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THE

CANADIAN AGRICULTURAL JOURNAL.

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In the *Montreal Gazette* of the 19th December, we observe an article copied from the *Albany Cultivator*, on the cutting and curing of beef for the English market. With regard to the mode recommended of cutting up the beef into small pieces of eight pounds weight each, we conceive it to be very objectionable, unless it is to be sold when it gets to England for the use of poor houses only. The English people, generally, do not like to purchase salt meat cut up into small pieces, they would prefer having it in large pieces, to cut to suit their own fancy or convenience. We would recommend that the beef intended for exportation, should be cut into large and suitable sizes, and we never found any difficulty in curing beef so cut. If the blood is properly taken from the cattle when slaughtering, it is one of the chief points for preserving the beef subsequently. In Ireland, if the cattle are driven from a distance, they are not killed for two days after their arrival, and in the interval are allowed only water, and are frequently bled freely, in order that all the blood may be drawn out of the body when finally slaughtered, and even after using this precaution, it is necessary, when the meat is cut up, to remove the blood very carefully from the pieces. The carcasses are not to be cut up until the animals have been dead twenty-four hours, and when cut up, all the marrow is carefully removed from the bones. The salt made use of should be perfectly clean, and the fine and heavy kind from Lisbon, in Portugal, was esteemed the best for curing beef in Ireland. The quantity of salt made use of, was in weight, one of salt to six of meat.

The mode of salting and packing adopted at some of the best establishments in Ireland formerly, was nearly as follows:—

When the beef is cut up, the salters have a leather guard or glove, upon the right hand, with which they rub the salt well into the meat, and press out any blood that may be in it. Each piece of meat passes through the hands of a series of salters, and when it arrives at the last, who is the most experienced and skilful, he exami es if there be any defect—any vein which requires to be opened, he corrects the defect, opens the vein, rubs in more salt, and throws it into the cask of salted pieces; in this it remains in the air eight or ten days, the salt penetrates into it, and is turned into brine; at the end of this time, it is taken out and barrelled. After the meat is removed from the cask, the brine is thrown into a trough, and a layer of salt is put at the bottom of the cask, upon this is placed a layer of meat, and this alternately until the cask is full. When the meat is all packed in, it is pressed down with a weight of 56 lbs., and the cask is closed; there must afterwards be a hole bored in one end of the cask, to blow into, in order to be sure it does not leak; if no air escapes, the hole is closed again. When it is ascertained that the cask is in good order, the bung is taken out, and brine is turned in until the meat is saturated and covered; and the less brine required, the better will the meat keep. After having allowed the barrels to remain five days, it is necessary to examine if they are well filled with brine, and do not leak; if necessary, they are again well filled with brine, and the operation is concluded.

According to Liebig, the salt is only required to extract the water and moisture out of the meat. He expresses himself thus:—

"Fresh flesh, over which salt has been strewed, is found in twenty four hours swimming in brine, although not a drop of water had been added. The water has been yielded by muscular fibre itself, and having dissolved the salt in immediate contact with it, and thereby lost the power of penetrating animal substances, it has on this account separated from the flesh. The water still retained by the flesh contains a proportionally small quantity of salt, having that degree of dilution of which a saline fluid is capable of penetrating animal substances. The property of animal tissues is taken advantage of in domestic economy, for the purpose of removing so much water from the meat, that a sufficient quantity is not left to enable it to enter into putrefaction. In respect to this physical property of animal tissues, alcohol resembles the inorganic salts—it is capable of moistening, that is of penetrating animal tissues, and possesses such an affinity for water as to extract it from moist substances. Thus salt substances introduced into the stomach, extracts water from the organ, and a violent thirst ensues; alcohol, taken into the stomach, produces the same effect, violent thirst, and acts upon it in the same manner as salt."

From these circumstances, it is obvious that water should not be used in curing beef or any other meat, as the use of salt appears to be, to extract moisture from meat in order to preserve it. The use of saltpetre is also condemned as injurious, and having a tendency to make the beef hard. A portion of sugar, mixed with the salt, when finally packing the beef into the casks or barrels, is better than the use of saltpetre. This is a subject of vast importance to Canadian Agriculture. We believe that a most profitable trade might be established between this country and England, in the articles of salted beef and pork. Canada is perfectly well adapted for producing the means of such a trade, if our lands and stock are properly managed. There is nothing in the climate or soil to prevent the raising and fattening of cattle and hogs for exportation, under judicious management; to a great extent, indeed, almost unlimited. It should be our object to instruct and encourage our farmers to produce the means for the trade. This sort of speculation would afford more certain benefit to the province generally, than any we are acquainted with. Let us augment the amount and value of our own productions, and we are sure to prosper.

LOUGHBOROUGH AGRICULTURAL ASSOCIATION.

The quarterly meeting of this Association was held in the Wellington room, at the Plough Inn, on Thursday, the 25th September. S. B. Wilde, Esq., presided; and Mr. J. N. H. Burrows occupied the vice-chair. After the cloth had been drawn, and the usual loyal toasts were given, as also the health of the President, C. Wm. Packe, Esq., M. P.—

The Chairman read the circular calling the meeting, in which it was announced that the subject for discussion was, "the fattening of cattle."

Mr. Rawson, surgeon, of Kegworth, introduced the subject. He said, there were known to chemists about fifty-six elements, of which there were only eight or nine in animals; the principal of those were oxygen, hydrogen, nitrogen, and carbon. Oxygen enters into all animal and vegetable substances, and is an essential ingredient in atmospheric air. Nitrogen has no positive properties, its object is to dilute oxygen. No animal could live on nitrogen alone. Hydrogen is sixteen times lighter than common air, and is an essential ingredient in water, and very inflammable. After an elaborate description of the various elements which enter into the animal frame, the speaker proceeded to inform the meeting what were the various uses of each. Nitrogen, he said, was the principal ingredient in flesh and muscle. Fat is composed of carbon and hydrogen. If they wished to make an animal fat for sale, or for show, they must feed it on carbonaceous food. Unripe straw is very carbonaceous. As the seed ripens it becomes less so, and not so suitable for fattening. Cows generally feed well on aftermath. Half-a-pound of Swede turnips contains 110 grains of nutriment, while the same weight of white turnips only contains 85 grains. The outer temperature is very important; it should be brought as nearly as possible to the temperature of the blood. The same regard to temperature is necessary with respect to a milking cow. Fat is a mere deposit, a secretion; it does not impart strength, rather the contrary. Hence we do not make a horse fat for racing, but make him display muscular power. In fattening horses for sale, carbonaceous food, young grass, oil-cake, swede turnips, &c., should be given. In feeding for use, the carbonaceous should be mixed with an equal quantity of other kind of food.

The Chairman after eulogizing the able exposition of the subject they had just heard propounded, with thanks for it, proposed Mr. Rawson's health, which was drunk with applause, and Mr. R. acknowledged the compliment, and had great pleasure in proposing "the best interests of the Agriculturists of the Midland Counties."

The Chairman next proposed "The health of Mr. Bernays," which was received with applause.

Mr. A. J. Bernays (analytical chemist, from Derby), then rose and said: Agriculture is a subject of such vital importance to the community at large, that I consider myself bound to attend all such meetings, where I may increase my knowledge of it; and I shall always be glad to be present at your quarterly meetings as long as I am in the neighbourhood of Loughborough. We have just now heard that although 56 elements are at present known, yet only a small portion of them enter into the composition of animal and vegetable life. Of this portion, consisting of from 10 to 12, only four enter extensively into the formation of the organized portion of the vegetable and the animal. These elements arrange themselves into two distinct classes; the one class, formed by the combination of carbon, hydrogen, and oxygen, in different proportions, includes what Liebig calls the elements of respiration. Hereto belong starch, fat, butter, sugar, gum, and alcoholic fluids. These may likewise be termed non-nitrogenised substances. The other class, formed by the combination of all the four elements, includes the elements of nutrition, or the nitrogenised constituents of food. Hereto belong vegetable and animal fibrine, caseine, albumen, and gluten. The non-nitrogenised constituents were provided for sustaining the animal heat of the body; and protecting its parts; and in so doing a provision is laid by, upon which nature draws when the body is diseased. From their very nature they are easily destroyed, by the influence of the oxygen of the air. You all know it to be a common practice to milk cows in the field, if they be at any distance from the homestead: the reason is obvious: when a cow walks a great distance without food, the oxygen of the air almost immediately begins to act upon those substances with which it can most easily combine. Such a substance is the butter in the milk; when a cow is driven home, the butter is found, in great part, to have disappeared. Again, after parturition, the milk of the cow contains only traces of butter; because, by the increased action of the muscles, a larger proportion of oxygen is taken into the system. This well known fact brings us to the subject of stall-feeding. When a cow is intended for milking, and with a view of yielding as much butter as possible, we naturally confine her. In this unnatural state, there being no call for exercise, the food taken by the animal is only in small part expended in maintaining its heat. However, we all know that confined milch cows never yielded so well-flavoured butter or cheese, as those which are unconfined. Cows living in a natural state eat what they like; stall-fed cows eat what they get. Owing to this cause, the Dutch cheeses have nearly been driven out of our market by the American. In Holland, stall-feeding is the common practice; hence is the produce less palatable than the American, in which country, land being cheaper, the practice is unnecessary. There can be no question about the utility of stall-feeding, but I very much question whether close confinement is equally beneficial with a confinement allowing of some gentle exercise. When the weather is warm, cattle may pasture in the meadows without loss to the agriculturist. The air is then nearer the temperature of their own bodies, besides being more expanded. The animals feel no call for exertion to keep themselves warm, and the gentle motion necessary in the seeking of food, by increasing the healthy state of the body, enables them not only to eat more, but to assimilate better what they do eat. In winter the case is materially altered. The temperature is far lower than that of their own bodies; the air, too, being more condensed, contains a proportionably larger quantity of oxygen. Therefore, *more non-nitrogenized food will be required to combine* with the excess of oxygen; indeed, as we all well know, more food will be required than in warm weather. Here, the peculiar advantages of stall-feeding come to our aid. You will perceive that warmth produces a saving in food; it is indeed an equivalent for food. Everything that cools the body of an animal, causes a proportionate expenditure of food. In stall-feeding, the temperature of the air of the stalls should be equally maintained, and they should be kept clean. The animals should be regularly fed, have plentiful litter, and be kept clean. If, as we have already said, warmth is an equivalent for food, it is obvious that the form in which the food is given cannot be immaterial. The more we facilitate the adaptation of the food for the organs of digestion, the greater will be the saving to us. The farmer cuts up his hay, straw, and turnips to save some expenditure of force, hence of food, by the feeding animal. If the food contain much water of a temperature far lower than that of the animal, it *must be raised to that temperature* at the expense of a part of the food. This is obviated by the process of steaming. An ox, fed by Earl Spencer, consumed in a winter month (the temperature of the air 32°), 60lbs. of mangold wurzel a day. Now, in order to raise the temperature of the water of the mangold murzel to the temperature of the body of the ox, no less than one-twentieth of the food was expended. All feeders of pigs know that they thrive better on dry than on wet fodder, (Mr. B. sat down amidst great applause).

