry of the malting process, the loss of food constituents during its progress, and the comparative feeding value of barley and malt, have been investigated.

Experiments were commenced in 1884, and are now in progress, to determine the changes and loss which food-crops undergo in the process of ensilaging. Experiments have also been made to determine the comparative value as food —of red-clover-ensilage as against red-clover-hay-chaff and swedes, when given (with other foods) to fattening oxen; and of red-clover-ensilage and meadow-grass-ensilage as against mangels, when given to milking cows.

Although many of the results of the investigations above enumerated have already been published, a large proportion as yet remain unpublished.

Professor J. L. Budd, Benton County, Iowa, has chestnut trees, started eleven years ago, from seed, slightly dried, bought at a grocery. The fourth season they bore a fair crop, and are now six to eight inches in diameter and from twenty-five to thirty feet high.

SIR,—I have taken the FARMER'S ADVOCATE for one year, and must say that I would rather have it than any paper I have ever read. Every farmer should read it. Enclosed please find one dollar, for 1887.—R. MONTGOMERY, Roseneath.

The Agricultural and Commercial Values of Manures and Fertilizers.

The commercial value of a manure or a fertilizer, like that of any other article of commerce, is what it will bring in the market, the prices varying with the state of supply and demand, which do not make much deviation from the average prices. This uniformity is caused by the readiness with which the demand can be supplied, and the constant availability of the raw material.

Not so, however, with the agricultural values. These present extraordinary variations, the chief cause being the lack of knowledge with regard to their application. The agricultural value represents the actual profits realized or the losses sustained by the investment. The agricultural value of barnyard manures is much more constant, as a rule, than that of the commercial article, not mainly because the knowledge of their application is more extensively diffused, but becuase yard manure is a general fertilizer, that is, it contains all the elements of plant food, although they may exist in very undesirable proportions for the particular soil or crop to which the manure is applied. A commercial fertilizer containing all the elements of fertility would likely have about the same agricultural value as barnyard manure.

Yard manures, as ordinarily applied, do not always produce profitable results, and hardly ever as good results as they should. They may injure the mechanical texture of some soils; the elements which the soil mainly requires may be leached or vaporized out of it, or it may contain elements which the soil is already too rich in, all of which detract from the agricultural value, although, on the whole, the results may be partially satisfactory.

But commercial fertilizers usually contain only one or two of the elements of fertility, so that the chances of their producing unprofitable results become greater, and the less fertilizing constituents the fertilizer contains the greater is the risk, which, however, can be largely obviated by a chemical knowledge of the constituents of the soil, the crop and the fertilizer. A knowledge of the chemical and physical properties of the soil also helps to avert losses that would be sustained by leakage through the soil, and evaporation into the atmosphere.

There is hardly any farm that always requires a general fertilizer, so that the keeping of a large quantity of stock to produce all manure required is a wasteful practice. There is no farmer, no matter how much stock he keeps, who could not economize by purchasing small quantities of special fertilizers to apply to his land with the barnyard manure.

Patrons of Husbandry.

We publish in another column extracts from the annual address by Mr. R. Wilkie, Worthy Master of the Dominion Grange. The statements should rouse every farmer to a keen sense of his duty to himself, to his fellow farmers, and to prosperity, and should indelibly impress upon his mind the imperative necessity of organized effort.

It is to be extremely regretted that there are some objectionable features in the Grange organization, by means of which it does not meet with the approval of the entire body of farmers. It has over-reached itself, and does not meet the immediate and pressing wants of the farmers. The Dominion Farmers' Council supplies these defects. We observe with regret that the question of secrecy has prevented the co-operation of these influential bodies. Let us compare the objects of the two organizations, and leave our readers to draw their own inferences:

Specific Objects of the Grange.—"To develop a better and higher manhood and womanhood amongst ourselves; to enhance the comforts and attractions of our homes, and strengthen our attachment to our pursuits; to foster mutual understanding and co-operation; to reduce our expenses both individual and corporate; to buy less and produce more in order to make our farms self-sustaining; to diversify our crops and crop no more than we can properly cultivate; to condense the weight of our exports, selling less in the bushel and more on hoof and in fleece; to systematize our work, and calculate intelligently on probabilities; to discountenance the credit system, and every other system tending to prodigality and bankruptcy. We propose meeting together, talking together, buying together, selling together, and in general acting together for our mutual protection and advancement, as occasion may require. We shall avoid litigation as much as possible by arbitration in the Grange. We shall earnestly endeavor to suppress personal, local, sectional and national prejudices, all unhealthy rivalry, all selfish ambition. We shall constantly strive to secure entire harmony, good will, vital brotherhood amongst ourselves, and to make our order perpetual."

Objects of the Dominion Farmers' Council.—1. The cultivation of social intercourse amongst its members, and the improvement of their minds in all matters pertaining to agriculture. 2. The establishment of a social, agricultural and educational bond amongst the farmers of the Dominion, the encouragement of free, independent, and self-reliant co-operation, and the formation of farmers' clubs under the patronage of the Council. 3. The improvement of agriculture, especially those branches which receive no aid, directly or indirectly, from the public funds, the dissemination of practical knowledge and sound principles by means of essays, speeches, discussions, correspondence, experiments, etc., and the prevention and exposure of frauds upon the farming community. 4. The economical and impartial administration of such funds, property or privileges as may from time to time fall into the hands of the Council for the furtherance of the objects above enumerated.

Many of the sentiments expressed in the objects of the Grange are grand, and if its guiding principles were modernized, the objects should meet the approbation of every intelligent farmer. Secret organizations are falling into disrepute on account of their dangerous tendencies, and the burdening of officers with high-sounding titles is a relic of superstition. We hope the Grange will note the objections to its order, and endeavor to bring themselves more in harmony with modern agricultural thought and the more urgent wants of the farming community.

Swamp muck is of exceedingly great value. The fertilizer manufacturer has no monopoly of the use of figures, and if we use them as he does, a farmer can just as easily and truthfully figure out a good bed of peat to be worth $5,000 an acre. A cubic yard of it air dried, will weigh 1,000 pound. If of ordinary good quality, it will contain one percent of nitrogen, which the fertilizer man values at, let us say the very moderate estimate —for him—15 cents per pound. This makes the 1,000 pounds of muck worth $1,500. In one acre of bog, three feet deep, there are 4,840 cubic yards. This figures up to $7,260 for the acre. What fault can the fertilizer man, or chemist, who analyzes leather scrap, dried flesh, and wood waste for its nitrogen, and sells it for 16 to 20 cents a pound, find with these figures.

Pumpkin seed are very attractive to mice, and traps baited with them will soon destroy the little pests.