The Chairman then proposed "The healths of Mr. Stokes and of Mr. Allen," who made a few observations on the advantages of giving artificial food to animals in the straw yard. He had himself given oil cake to cattle, and found it to remunerate him.

C. Stokes, Esq., rose to give his testimony to the principles laid down by Mr. Rawson and Mr. Bernays. He could fully bear out Mr. B.'s remarks on stall-feeding.

Mr. Smith wanted to see science brought forward in connexion with agriculture. "We want," he said, "something definite and distinct on the formation of fat and muscle." He wanted defined what would produce most fat, milk, and cheese; and he hoped to provoke one of the gentlemen present, to rise and define it. He hoped they would give them the kind and quantity of food to produce them.

Mr. C. W. Wood, surgeon, of Woodhouse Eaves, said he would direct the few remarks he had to make exclusively to the expressed object of the meeting, namely, the feeding of cattle; and he viewed that as the most important matter with which the practical farmer had to do; in short, his whole life and exertions tended to produce the greatest possible quantity of beef and mutton—if not in the shape of fat cattle, his supply of grain only produced the same effects in man. But before we talk of producing, it is necessary to ascertain correctly what it is we want to produce. All animals are composed of bone, muscle, fat, cellular tissue, wool, hair, horns, skin, and nails, and we find these very substances ready formed in vegetables, the power of nutrition in the animal having *nothing to do but select them from its food, and by means* of the circulation to place them where they are wanted. If your object be, as in the young growing animal, to increase as well as to sustain it, you choose those vegetables which contain a large muscular fibre, or nitrogen and phosphate of lime for the bones, such as peas, beans, oats, barley, &c. If with a full grown animal, your object be to sustain its condition with an increase of fat, you give those vegetables which contain fat ready formed, as lentils, Indian corn, oil cake, &c. But as you have generally a mixed object in view, namely, to produce bone, muscle, and fat also, you must necessarily give a mixed food—the operations of which I will now explain. The composition of the animal and vegetable world is identically the same, and the latter, wherever we find it, contains in a greater or less degree all the elements of the former. The vegetable world is sustained entirely from inorganic nature, the earth on which we tread, and the atmosphere we breathe, occupying a middle sphere, *its whole existence being to collect materials to build up* the animal, consequently entirely subservient to it. The inorganic world, again, is composed of a few simple elements, of which hydrogen, oxygen, nitrogen, carbon, phosphorus, sulphur, and some saline substances, as pottassium, sodium, and calcine, form the chief, the very elements of vegetable and animal life. Geology, chemistry, physiology, are therefore essential to the right understanding of this subject, bearing ever in mind that the lower are always adminstering to the wants and necessities of the higher orders of creation. There is no motion in an animal body, or emotion of mind, but what causes a corresponding absorption of the tissues of the body, and in order to keep up this daily waste, a certain amount of food is necessary. This is called sustaining the body. Thus cattle, working hard, require a larger amount of food than when at rest. This necessity being duly attended to, constitutes health. But fattening, gentlemen, is an unnatural condition, and requires an increase of substance. Hence the necessity of unnatural means, as the absence of exercise, light, and the influences of the atmosphere, a mixed diet (to bring out all the materials of the animal body to the greatest perfection) in a dry warm state. Mr. Childer's beautiful experiments proved that warmth alone with an animal would produce one-third more flesh, and at the expense of one-fourth less food. Mr. Norton also proved that the absence of light with warmth produce still greater results. The reason of this is obvious. Every animal possesses both a nutritive and respiratory apparatus; the one to sustain the body, the other to support its vitality, by producing health or warmth. This first object is effected by the gluten in the food principally, the basis of which is nitrogen. The second by the starch, sugar, and gum, contained in the food, which forms bile, the basis of which is carbon. The bile passes into the intestines, where it meets with oxygen, and thus becomes carbonic acid. In this state it enters the circulation, where it meets with peroxide of *iron (which the blood always contains), the carbon unites* with the iron, and forms carbonate of iron. In this state it passes to the lungs, where it meets with fresh oxygen during inspiration, which reconverts the carbon in the carbonic acid, which passes off during expiration, while the peroxide of iron is reformed, and taken back by means of its carriers to be again transformed into carbonate. The result of this combustion of carbon is heat. The heat of the animal body is nearly 100 degrees; all food, therefore, before it can be assimilated, must be raised to its own temperature, which can only be done by the consumption of carbon, or in other words, food. Potatoes, linseed-cake, and oleaginous seeds, on account of the starch, sugar, oil, and gum, they contain, are well adapted to accomplish this end. If we reflect for one moment on the immense importance of the liver and lungs in the animal economy, is it not strange to see the scores of diseased ones which our shambles are constantly exhibiting? showing the great inattention the farmer pays to the comfort and well being of his cattle. Fat is a reservoir of carbon for the system to draw upon for the purposes of combustion, in the event of the food not containing a sufficient quantity of the proper elements to keep up animal heat. As manure is an important result attending the feeding of animals, it may be well to remark that its quantity depends upon the refuse of food, and the amount of absorption going on in an animal's body, or in other words, upon its own destruction, thus returning to inorganic nature, as food for vegetable life, the elements of its own destruction. But the quality depends upon the quantity of nutritious food given to the animal. The young growing animal requiring increase as well as sustenance, consumes all the nitrogen and fatty matter in its food. The milking cow the same. But in fullgrown feeding animals a large quantity of these ingredients are not consumed; a rich and valuable manure is the result. In choosing animals for feeding purposes, the farmer often exhibits a remarkable knowledge of physiognomy. He li :es a kindly disposed, quiet looking animal, with symmetry of carcass; one built for strength, broad across the back and loins, and long quarters, where large masses of muscles are placed, a narrow and deep chest, and "a good handler," or where there is a large quantity of fine soft hair, with plenty of fatty matter underneath to nourish it. Thus furnished, he has only to put into operation the suggestions of science, and the result must necessarily be profitable and useful. When we see the extensive application of capital, industry, and science to the manufactures of this country, and the comfort and wealth they produce to thousands of our fellow creatures, also the dominant influence of its interests, threatening the downfall of the British farmer, surely it is time, and our bounden duty, to unite these same principles, that the abundance of the soil may satisfy both landlord and tenant, and be the means, under the blessing of Divine Providence, of producing plenty of cheap food to the many thousands of our wanting fellow-creatures.

The Chairman proposed the health of Messrs. Smith and Wood.

Mr. Smith replied, and expressed his gratitude to Mr Wood, for his elaborate exposition of the subject, and still hoped to see science and practice combined much more than he had done.

Mr. Wood proposed the health of the Chairman, which was received with loud cheers.

The Chairman rose and expressed his gratitude for the kindly manner in which they had drunk his health. He would have gone further into the subject before them, had it not been so ably treated by gentlemen of practical science. It was from practical men they must expect useful information; and when they had practical men for their leaders, it was their own fault if they did not benefit by them. He bore testimony to some of the principles laid down by the previous speakers, and said he should feel pleasure in presiding at their meetings. Again thanking them for the honour done him, he resumed his seat amidst applause.

Mr. Bernays again rose and said—In order to obtain a fair proportion of fat and lean, it is of the utmost importance that you should be acquainted with the composition of food. We should be very much mistaken were we to judge of the value of food by its bulk. Greentop turnips, mangold wurzel, and red beet, contain 89 per cent of water; Swedes, 85 per cent.; potatoes, 72 per cent.; oats and wheat straw, 18 per cent.; hay, peas, and lentils, 16 per cent.; and beans, only 14 per cent. Hence the latter food is infinitely superior as to its feeding properties than the former. But we have only spoken of the food in relation to water; it is necessary that we should understand each other when we make use of certain terms. It is but too indefinite if we include fleshening and fattening in the term *fattening*; the term rearing would then be more appropriate. But it would be still better if we distinguish between *fleshening*, or the formation of muscle, and *fattening*, or the formation of fat. According to the quantity of non-nitrogenized constituents of food capable of forming fat, in other words, according to the supposed fattening properties of food, they rank thus:—1, Oats, barley meal, and hay; 2, beans and peas; 3, lentils; 4, potatoes; 5, turnips and red beet. According to their fleshening properties, they stand thus;—1, lentils; 2, beans; 3, peas; 4, flesh; 5, barley meal; 6, oats; 7, hay; 8, carrots and potatoes; 9, red beet; 10, turnips; 100lbs. of lentils are supposed to be capable of yielding 33 times as much muscle as 100lbs. of turnips. Great advantage therefore results from the admixture of food. An animal which has been fed chiefly on oil cake, would, on being turned out, increase in size much more slowly than the animal which has been fed on hay, or on turnips and hay. The oil cake produces chiefly fat, and little flesh; hence the movement of the animal will consume much of the ready formed fat, or tallow. It is only when the oil cake is given with fleshening food—such as beans, oats, and hay—that lean is proportionally formed. Warmth, confinement, and fattening food are most favourable for the formation of butter, fat, and tallow. Herbage—which is generally denominated poor, but which, in reality, is rich in nitrogenized constituents, and which cows have to crop themselves—is favourable to the formation of cheese, but not of butter.

Mr. Stokes.—Would you recommend the food to be given in a warm state?

Mr. Bernays.—Decidedly; a little lower than the temperature of their own bodies.

Mr. Stokes proposed the health of Mr. Burrows, and the Stewards.

Mr. B. returned thanks, and said he had been much pleased with the discussion that afternoon. He was sorry that more practical men had not risen to take part in it. He had found by experience, that cattle kept dry and warm, consumed less, and fattened better.

Mr. Henson rose, and asked what mixture of food Mr. Barnays would recommend. He was at a loss to know how to put these different elements together. He hoped to hear at some future discussion how to produce the largest amount of fat, without losing sight of the manure heap. He proposed the health of the Rev. E. Wilson; who rose and returned thanks, and expressed his gratification with the discussion. He always found instruction at their meetings.

Mr. Stokes suggested that tables of the quantity and quality of food recommended, should be drawn out, and some of the members requested to keep an ox or two, and give the result of their experiment for the benefit of others.

Mr. Henson made another observation or two relative to the quantities of food and the manure heap, and

Mr. Bernays rose and said—I can only say, in answer to Mr. Henson, that I shall be happy to answer his questions as to the necessary qualities of food for producing flesh and fat, on some future occasion.

POTATO DISEASE.

To the Editor of the Durham Advertiser.

SIR,—The investigation of the potato disease having been taken up on a large scale, I have been requested to undertake the chemical part of that investigation. I have in consequence drawn up the following queries for the purpose of obtaining information. They have already been widely diffused in the form of a circular, I hope you will have no objections to give them a still wider circulation through the columns of your journal, and you will oblige, Sir, yours truly,

JAS. F. W. JOHNSTON.

Durham, Oct. 27.

QUERIES REGARDING THE POTATO DISEASE.

1. To what extent has the potato disease appeared in your district, or county, during the present year? Is the general crop large? and how much of it do you think is affected?

2. Is it more extensive during the present than during the past year?

3. How many years is it since it first began to be noticed among you?

4. At what time during the present season did it first appear in your neighbourhood? Has its appearance been sudden and unexpected?

NOTE.—A letter from a Mr. Gilchrist, of St John's, New Brunswick, dated 27th September last, contains the following passage:—"I was never more surprised at anything than the change upon the appearance of the country from the time I had gone through it two months before. At that time everything looked beautiful, and crops of every kind seemed abundant; but now a blight seems over everything. From Halifax to St. John's, I did not see a single field of potatoes but what was completely destroyed; and it is universal throughout the whole of North America. So bad are they upon St. John's River, that the health officers have forbid them being brought to market; and, from what the country people say, there will be scarcely enough left for seed. It is a strange sort of disease. It first attacks the shaw, and so rapid is it, that in the course of two or three nights a whole field will be destroyed, and the stench that arises from them is almost unbearable."

5. What peculiar appearances has it presented—does it differ in character from the disease of former years? Does it generally show itself in the leaf and stem, before it appears in the bulb?

NOTE.—The rot in the tuber of the potato assumes two distinct characters, known by the names of dry and the wet rot. The former, which has hitherto prevailed most in this county, has the appearance of brown or brownish-black streaks, spots, or layers in the potato, beginning at the outside, and extending inwards, often to the very core. The affected potatoes often appear sound externally, though upon a closer inspection the seat of the disease may be traced by a slight wrinkling or discoloration of skin. In many cases the disease appears first at the end of the potato most distant from the root. In others it is the prominent eyes at the side of the potato which are first attacked, presenting a blue or livid appearance, and exhibiting, when cut, the brown fungus within. Potatoes, with this form of disease, are often difficult to boil soft. When far gone they have a disagreeable taste and smell after being boiled, and they not unfrequently decay after being pitted.

The wet rot forms an ulcer or distinctly decayed and rotten part in the potato. It sometimes appears as a rotten hole proceeding from the heel of the potato, where it is attached to the rootlet: sometimes it forms a soft mass over a large part of the surface, which can easily be pushed off by the thumb; and sometimes it appears sound externally, and yet may be crushed together in the hand.

The rotten portion has frequently the consistence of a paste, "with tenacity sufficient to rope when held up, and the semi-fluid mass strings down like honey."

6. On what soils is it most prevalent—on light or heavy—on wet or dry—or on all soils equally?

7. Has it, to your knowledge, appeared on peaty or on newly broken up grass lands?

8. In what varieties of potatoes? Have old or long cultivated varieties failed more than new or recently introduced varieties?

9. Are varieties raised from seed, to your knowledge, liable to failure?

10. Have potatoes planted whole shown any difference in the extent of the failures?

11. Has the previous draining of land any effect in preventing the diseases?

12. Has the kind of manure applied any influence on the appearance or fatality of the disease?

13. Do you think the want of lime in the land is any cause of failure?

14. Does it, in your district, attack particular fields or farms, and what are the peculiar conditions of these farms?

15. Does nearness to the sea or the use of sea-weed make any difference?

16. What is your opinion of the cause of the disease?

16. Do you think you have in any way contrived to prevent it, during the present or past seasons, and how?

NOTE.—An American Agriculturist says:—"I have used slack lime, which I sprinkle on the potatoes as soon as they are cut for seed, and shovel them over in it, and plant them immediately. Since I have adopted this plan, I have not lost a potato, either in the ground, or after they were put in the cellar; and such of my neighbours as follow my example are alike fortunate, and in no way troubled with the rot." This was written in 1844.

In Scotland some practical men have supposed that by the use of saline, or chemical manures, they have been able to prevent it.

18. Has the peculiar wetness of the season, in your opinion, had anything to do with its occurrence in your neighbourhood?

NOTE.—The American Report for 1844, contains the following passage:—Notwithstanding the intensity of the drought, and its long continuance, the potatoes in this section of the country are rotting to such an extent as to destroy nearly the whole crop.

19. What are the first symptoms of decay after storing?

20. It is said that the rot spreads faster after the potatoes are put together in heaps or pits, than when left in the soil—and late digging or leaving them all winter in the soil is therefore recommended, what practice would your experience lead you to adopt?

21. How would you recommend that the potatoes should be stored during the winter? Will a sprinkling of slacked lime, or of salt, or pounded charcoal, or charred peat, or wood ashes, be beneficial? Will washing the potatoes clean, and then picking and drying them before storing, help to preserve them?

22. What precautions would you adopt in preparing the seed in spring?

23. Have any cases occurred in your neighbourhood in which the use of diseased potatoes has been injurious to animal life?

24. Are you able to forward me any striking examples of very healthy or of very diseased potatoes from your neighbourhood, or specimens of insects or of fungi you suppose to infest the potatoes, for the purpose of chemical, botanical, or entomological examination?

JAMES F. W. JOHNSTON.

DR. BUCKLAND ON THE POTATO DISEASE.

At the Annual meeting of the Queen's College, Birmingham, for the distribution of prizes, Dr. Buckland delivered a powerful address, in the course of which he alluded in the following terms to the murrain of potatoes:—"It had been too notorious for some weeks past that a gangrene had seized upon the potato crop, that it was almost universal. It extended all over Europe, and it was felt in the United States. It was felt, in the first instance, in Belgium, and then all over France and in Italy. He (Dr. B.) had received, within these few days, the result of an investigation of the potato disease in Scotland, in which Dr. Johnston had been summoned to institute a chemical investigation into the nature of the disease, and it was only that morning he received intelligence which confirmed his worst fears of the nature and extent of the malady. He had read that morning before leaving London, in the letter of a gentleman called the *Times* commissioner, the most awful statements relative to the condition of the potato crop in Ireland. That gentleman stated that he had just been informed by a priest that the disease of the potato crop was general in his parish in the county of Clare, and that out of 68 barrels of potatoes which had been buried in two pits, not one barrel had escaped uninjured. Nearly the whole were found to be diseased and decomposed. From these and other awful accounts he (Dr. B.) would say that the plague was begun. There was, he believed, yet a remedy for the disease, if taken in time. They must, however, loose no time—every day lost in preparing for, an guarding against the evil might prove fatal to hundreds of thousands of their fellow-creatures. What was to be done when the pestilence—the vegetable gangrene might come and seize upon man and beast? He used the term "gangrene" advisedly, for they might see in the samples of potatoes which he then held in his hand, evident gangrene, and the term had been applied by the physicians and scientific men of France to the disease. The great question now to be considered was, could they apply any remedy to the evil which existed. He believed they could; and he would at once say, first of all they must remove the potatoes from the ground, store them wherever they might—barns, warehouses, and every place that could be made available for holding them, must be used. Infected potatoes must not be allowed to touch the sound ones, for there was contagion in them; and so long as sound potatoes were kept dry, there was no danger of them. The diseased part of the potatoe is innocuous to man or beast if mascerated or steeped 12 hours in clean cold water, and then changed and washed again in other water, before they are boiled. The starch then in the most decayed and putrid portion of the potato was perfectly good. After the first 12 hours' steeping, the rind was to be taken off. The diseased part must be pared, and the parings washed twice in cold water, there being 12 hours, as he had said between each washing; then they were to be dried and set by for the use of cattle. He would therefore impress upon all concerned in the care of potatoes the absolute necessity of keeping them dry. Instruments are now being made in Paris and London by means of which the starch could be separated from the potato; but where the vegetable fibre remained, let it be washed and preserved. He would again impress upon those who had buried their potatoes the necessity of removing them at once. They ought to be put into straw, and every means taken to preserve them and keep them dry. He regretted to state that one-third of the potato crop in Ireland was lost, and with them the food of 2,000,000 of the people of that country had perished. Not one moment was to be lost. The government must interpose, science must interpose between the dead and the living, and by the goodness and mercy of God the plague may yet be stayed. At all events he would say, when God's plague was on the earth, let men leave of their unrighteousness."

AGRICULTURAL STATISTICS.

At the monthly meeting of the North Cornwall Experimental Club, held at the Tree Inn, Stratton, G. Gurney, Esq., presiding, after the various topics connected with the "operations of the month" had been discussed, Mr. Rowe read a paper on "The Importance of Statistics to Agriculture." He began by observing, that the subject might be thought by some as of too little practical value to merit attention; and that this opinion had very generally prevailed might be inferred, or Great Britain would be the only country in Europe, with the exception of the Netherlands, devoid of correct statistical information relating to the science of agriculture, founded upon official inquiry. If a consciousness of having exceiled incited to exertion, would it not be well, as far as practicable, by a compendious system of statistics, to settle the question, "How far does agriculture progress?" To each member of the club it should occur that the object of their associating together was "the advancement of the art and science of agriculture!" but without correct data, without statistics, were they not in a great manner at a loss to say, how far they were aiding in such advancement, or whether, in fact, any "advancement" was with them being made? These were questions of deep import, and deserving, if possible, a solution In political economy generally, the science of statistics was now fully recognized, and its importance appreciated. In 1832, a department of the Board of Trade was created, for the special purpose of collecting and arranging statistical information, with a view to its presentation to Parliament, and much valuable material had, from time to time, been thus brought together; but the attention of that board had been mainly occupied in matters relating to our commerce, manufactures, and intercourse with *foreign countries*. Again, those engaged in almost every art and manufacture had been strikingly alive to the most trifling minutiæ bearing upon the process, result and expense of each department in their several pursuits, whilst the agriculturists as a body had proved themselves indifferent in such matters, and the consequence was, that it was scarcely possible to obtain from two individuals a like opinion, either as to the expense of preparation for a single crop the average quantity of any given crop in a series of years, or the value of such crop when produced. Indeed this vagueness seemed to run throughout the whole operations and results connected with agriculture, and hence the difficulties which their society had met in arranging a scale of labour. In proof that British agriculturists had been as inattentive as he had stated, and more so than the other European states, Mr. Rowe adduced the example of France, where the quantity of land sown with each description of grain, the produce, and the quantity of live stock for the whole kingdom were annually ascertained, and accurately known. In Belgium, similar information had been periodically collected. In the United States, also, at the decennial census, much interesting and valuable information was obtained, as to the live stock, the produce of various crops, and the quantity of dairy, orchard, and garden produce, &c. In England, in 1793, a Board of Agriculture was established, assisted annually by a grant from parliament, and was continued until 1816; but the attention of that board he apprehended, was directed to modes of agricultural improvements, rather than simply collecting and arranging information. Our neighbours north of the Tweed possessed statistical accounts of each parish in the kingdom, collected by the ministers of the respective parishes, and lately published with the authority of their names. These accounts generally include the extent and boundaries of the several parishes, the topographical appearances, the rivers, the geology, with short historical notices, the population, the number of acres, the number cultivated as arable or otherwise, the system of cropping, general holdings, and annual value of agricultural produce distinguishing that of grain, green crops, &c. Within the last few years, he believed, a series of questions had been issued by government, and addressed to the several parishes in England, but whether returns had been generally made was doubtful, as the result had not been published, and hence the average produce of the kingdom stated to be in years of fair crops, 28 bushels per acre, must be regarded as a matter of conjecture rather than of evidence. This question was now, however, forcing itself on the attention of government, and had been brought before parliament for several years past. By a well arranged plan, as in other countries, the quantity of grain annually produced might be ascertained, and the important and practical question settled, as to how far the produce of the country kept pace with the increase of population? a question which must be looked fairly in the face, as one becoming every day of greater moment; for it should be borne in mind that our population did not simply augment in an uniform ratio, the increase in the 20 years from 1821 to 1841 being 2,733,669—more than the increase of 180 years preceding 1750 (which was but 2,230,000), and greater than the increase in the 500 years succeeding the conquest. Objections might be urged to the adoption of a plan of statistics; one—"that it would be a prying into the private affairs of individuals," was certainly entitled to much consideration; but after having been inured to the ordeal of the income tax, we might well suffer the investigation that might be necessary for such a purpose, a restoration to vigour being oft-times secured only by an unpalatable draught or a painful operation. The lecturer then urged the great importance which would have been given to this part of the county had such a plan existed; its capabilities and fertility would have been definitely shown, and would have given it a claim to consideration and accommodation in any scheme of local improvement professing to be directed to the welfare of the county generally; a remark forcibly applicable at the present moment, when other parts of the the county were urging their relative importance in reference to the intended railway communication. After quoting from several ancient authors on the agriculture of the county, Mr. Rowe referred to a statistical detail of the number of acres and the quantity of produce in the several parishes of the hundred, compiled by the late Sir John Call, in 1795, from which it appeared that the wheat crop bore at that period but a small proportion to the spring crops, for while the quantity of barley and oats reaped in the 11 parishes forming the hundred, together with the parishes of Poundstock, amounted to 4503 acres (being 1378 of barley, and 3125 of oats), the number of acres of wheat only amounted to 2191, being less than one-half; they might therefore conclude, that as green crops were not at that time cultivated to any considerable extent, the system of taking these crops in succession was, so late even as then, in full operation. The parish of Poughill stood conspicuous in this list, as being the only one in the hundred in which the extent of the wheat crop was not exceeded by either oats or barley.—*Royal Cornwall Gazette.*

QUALITY AND ECONOMICAL USE OF AGRICULTURAL PRODUCE.

Corn and Potatoes are direct food for man. Turnips and green herbage are only indirectly convertible to his use. The manufacture of these into such food as he can consume—into beef, mutton, and pork, or into milk, butter, and cheese—gives rise to important branches of rural economy, to which much rural industry is devoted, and a great breadth of land. In these branches it is as important to convert the raw vegetable material—the turnips and herbage—into the largest quantity of the manufactured article—beef or cheese—as it is, in arable culture, to raise the largest possible amount of grain with the smallest quantity of manure, and with the least injury to the land. Hence arises many questions as vitally affecting this indirect, as the doctrine of manures affects the direct method of raising human food. Thus it was observed that one kind of herbage, or grain, or root, fattened animals more quickly than another; or aided their growth more; or caused them to yield more milk; or made their milk richer: in butter or in cheese; that, from certain kinds of land, or after some modes of culture, or when raised by the aid of some kinds of manure, the same kind of produce was more nutritive; and that, when given in some states, or under some known conditions, it went further, and was therefore more valuable in the feeding of animals. How many curious questions are suggested by such observations as the following! Some varieties of wheat are better suited for the pastry cook; others, for the baker of bread. Some samples of barley refuse to malt in the hands of the brewer and distiller; and some yield more brandy; while others lay in more fat. The Scotch ploughman refuses bog Oats for his brose meal, or for his Oaten cake, because they make it tough; and the cotter's family prefer Angus oats for their porridge meal because they swell, and become bulky and consistent in the pot, and go farther in feeding the children at the same cost. The pea sometimes refuses to boil soft; the potatoes, on some soils and with some manures, persist in growing waxy. If Swedish Turnips sell for 30s a ton,—as in large towns they often do—yellow turnips will bring only 25s, and white globes, 13s; while all the varieties cease to feed well as soon as a second growth commences. What is the cause of such differences as this? How do they arise? Can they be controlled? Can we by cultivation remove them? Can we raise produce of this and of that quality at our pleasure.—*Progress of Scientific Agriculture; "Edinburgh Review."* January 1845.

HONEST INDUSTRY.—If there is a man that can eat his bread at peace with God and man, it is that man who has brought that bread out of the earth by his own honest industry. It is cankered by no fraud, it is wetted by no tear, it is stained by no blood.—*American Paper.*

The Canadian Agricultural Journal.

MONTREAL, JANUARY 1, 1846.

By the last Mail, accounts are received from Ireland, of important proceedings on the 19th of November, at the Mansion-House, Dublin, respecting the potato disease in Ireland. Seventy-five letters were read from all sections of the country, giving a deplorable account of the state of the potato crop. The following are three of the resolutions adopted at the meeting:—

"2. That we have ascertained beyond the shadow of doubt, that considerably more than one-third of the entire potato crop in Ireland has been already destroyed by the potato disease, and that such disease has not by any means ceased its ravages, but on the contrary, it is daily expanding more and more, and that no reasonable conjecture can be formed with respect to the limits of its effects short of the destruction of the entire remaining potato crop.

"3. That our information upon this subject is positive and precise, and is derived from persons living in all the counties in Ireland; from persons also of all political opinions, and from clergymen of all religious persuasions.

"4. We are thus unfortunately able to proclaim to all the inhabitants of the British empire, and in the presence of an all-seeing Providence, that in Ireland famine of a most hideous description must be immediate and pressing, and that pestilence of the most frightful kind is certain, and not remote, unless immediately prevented."

Up to this moment the disease has not been satisfactorily accounted for. It is said that potatoes planted on the sides of high hills in Scotland, have not been much injured. In the best and richest soils, the crops have been the most diseased. In new, and fresh broken up lands, on the contrary, the rot has not done much injury, and this agrees with our own experience this year. It is also reported from Ireland, that the wheat which has been sown this fall, on land which has produced this year a diseased crop of potatoes, has not sprouted, and that the wheat sown is found to have rotted in the soil. This, however, is not generally the case, as the superintendent of one of the Model Farms says, that wheat sown by him after a diseased crop of potatoes has come up as well as he could wish. The prospects for the poor in Ireland, are certainly very deplorable, if matters are anything near so bad as they are represented, but we would hope they are not. The crop of grain has been abundant, but, it appears, a large proportion of it has been already exported to England already.

They have adopted a novel mode of planting potatoes in England lately, which is said to answer extremely well. They put in the seed in the usual way, in the month of October, and in each of the succeeding months, when the land is not greatly frozen, until May. We have seen a report of the produce of an experiment made last winter. Several drills of potatoes were planted in the same field, with equal manure, in the months of October, November, December, March, and April; and, when taken up, it took the following number of yards of a drill, or row of potatoes, of each month's planting, to produce the same quantity:—

Those planted in	Oct.	30 yards.
	Nov.	32 do.
	Dec.	32 do.
	March	44 do.
	April	45 do.

The person who made this experiment had tried a similar one the year previous, with like results, and in both cases the potatoes did not rot. He, very justly, attributes the success of the experiment to the seed not being exhausted by sprouting, or growing in the pits or cellars previous to planting, and hence retaining their full vigour and strength when planted. This plan could not, perhaps, be tried in Canada, though we are convinced any plan which would prevent potatoes, intended for seed, from sprouting during the winter, and previous to planting, would be advantageous.

In the Colleges for education, in the British Isles, there is now, generally, a professor of agriculture, who instructs any students who desire it, in the science of Agriculture. This branch of education cannot injure the individual in future life, whatever business or profession he may be engaged in, and we conceive that such an education would be much more useful for a large portion of the students in our Canadian Colleges, than devoting years to learning Hebrew, Greek, and Latin. At all events, it would do no harm were agricultural science to form a part of their education in such a country as this, where nineteen-twentieths of the people depend upon the produce of agriculture. It is a most extraordinary fact, that education is thought necessary for every other profession and business, except for that business which is of vastly more importance to the people that it should be successfully carried on, than all others put together. Now that we are adopting means of general education, why is not something done to educate the people in the science and art of agriculture, which is so little known? and when so necessary to be known? We have urged this necessity constantly, for many years, and nothing has yet been done. If it produced no other good, it would show the people that the Government thought it was of some importance to the country that an opportunity should be afforded to the people to be instructed in the art and science of the business which was to furnish them the future means of their subsistence. However we may endeavour to persuade ourselves to the contrary, it is the produce of agriculture that must pay the greater part of our revenue in Canada, and the larger the amount and value of agricultural productions, the greater must be the means of paying revenue. Those, therefore, who wish to see our revenue in a flourishing condition, should do all in their power to augment the productions of the country, from whence alone this revenue can be chiefly paid. The general and judicious education of the people will do much towards this, if they are only instructed in what will be most useful to know. The education of every man should have some reference to his future employment, to make it the most useful to him, particularly to men in the middle, and working classes of society, who cannot devote half a life to education in schools and colleges.

We have seen a report of sixty tons of carrots obtained to the acre in England, the land being manured the year previous, with litter and salt. This produce would pay the purchase of the land, even in England. We know that large crops of carrots might be produced in Canada, with proper cultivation for them, and they would be a profitable crop for feeding horses, cattle, or sheep. We have seen it recommended to slice one bushel of carrots, and mix them with three bushels of oats, to feed horses, and the horses are said to thrive very well upon this feed, and be fully equal to hard work. Carrots are a healthy food for horses, and would be a great saving of more expensive food, which we consider hay and oats to be. It is very necessary that farmers should be economical in providing the least expensive food, if it be equally good, for their horses, as they are a stock very expensive to keep, and require a large portion of land to support them, when exclusively fed on hay and oats. A working farm horse, fed throughout the year on hay and oats, the latter at the rate of three gallons per day, will consume the produce of seven acres—three acres for hay, and four for oats, at twenty-eight bushels to the acre, which is here rather above a general average. Farmers will find that this estimate is not too high, and hence those who keep a large number of horses, only for the work of the farm, will consume a large proportion of the produce for the support of horses alone. At any considerable distance from our cities, it would be much more profitable to keep oxen for ploughing than horses. Oxen would constantly be increasing in value until a certain age, and then they might be fattened, and replaced by a young set. There is no doubt that a large proportion of the produce of the land of Canada is consumed by horses alone. There is, perhaps, not less than from three to four hundred thousand horses in the Province, and if the latter number only, allowing five acres for each, it requires the produce of two million acres for the support of horses alone. We do not say that this proportion of the land is required for their general mode of keep, but we are convinced that over a million of acres of our land that is arable, is required to keep the horses at present in Canada. This is a serious drawback to the profits of agriculture.

The Turnpike act provides, that the Trustees should have it in their power to "commute the tolls on any road or portion thereof, with any person or persons, by taking a certain sum, either monthly or yearly, in lieu of such tolls." Now, we do not see the use or necessity of this provision, if the Trustees are never to act upon it, however unjust they know it to be, that persons should be obliged to pay the same rate of tolls, when making use of only a few perches, a mile or two miles of the road, as those who use it for nine miles, and have the turnpike road made to their doors. The turnpike act has been now a sufficient period on trial, to know that the tolls might be safely and justly commuted, according to the act, with persons residing on or near the line of roads, in proportion to the distance travelled upon it. The only persons who had any concession made to them in respect to commutation of tolls, were the farmers residing on the Lower Lachine road, or the River Side. These farmers, from the Race Course upwards, were allowed to pass for half the tolls paid by others. We conceive this matter requires the attention of the Goverment; the government, it is not to be presumed, have any desire that equal justice should not be administered to all under the provisions of this or any other act.

The French minister of agriculture and commerce has lately addressed a circular to the several departments of France, giving a full report of the prospects of food, for the people, for the ensuing eight or ten months. This report is taken from the statistical returns, annually supplied to each prefecture, respecting the results of the last crop, and must be very useful and interesting to the whole community of France. We have often urged the necessity of such statistical returns being annually made in Canada, but without any notice being given to our suggestions. A late number of the Mark-Lane Express says, in reference to this subject:—"The state of ignorance in which the country is placed in reference to that species of statistical information necessary to enable us to estimate the amount of food available for use, is disgraceful to the government, and cannot be adverted to too frequently. A matter of such vast importance should not be left to the energy of private individuals." We believe that statistical information might be obtained in Canada, at a trifling expense, now, in particular, through the Municipal Council. The interest that, above all others, is of the greatest importance to the government and people of Canada is neglected, and left to shift for itself. There has been a few thousand pounds given to Agricultural Societies, but we say without hesitation, that this money has not been generally applied in Lower Canada, to the greatest advantage, for producing the improvement of agriculture, where improvement is most required.

We beg to offer our sincere congratulations to our friends and subscribers on the commencement of a new year, and we hope the coming year may bring them all possible health, prosperity, and happiness. Though our hopes may not have been fully realized during the past year, yet we are convinced, that most of us have, upon the whole, much cause of gratitude to our Creator. We may have anxiously wished for many things, which it would not have been advantageous for us to have obtained, and we may have obtained advantages which we did not expect. Health and life are blessings that should be more highly prized than any o her, because none other can be enjoyed without these. As regards temporal blessings, we have cause of thankfulness that our country produced a crop fully equal to the necessary consumption of food by our population. This is a blessing, in such a year as this, when the crops of other countries have sustained so great an amount of damage, as to threaten the inhabitants with famine, sickness, and death. Some of our crops, it is true, have been partially damaged, but not to such an extent as to make our produce less than is necessary to feed the inhabitants, and leave a surplus also. It is the duty of every one to commence the new year with a settled determination to act their part well to the end of it, whatever may be their situation or circumstances. A labourer cannot act the part of a legislator, but he has duties to perform, nevertheless, which it is better for himself and the whole community should be done well than otherwise. Every individual has, in their own sphere, an opportunity of acting so as to produce benefit to themselves, and others, or the contrary. Our world would be a much more happy one than it is, if all were to do their duty well, and conscientiously; those having the power and opportunity to promote the general good, as well as their own, doing so, by every possible mea ns.

CHEMICAL AGRICULTURE.

BY G. M. BURTON, ESQ., MANCHESTER.

Of all the subjects which, at the present period, occupy the attention of the scientific world, there is none, perhaps, so practically important as that department of chemical knowledge which has for its object the improvement of the productive qualities of the soil and the increase of the amount of the edible produce of the land. Surely a greater patriot or philanthropist there cannot be than that man who, after years of toil and dangerous experiment, brings all his literary powers to bear on a question so vitally important; and he who is able by his scientific researches to make an acre of land produce one quarter of wheat more than had been gained before, ought rather to be lauded for his merit, than despised as an underminer of old-established customs. Let us appeal directly to the judgment and common sense, which every agriculturist of England must possess, whether custom can always be relied on? If so, why do they so assiduously read those publications which profess to describe the greatest improvements of the day? why do they so eagerly snatch at suggestions for the amendment of their implements of tillage? The answer is uniformly the same:—We may improve the works which we have made, but we must not interfere with the operations of Nature." If a man is sick does he not send for the physician? or does he passively yield up the dictates of his mind, and give way under the adverse results of natural causes? This is not the case. Every faculty is strained and every energy exerted to renovate the system, to supply the deficiences of nature, and to restore the body, which is the garden of the mind, to its primitive vigour and beauty. This is the case with the diseased body, and equally applicable to the diseased soil. Sow wheat on the same land for many consecutive years, and every farmer knows the result. The land at first yields plenteously, but gradually the crop falls off; the soil actually becomes sick, and incapacitated to afford the ingredients necessary to the nutrition of the wheat; the farmer perceiving this, abandons the idea of sowing more wheat, so removes his seed to fresh land, where he may get an adequate return for his labour and his pecuniary outlay. Were the farmer as well acquainted with the abnormal changes which take place in the economy of soils, as he is with the general routine of husbandry, how much labour and how much money would be saved, for the comforts of his household, which are now expended in the support of his ignorance or his indolence. For, in the present state of our science, we know, for instance, that wheat will not grow for consecutive years on the same soil, because the stimulus to solution of those portions or ingredients of the soil which are absolutely essential to its growth is deficient; or, because there is a real paucity of such substances in the soil itself. In either case, or in both combined, chemistry comes directly to our aid. We apply manure, and thus supply at random the necessaries to the crop. We use electricity, and administer, in uncertainty, stimulus to the growth of the wheat. Now, it is the part of agricultural and organic chemistry to substitute definite design in manuring for random fertilizing, and to replace uncertain stimulus by effectual promotion of growth. We propose now to consider briefly the different properties of the chemical manures now in use, as evincing their superiority over common farm-yard dung, to which the agriculturists of England appear inseparably united by the bonds of custom and of long established experience.

Of all the varieties of guano imported into this country, there is none perhaps superior, reasoning from analogy, than that lately brought over from the Patagonian coast. Its richness in ammonia presents the highest claims to the agriculturists' attention. I am informed by Mr. J. W. Hopkins, of Manchester, who has devoted great time and labour to the study of the fertilizing properties of substances in general, that the ammonia is in large masses, and especially adapted for the promotion of vegetable growth on account of its great solubility.

Guano is well adapted for the growth of certain plants, but must not be considered as a universal fertilizer, for though it abounds in animal matter and ammonia, it nevertheless is deficient in the principal salts which are equally necessary for the production of a flourishing crop. Guano is not adapted for potatoes, turnips, mangel wurzel, &c.

No manure can be perfect unless it contains every ingredient that plants may require, nor is it absolutely necessary that such ingredients be mixed together in the exact proportion in which they are found on the analysis of such plants; for plants are endowed with a peculiar vegetable instinct, which enables them, by the spongioles of their radicles, and by means of an intricate process of endosmose and exosmose, to absorb into the system such principles as may contribute to their growth, and to excrete and reject those which would have a contrary tendency.

Numerous attempts have been made so to combine vegetable essentials, if I am allowed the term, as to form a chemical compost, adapted to the adequate supply of the deficiencies of the soil; but in the majority of cases such attempts have proved failures. In the first place they have been palmed upon the agricultural world at such low prices that no chemical compounds of any value could possibly have entered, in any quantity, into their composition; and, in the second place, the principal ingredient has been of such an evanescent character, that a trifling exposure to the influence of the atmosphere has deprived them altogether of any fertilizing power which they might possess. I believe the "Pinguedo" to be a compost the most exempt from what has just been stated, for I have seen its virtues tried, and know, by analysis, that its intrinsic value nearly equals its price.

To return to the objects of this paper, I would urge all those who call themselves agriculturists to penetrate, by observation and research, into the mysteries of nature, not with the idea of diving into the obscurities of metaphysical questions, but in order to obtain clear views in tracing natural results to natural causes; for we are assured that agriculture, conducted on scientific principles, will not only be more sure in its results, but more economical in its details.

That farmer who knows and properly understands the application of chemistry to the improvement of soils, will gain credit as a man of science, and save money by the purchase of such articles as can be turned to the best account.

Thus, the unscientific farmer might mix together lime and guano (which I have often known to be done), whereas the chemical agriculturist well knows that he would loose, in the ammonia set free, what he had hoped to gain.

I have little doubt that, from the rapid strides by which chemical knowledge is gaining upon the darkness of old established custom—I have little doubt, I would repeat, that, at no very distant period from the present time, England will see the sons of her soil sowing and reaping under the guidance of those immutable laws which have ever been found to preside over all natural operations.

Litchford Hall, Oct. 22, 1845

MAKING CHEESE,

AS PRACTISED IN ONE OF THE MOST EMINENT DAIRIES IN NEW ENGLAND.

Add the night's milk with the morning's, and heat it gently over a fire until well warm, then put in a tub or vat with sufficient prepared annatto to give it a handsome yellow colour. Put rennet sufficient to make it curd in twenty-five minutes: when curded take a wooden knife or sword and chequer it all into squares to the bottom; let it stand from fifteen to twenty minutes, or until the whey appears above the curd; break it up carefully with the hands in such a manner as not to bruise or break the pieces of curd; next put a clean strainer on top of the curd so as the whey may arise on top, and lade it off with a dish or dipper; then put a cheese strainer in a cheese basket over a tub, and carefully remove the curd and remaining whey into it, and cut it into slices with a thin skimmer until the whey has mostly drained out; then bring the corners of the strainer together and twist them, so as to bring the curd in a solid mass, and put the twisted corners down in the basket, and a clean board about one foot square on the top of it, on which put a sufficient weight, in order to press out the whey. After remaining about fifteen minutes, the curd is to be cut in pieces about one inch square, and put back again with the weight on, and remain from ten to fifteen minutes, and then cut as last stated, and put back again, and so repeated from six to ten times, or until the whey has entirely done dripping from it; after which take it out and cut in pieces of about two inches square, put in a wooden bowl and chop with a chopping knife until the pieces are the size of Indian corn. The next is scalding the curd, which is done by putting it in the strainer and putting in the kettle of whey heated to blood warmth, for if the whey is too hot it will ruin the cheese, and make it dry and hard; while in the whey it must be stirred with the hand until the whole is equally heated; then it is taken out and put in a cheese basket over a tub and clean fine salt thoroughly mixed, to give it a high salt flavour, and let it stand until hardly blood-warm, then the corners of the strainer are twisted together as before, and put in the hoop and pressed, in this instance, with a weight of one hundred lbs. to every ten of cheese, to remain about half an hour, taken out and turned and re-placed in the press and add about one-third to the weight—then let it remain three hours. Then take it out and put it in a fine clean linen cloth perfectly smooth, and no wrinkles in it; put again in the press and press forty-eight hours, being taken out and turned once during the time. At this pressing about one third additional weight must be added. It must then be taken out, oiled, and put on the shelf, where it must be turned, rubbed and oiled at least every twenty-four hours. From long experience, I have found it the best method of making cheese.—*Tennes. Farmer.*

SIZE OF FARMS.

Farming, when it is carried on merely as a money making business, to be most profitable, requires farms of such size as to furnish regular employment to the head farmer and all the hands in such a way as to make the greatest return of their labour at the least expense. This can only be effected on farms of considerable size. The immense advantage of a regular division of labour is shown in all extensive manufactories, where extraordinary expedition in the various operations is attained, by allotting each department to separate individuals. For division of labour to be effected in farming, farms of considerable size are required, or where several hands can be constantly employed to advantage. Where farms are very small, and one man does the whole labour, it cannot be executed at so small an expense as when the work is divided.

The productions of a farm should not be confined to one or two articles; the farmer should not be principally a wheat grower, nor a drover, nor a shepherd, but should attend nearly equally to all these different branches. When the business is thus varied, too much work does not occur at one time, nor too little for the employment of the hands at another. This variety of business is also necessary to the improvement and enriching of the soil—to the production and application of manure, and to maintaining the benefits of rotation in crops. But it cannot be advantageously adopted on very small farms, as there would be a great waste of ground, and a great expense of material, for partition fences, and a loss of time by attention to a great number of small crops.

Another disadvantage of small farms is, that labour-saving machinery, cannot be so profitably used on them; for where these are expensive, and the quantity of work they perform is small, the interest on them is a heavy drawback on the profits of the farm.

Notwithstanding all these disadvantages, there is not one farmer in a hundred who has not more land than he can cultivate in the best possible manner; or, to speak more correctly, there is not one in a hundred who has sufficient additional capital to carry on profitably all the operations of the farm. A farmer must be able to expend a large sum in addition to what he does in paying for his land, if he expects to make money by the business. But instead of this, the common practice is, to expend all the additional capital which is realized by farming, in purchasing mere land. Instead of doing this, it would be much better for the farmer to sell a part of what he first had, if this is the only way for obtaining additional capital for carrying on his operations.

We will suppose the case of a farmer commencing business with five thousand dollars; if, with one half this sum he buys a farm of fifty acres, and with the other half he improves it to a high state of fertility, he will do far better than if he should purchase a hundred acres, and have no further means of improving it or of performing the work upon it in the most advantageous manner. Most land, by a judicious expenditure to the amount of its cost upon it, may have its productiveness increased four fold, and its profits to an almost incalculable amount; if, therefore, a farmer can raise from fifty acres, twice the amount of produce that he does from a hundred acres, he will not only receive twice as much for it, but he will be able to raise this amount with even less than one half the labour that he does from the hundred acres, because land in good condition is much more easily tilled than that in poor condition. Thus, with only fifty acres, he would, in fact, experience the advantages of large farms to a far greater extent than if he should purchase a hundred acres.

AN ENGLISH GENTLEMAN'S RESIDENCE.

Killerton House, near Exeter, the seat of Sir Thomas D. Ackland, Bart., M.P., has long been known and celebrated as one of the most interesting and delightful residences in Devon's favoured clime. The elevated situation of the mansion commands magnificent views, and is surrounded with some of the noblest trees in Britain, which add grandeur and interest to the place. The ilexes and cedars of Lebanon have attained a great size, so have the Exmouth magnolias, which flourish most luxuriantly in this climate and soil. One of the most important features in a gardening point of view is the shrubbery near the house, well known as Killerton Hill. This was laid out under Sir Thomas's own eye, and is unquestionably one of the finest things of the kind in the kingdom. The planting has been boldly yet consistently carried out, and it is doubtful whether any one thing can be added or varied which would improve it. From the growth which the plants have made we should suppose that they had been planted twenty-five or thirty years. Occasionally, however, some new plants have been added. Some of the rhododendrons have attained an enormous size, as much as thirty-eight paces round; and one recently transplanted, having outgrown its situation, is beyond these dimensions. A vast variety of trees and shrubs cover the surface of this hill, which includes several acres of ground. A very beautiful chapel has recently been erected on the east verge of the park, but the arrangement of the ground around this is not quite so happy as the hill. For example, a square portion of ground is enclosed by a box hedge surrounding the building, and this space not having been made perfectly level, as it should have been, the hedge presents an awkward appearance, and produces an uneasy feeling in the mind by its traversing up and down the hill. The whole area within this hedge ought to have been brought, unquestionably, perfectly level, to have given base and dignity to the building enclosed, and the planting should have been carried out with subjects suitable to ecclesiastical architecture. As you approach the chapel from the kitchen garden side, a vast number of rare conifers are planted, and doing remarkably well. They will, at no distant day, become a very important feature in this part of the pleasure-grounds. The kitchen garden is one of the best in Devonshire. The soil in the locality is excellent, being the red loam so highly prized by the agriculturists. Both trees and vegetables, however, prove its quality to be good, as everything under the care of Mr. Craggs, the gardener, was in capital keeping, as has always been the case. A new range of hot-houses is in course of erection by Mr. Clark, the hot-house builder, of Exeter, who has introduced all the modern improvements in construction, as well as in ventilating and heating. There was a most important matter pointed out to us by Mr. Craggs. Where vines are planted outside the house, instead of cutting the sill or bottom rail of the front sashes, to admit the vines, a false sill is introduced on the top of the main sill, and fastened to the uprights by means of a bolt at each side. This answers the purpose admirably, and without weakening any part of the building. Mr. Craggs has adopted a plan of preparing soil that has been recently got in for immediate use in potting, which deserves to be made known. A fire of wood is kindled under an iron grating, and on this is laid the grassy furzy turfs. Vegetable life is at once destroyed, and all insects are at the same time annihilated. The fire is kept smouldering; and when the turfs are taken off, they are fit for immediate use when cool. This deserves the attention of plant cultivators. We had almost forgotten to mention a very large specimen of Cunninghama lanceolata in the shrubbery, measuring fifteen feet in height, and eighteen inches in circumference in the stem.—*Western Luminary.*

NEW CLOVER.

Two new clovers have been attracting attention in France, concerning which we find some information by M. Vilmorin, in the *Bon Jardinier*. One is the hybrid and the other the elegant. Elegant clover was for some time considered identical with the Trifolium hybridum, cultivated in Sweden; when, however, growing together, the differences are striking; the latter is larger in all its parts than the former, and the colour of its flowers is a brighter rose, shaded with white in the centre, while the elegant trefoil has rather dull reddish rose blossoms, coloured alike in every part of the flower head. The appearance of the herbage is different; the hybrid clover has bright and dark foilage, and that of the elegant is pale and unequal; the leaflets of the latter are also marked with a brown band like common clover, which is not the case with the hybrid. Another character of the hybrid is that, in the summer, when it begins to shed its blossom, and during the autumn, the root throws out fresh foliage, arranged like a rosette; but in the elegant trefoil this does not occur; it is the latter branches which rest on the ground that supply the verdure. The hybrid trefoil also flowers fifteen days earlier than the other, which, however, last the longest, and branches more; lastly, the former is taller, more beautiful, and comes in earlier; but when the latter has arrived at perfection, having more numerous stems, well covered with branches, and more solid, it will, when mown, yield as great a produce as the former. The hybrid trefoil has been a great deal used by M. de Kruns in the formation of artificial fields at Orebro, in Sweden, and it has succeeded well; it has grown from three to four feet high, and has yielded, during about twenty years, often more than 10,000 pounds per tunnland (about an acre and a quarter English), and always upwards of 5,000 for the first ten years. It is regarded as a plant equally suitable to cultivate for mowing and for pasturage; strong moist soils, argillaceous or calcareous suit it well; it frequently comes spontaneously on lands, in Sweden, that have been drained. The elegant trefoil is found in abundance on poor clayey strong soils, where it grows thick and vigorous; it is wild in France in many places, not unfrequently in ferruginous sand. It seems very probable that the species will one day form valuable additions to our forage plants, as they appear as though they would succeed on land unsuitable for clover, lucerne, and sainfoin.—*Transactions of the Highland Society.*

CULTIVATION OF PARSNIPS.

To the Editor of the Mark-Lane Express.

Sir,—A correspondent of the *Mark-Lane Express*, who signs himself "Young Farmer," asks after the management necessary for cultivating parsnips. Parsnips will thrive in any deep land, whether stiff or light. Some break up old grass land for parsnips in September: and after the land is well rotted, twenty tons per acre of stable manure are spread over the land. A trench is then opened through the centre of the field, between two and three feet wide, and where the soil will admit of it, from a foot to eighteen inches deep; a small two-horse plough then turns the manure and about three inches of soil into the trench, and this is immediately followed by a large trench plough with three or four or more horses, which turns a foot or more of clean soil upon the manure and scurf, when the land has been recently skimploughed. The soil is then harrowed, and the parsnip-seed, which should be new, is sown at the rate of three or four pounds to the acre. The plants, when they are an inch high, are weeded, and are thinned out to nine inches or more at the second hoeing: they are taken up with a fork or ploughed up in October or November. The average produce per statute acre is nine to eleven tons. Parsnips being a very hardy plant, the frost does not injure the seed or young plant, and, if thought desirable, the former may be sown as they are ripe in autumn. Yours Mr. Editor, J. S. T.

The *Times* estimates the capital of seventy-four railways completed, or being completed, at £103,166, 220—of projected branches of these at £35,000,000, and of 707 new companies, either established or projected up to date, at £464,698,656—making a total of £602,864, 876!

THE SILK-LOOM WEAVER'S LAMENT.

BY MRS. EDWARD THOMAS.

I long to stretch me on the verdant grass,
And gaze in IDLENESS on the summer-sky;
To see the happy clouds careering pass
In all their DEAR, unchartered liberty.

I long to scent the violet of the glade,
The fragrant hawthorn that the air regales;
To feel creation by that power was made
Whose seasonal benificence ne'er fails;

To feel away from man—far, FAR away—
With thoughts as free as flowers, as unconfined,
With none to question whither I may stray,
The world—its artifice—left all behind.

Oh for one hour of such unshackled ease!
Thought too ecstatic for my toil-worn brain!
The chidden wretch ALONE, himself to please;
The galley slave freed from the galling chain.

To walk erect, with no one to control,
No hard task-master, brutal, to deride.
O liberty! still native to the soul!
O liberty! still man's ennobling pride!

We are born free; the beggar is born free—
Free as the noble—but alas! full soon
The grim, gaunt hand of dire necessity
Enfetters gen'rous nature's righteous boon.

My brow is burning and my brain's on fire:
How fiercely madd'ning is its flame intense!
Still, still I pant with the one fond desire,
'Till disappointment sickens every sense,

To breathe the air of heav'n the country yields,
The unpolluted air, that comes direct
From the clear skies, to fan the pleasant fields,
In floral loveliness profusely decked.

The tainted air blows HERE, but parches still,
With ague-chills, and fever nought abates.
Oh for the gushing of the rural rill,
To quench the thirst the heated town creates!

I've but ONE hope, and that is, when I die
The lovely green grass, ne'er my own in life,
Will mark the spot where I serenely lie,
With dear, refreshing, spring-tide coolness rife.

PLANTS DELETERIOUS IN CONFINED PLACES.—It is not sufficiently known by the admirers of flowers, that the agreeable perfume they emit, when in full bloom, is decidedly deleterious when diffused through close apartments, producing headache, giddiness and other affections of the brain. But it is only in confined rooms that such effects are produced. In the garden, when mingled with a wholesome and exhilarating atmosphere, amidst objects that awaken the most delightful sensations of our nature, those sweets are a part of our gratifications, and health is promoted in consequence of our enjoyment. Who has not felt the excitement of spring? of nature in that delightful season, rising from lethargy into beauty and vivacity, and spreading the sweets of the primrose and the violet for our gratification? Amidst the beauties of the flower-garden, these pleasures are condensed and refined; and the fragrance there hanging on the wings of the breeze, is not only pleasant but wholesome. Whatever increases our gratifications, so peculiarly unmixed with the bad passions of human nature, must surely tend to the improvement of mankind, and to the excitement of grateful feelings towards that beneficent Creator who has so bountifully supplied us with these luxuries.—[*N.Y.Sun.*

VARIATIONS IN THE VALUE OF RAILWAY PROPERTY.—The fluctuations which take place in the value of railway property are often the subject of remark. In no other description of joint-stock shares do equally sudden and extensive changes occur. Most persons who have paid any attention to what is passing in the railway world are aware of the high prices of several of the leading lines, as compared with what they were in 1843. In that year the Great Western shares of 80*l.* were as low as 11 premium; lately, they were 140. In the same year, the Great North of England 100*l.* shares were scarcely saleable at 40 discount; a few months ago they were 150 premium The Midland Counties 100*l.* shares were, little more than two years since, at 35 discount; they were lately at 90 premium. But a greater increase than in either of the instances we have mentioned has taken place in the shares of the Dublin and Kingston Railway. Little more than 20 months ago the 100*l.* shares were selling at 75*l.*, being 25 discount. Seven or eight weeks since they brought 250*l.*, being 150 premium. But still greater than these have been the variations, considering the amount paid, which have taken place in the value of some of our new lines. The Goole, Pontefract, and Wakefield shares, on which a deposit of 2*l.* 10*s.* has been paid, and which remained stationary for many weeks at a premium of from 14*l.* to 16*l.* have recently mounted up to 40*l.* Even this sudden and extensive rise, however, is surpassed by that which lately took place in a new line which is scarcely known in this country. We allude to a Scotch line, called the Glasgow and Barrhead Railway. The shares in this line were selling, six or seven weeks ago, at 6*l.*, including the deposit of 2*l.* 10*s.*; they rose in a very short time to 24*l.*, and then as suddenly fell back to 17*l.*; but, strange to say, they again took a start, which has, we believe, no parallel in any description of joint-stock property. They bounded up in a few days from 17*l.* to 40*l.* Those who were fortunate holders, to any extent, of the scrip of this line, must have realized large fortunes in the brief space of a few weeks. A holder of 250 shares, at par, must have realized little short of 10,000*l.* by the transaction.—*Railway World.*

THE OBSCENE PROPERTIES OF THE VULTURE.—The above foul bird will devour, with a disgusting trait of greediness, the most putrid offal; and in almost all parts of the East, groups of them, from twenty to thirty, may be seen assembled together, fattening upon human and other animal corpses. So depraved, so vitiated, and so rotten is the constitutional system of the vulture, that its very feathers may be observed to molt from its wings at voluntary intervals, whilst it is in the act of gorging its prey; and there is one fact in relation to this repulsive bird which is perhaps not generally known; it is this, viz., that no animal whatever will prey upon the vulture, living or otherwise—not even the jackall or glutton, which are in the habit of burrowing into, and ransacking, the repositories of the dead, and indulging each a morbid appetite; yet these beasts will not approach the vulture, but will turn away from it with total abhorrence. Even the common flesh-fly (*musca putris*) will not lend its aid towards annihilating the volucrine nuisance under consideration, by inoculating the carcase of the bird with its consumind larvæ, but avoids coming into contact with this fetid mass; so that the vulture may be looked upon as the most obscene of all carnivorous scavengers, and can be viewed only in the light of a solitary outcast, singled out from the wide and varied university of animated nature.

PROLIFIC WHEAT—In the harvest of 1840, Mr. C. Spring, of Sohman, Cambridgeshire, gathered from one of his fields eighteen very fine ears of wheat (which were five, six, and seven set), the proceed of which filled a common wine-glass; the above was planted the following autumn, and produced one peck, which was again planted Nov. 3, 1841, and produced seven bushels and one peck; planted the same Nov. 2, 1842, the produce one hundred and eight bushels and two pecks; which was again planted in the autumn of 1843, and produced one thousand eight hundred and sixty-eight bushels. Thus the increase, from the eighteen ears in the short space of four years was the enormous quantity of four hundred and sixty-seven coombs.

A single root of potatoes, of the species called second early, was lately dug up by Mr. James Allen, gardener to Mrs. Dykes, of Dovenby Hall, to which no less than 110 potatoes were found attached.—*Cumberland Packet.*

AGRICULTURE IN SCHOOLS.

Professor Johnston lately delivered a lecture before a Convention of School Teachers, in Scotland, and as there are many of the facts submitted by the learned lecturer, very interesting and useful to know, we copy a part of the lecture:—

"Gentlemen, there was a time when this hill on which we now stand, was nothing but a naked rock of lava. That old lava gradually decayed as modern lavas do, and crumbled down and formed loose matter on the surface, in which seeds of plants grew, died, and left their remains. Thus by degrees the soil accumulated to such as you now see on the surface of this rock, on which plants now grow. Such is the history of nearly all the soils on the surface of the globe.

Suppose you take a portion of any one soil, and put it upon the end of a piece of metal, such as I am doing just now, and in any way expose it to the action of the fire, you will see that part of the soil will grow blacker at the edges; by and by this blackness will disappear, and the soil will assume a colour more or less dark, according to the nature of the substances of that which remains consists. If you take this portion of the soil before it is heated, and weigh it, you will find that after it is exposed to the fire, it is not so heavy as before. That portion of the soil which has burned away, consists of the remains of those vegetables of which I have spoken; of those animals that have died and been deposited in the soil; and of the manures which have been applied by the farmer.

Thus, vegetable matter forms what is called the organic, and the other portion of the soil, the inorganic matter.

The quantity of organic matter varies very much—in some soils it exists to the extent of 2 per cent. and in peaty soils, sometimes as high as 70 per cent. If you take a piece of vegetable matter and burn it, such as this wood, you will find, here, also, that a large portion will not burn away, but remains, forming wood-ash. It is the same, then, with regard to the plant, as to the soil—a part burns away, and a part remains. Different plants have different proportions of inorganic matter—thus, meadow hay leaves nine or ten per cent. of incombustible matter. Again, as to the animal substances: take a piece of muscle, dry, and burn it, and you shall find that the greater part of it will burn away, which is the organic matter; the remainder being, as in the soil and in the plant, the inorganic and incombustible matter. Now, one hundred pounds of fresh muscle contains phosphate of lime and other saline substances, to the extent of one per cent. of incombustible matter.

Thus the three different substances, soil, vegetable, and animal matter, consist of organic and inorganic matter; but there is this difference, that in the soil there is a larger portion of inorganic matter than there is in plants and animals—in the latter, the greater portion burns away.

By looking at the table, you will observe that the inorganic matter consists of different substances, such as silica, which forms a very large proportion of flint; alumina, a principal ingredient of pipe-clay; oxide of iron, which is the rust of iron; potash, of which the potash you got from the shops may serve to give you an idea; chlorine, which is a kind of air; and then there is manganese, phosphoric acid, and carbonic acid. These substances are found in all soils, but not in equal proportions. You will see in the table before you the details of the constitution of a soil which would yield good crops for perhaps a hundred years. Were you to possess such a soil as that—and such soils are to be got in the virgin land at the Cape of Good Hope, on the banks of the Ganges, and the Missisippi,—you would find that it would contain a notable quantity of all these different substances of a soil capable of yielding good crops, but which would require to be regularly manured.

You will observe that opposite three of the substances the word "trace" is put, which means, that though the substance was not absent altogether, yet it existed in so small a quantity that it could not be weighed. In the rich virgin soil stated first, you observe that there is of lime 59 per cent., while in the second column there is only nineteen. Of phosphoric acid there is four in the one, and two in the other. In the third column of the table is the constitution of a soil so barren, that though manured, it could not produce a good crop. You see that there is a great many gaps in the list; in short, there are only five substances which exist in anything like quantity. So much for the substances which exist in all good soils; and you may be sure that if any soil does not produce a good crop, some one or other of these substances are wanting.

The question arises—how do soils come to have such different compositions as these? I stated to you how the crumbling down of rocks formed the soil, along with the accumulation of organic matter in it, and if I had time, I would have directed you to a geological map, and shown that in every country the rock on which the soil rests, is different; and if it be true that the crumbling down of rocks forms the soil, you learn at once how soils must differ very much in their composition. In felspar soils, of which rocks principally consist, you will observe only silica, alumina, and a few others. A soil formed from this, must therefore contain a large quantity of these substances, while it would be defficient in many others.

As soils differ in this, we are led to this practical question—how can we make *this* soil to be like *that* soil, or how can a bad soil be made equal to a good one? The answer is simply, that you must supply those substances, that are wanting in the soil: you must supply as much potash or lime as is wanting in the third or poor soil—and as is wanting in the second, to make up all the constituent elements which exist in the first or rich virgin soil, and which are necessary to enable the soil to produce a good and profitable crop. This shows you the benefit of an analysis of the soil, by which a farmer is enabled to decide what the soil requires, and proceed accordingly.

I shall next speak of vegetable substances; and first, as to the inorganic part of them. If you take the ash that remains behind, from a plant which has been exposed to the fire, and analyze it in the same way as with the soil, you will come to this result—that the inorganic part of the plant contains precisely the same substances as the inorganic portions of the soil.

In reference to the ash of vegetables, 100 lbs. of wood leave behind not more than a half pound of ash. Perhaps you may be inclined to ask why, seeing that out of 100 lbs. one half pound only is ash, can that half pound be necessary for the existence of the plant, or is it rather accidental, and in no respect making any difference to the plant? No such thing, gentlemen. That half pound of ash is just as much an essential part of the plant, as the 99½ lbs. which burned away. The plant could not live, or at least fulfil the purposes of its nature, without this small quantity of inorganic matter.

Let us inquire, whence do plants derive the organic and inorganic parts of which they consist? They derive the organic partly from the air; the inorganic solely from the soil. In the air float certain proportions of all those substances which enter into the organic part of the plant. Now, the different kinds of plants in the soil will materially affect its constitution, and have a remarkable influence upon that constitution. Suppose I grow lucerne upon the very fertile soil detailed in the table; as lucerne requires a large quantity of lime and phosphoric acid, it would rob the soil of a large proportion of these, and therefore it would not continue to grow the same crop with the luxuriance that characterized it at first, because it could not supply, in the same abundance, those particular substances upon which lucerne lives more than upon any other.

Take the ash of the different kinds of grain, and analyze it, and you will find that each in its own way affects the soil. Wheat, oats and rye require a large quantity of phosphoric acid: so if you grow wheat a long time in the same soil, it will draw out this phosphoric acid among other things, and thereby reduce its quantity. This is what is meant by *exhausting* the soil. If rye-grass is the plant used, it will exhaust the soil generally, because it does not take away a great portion of any one of the substances. In the same way, different crops make the soil poor; but if I take the same crop say fifteen or twenty times—a practice which, as is well known to the most of you, existed not many years ago—the soil would by that time produce no crop at all.

The land then may be exhausted in two ways—generally of all the substances, and especially, of particular substances; and from this circumstance we are enabled again to make two or three practical deductions.

In the first place, insomuch as the soil contains a limited quantity of these substances, and inasmuch as different crops carry off different portions, you at once see why it is judicious to have a rotation of crops. A soil may produce one crop abundantly when it cannot produce another.

Let us next inquire why land is manured. It is obvious that manure is applied to restore those things which are wholly or comparatively wanting. Chemistry tells practical men how to renew their exhausted soil. Suppose that fifteen crops of oats have been taken off a piece of land, then it will have lost a large quantity of lime, phosphoric acid, and potash, and in order to restore it, you must supply the soil with these ingredients of which it has been robbed. Manure from cattle being composed of the remains of vegetables taken off the land, and containing all these things of which plants consist, the farmer, generally speaking, is enabled by its application, to retain the fertility of the soil. But then, observe you, he adds all the things which are required for a fertile soil, and may apply too much of one substance, and not enough of another, which the land requires for a particular crop. Now, guided by chemical knowledge, he would be able, by other means, to provide for his land. If the farmer knows chemistry, he will, at far less cost, and far more effectually, secure good crops.

I come next to the organic part of the plant. You observe, when I take this flour dough, and wash it in water, it diminishes in bulk, and the water becomes milky. The portion that remains, for it will not all wash away, is a sticky substance, and this is called gluten. If the water is allowed to stand a short time, the white will fall to the bottom and form starch. The flour is thus easily separated into two parts, the starch and gluten. Wheat contains gluten to the extent of from ten to thirteen per cent; meadow hay, forty per cent. of starch. Of fat, (oil) wheat contains from two to four per cent; oats, six per cent.; Indian corn, nine per cent., and meadow hay, from two to five per cent. Thus the organic part of vegetable matter contains gluten, starch and fat.

I shall now make a few observations on the composition of animals. Of what does the ash of animals consist? The body is composed of various parts—of muscles, fat, and bone, and other elements which I need not detail. If we examine the composition of the muscle, we shall find that it contains 2 1-2 per cent. of phosphate of lime, and a third per cent. of other saline matters. In bones you do not have all the substances which exist in wheat, but you have some of them, such as lime, magnesia, &c. In ten gallons of milk, there is three-fourths of a pound of saline matter; so that if you take the composition of the muscle, of the bone, and of the milk together, you will find that animals contain the different substances which are to be found in the soil. Thus it is we learn the intimate connexion between the composition of the inorganic matter of the plant, of the animal, and of the soil.

But where does the animal get this inorganic matter? From the plants on which it feeds. In bone, six-tenths of the whole consists of phosphate of lime and magnesia. Now an animal could not support itself or walk about without some bone or firm substance to uphold it. It feeds upon herbage to obtain the different substances of which it is made up. But if the plant had no soda or magnesia, the bone could not be built up, no more than the walls of this house could be made without lime, stone and other substances. It is necessary then, that the plant should have all these substances, in order to supply them to the animal. And where does the plant get these substances? It gets them from the soil; nor can a plant live without them. And here we have a beautiful example of the provisions of nature, for a plant cannot grow, unless it can acquire those elements—or, indeed, if it did live, it might deck the earth, but it would be useless for food for animals, which is the great purpose of its creation.

Some animals lay on fat very abundantly, and some, like myself, lay it on very sparingly. If you have an animal inclined to fatten, and you *wish* to fatten him, feed him with Indian corn.

There is an important difference between the composition of the vegetable and that of the animal. In the former there is gluten, starch, and fat only. The lungs of the animal are a sort of carbonic acid manufacturers. The starch which the animal throws off to the air, the plant sucks in: in this the leaves are continually employed—perpetually sucking in, with their thousand little mouths, the carbonic acid. The lungs of animals might suck in the same as plants do, but such is not the order of nature, and it falls to the plant to supply the deficiency.

You all know that every part of our body is continually undergoing a change, and that a certain quantity of gluten must be eaten every day to supply it; it is the same with young animals; they require an extra supply of the elements of muscle and bone.

Animals reject in dung and urine a great many substances, and as the plants contain substances which are soluble in water, it is of great consequence to take care of the liquid excrescences, and to mix it with the solid, so that the whole the animal ate may be preserved, which being applied to the soil, it is provided with the same substances almost for ever. If you allow the liquid to run into the river, or pond, you deprive the land of what the plant gets from the soil, and which the animal gets from the plant. When the animal dies, all those things which it got is returned to the soil, and thus the same revolution goes on from the soil to the plant, and from the plant to the animals.

These are some of the points, gentlemen, by relating which I hoped to interest you, and which demonstrate the over-ruling presence of One mind, directing practical operations to the same end. If there was not the same Spirit pervading the nature of the soil, the plants, and the animals, there would be some confusion; but there is manifested the presence of One mind and of one principle, directing the whole cycle of animal and vegetable life, as there is to be seen in all the cycles and motions of the planetary bodies.

Burlington Agricultural Show.—The annual show of stock and implements before the members and friends of the Burlington Agricultural Society took place at that town on Wednesday last, under circumstances as auspicious as could have been wished. The weather was fine, the exhibition generally good, particularly as regards the sheep and short-horned cattle; the attendance of visitors numerous and highly respectable (including all the influential land-owners and agriculturists of the district), and the after proceedings of the day of that spirited and exhilarating character which is alone sufficient to ensure success to the Burlington Agricultural Association.—*Doncaster paper.*

The Lapland Horse.—This animal, according to Berenger, is small, but active and willing—somewhat eager and impatient, but free from vice. He is used only in the winter season, when he is employed in drawing sledges over the snow, and transporting wood, forage, and other necessaries, which in the summer are all conveyed in boats. During the summer these horses are turned into the forests, where they form themselves into distinct troops, and select certain districts from which they rarely wander. They return of their own accord when the seasons begins to change, and the forests no longer supply them with food.—*Youatt on the Breed of Horses.*

Bencraft's Patent Hames.—During a visit we lately made to the Royal Polytechnic Institution, we observed among the numerous models Mr. Bencraft's patent hames; and for the sake of humanity, we hope it will be adopted everywhere, the object being to prevent galled shoulders. It possesses the power of materially facilitating the horse's draught, and of effectually preventing galled shoulders; and even horses that were at the time in an extremely bad state were put to work, when the wounds rapidly healed, without the aid of medical treatment, or the animal being subjected to one day's rest. A slight acquaintance with the formation of the horse's shoulder will show that the trace, as attached to the harness hitherto in use, has been made to bear upon the most objectionable part—viz., in front of the joint which connects the leg with the shoulder blade, thereby imposing upon it continuous pressure and friction, and at the same time, greatly impeding the action of the fore limbs. It is evident that, in the horse, the shoulder, and that portion of the front of the spine which forms the withers, should be the point of draught; but it is equally clear both with reference to the economy of draught, and the ease and freedom of the progression of the animal, that in the application of the draught, the motions of the shoulder joint should be as little interfered with as possible.—*Mining Journal.*

Liquid Manure.—The greatest care should be taken to make the most of this valuable article. The channel which is behind the cows in every well made cow house, may be filled daily, or morning and evening, with hog earth, or earth of some kind, which will absorb the fluid and then be converted into excellent manure; or a tank, either a hogshead or a cistern built of brick and cemented, may be placed where the seepage from cattle and horses, can be conducted by drains; the tank should be covered, and have a pump in it by means of which the fluid can be raised. Pouring it over the compost heaps is perhaps as good a way as any of disposing of it. To this tank, the urine and suds from the house, water in which vegetables are boiled, &c., should be conveyed. This is a branch of economy seldom attended to by farmers, and the consequence is, as much valuable manure is wasted about most houses as would increase the product of the farm to a great amount. According to Liebig, 100 parts of human urine are equal to 300 parts of the fresh dung of horses: and we learn from the same high authority, that the liquid and solid excrements of an individual annually, contain nitrogen, necessary for 800 lbs of wheat, rye or oats, or 900 lbs. of barley. We are hereby enabled to appreciate the industry and sagacity of the Chinese in preventing the loss of this valuable article as manure.—*New Far. Jour.*

Improving Coarse Hay.—It often happens that farmers have certain wet portions of their meadows occupied with coarse grass and weeds, which are cut after the rest of their hay is made and secured. It is of course only second or third rate in quality, and intended for the hardiest class of cattle. It can be rendered very palatable, however, by a free application of salt in frequent and successive layers as it is deposited in the stack or mow; the amount of which may vary from a peck to a half bushel of salt to a ton of hay. Coarse hay, thus prepared, is frequently preferred by cattle to fine hay not so prepared. All hay should receive an application of salt, when stacked or stored away, as the salt not only preserves it from injury in keeping, but domestic animals, which are frequently much neglected in salting in winter, thus obtain a constant and regular supply, administered to them in the best possible form.—*Alb. Cult.*

Growing Crops.—A sale of growing crops took place at Craigentinny Farm in July; wheat sold on an average at 16*l.*, oats from 10*l.*, to 11*l.*, barley about 13*l.* 13s., and beans 13*l.* per acre.—*Dumfries Herald.*

Strood Fair.—Six thousand sheep penned, upwards of four thousand sold. Prices as follows:—Kent Lambs, 18s. to 25s.; Down Lambs. 20s. to 28s.; two-tooth sheep, 28s. to 35s.; stock ewes, 31s. to 36s. A good supply of horses and cattle. Trade good for all.

Ballinasloe Fair.—*Ballinasloe, Nov.* 6.—This was the second day of the sheep fair. There is an improvement in prices, and the average may be fairly taken from 1s 6d to 2s beyond the rates of Saturday. Some high prices were obtained. One lot of maiden ewes sold for £3 5s. There were a good number of rams, which sold from £10 to £30. Mr. James Dillon and Dean French, so celebrated for purity of breed, got highest prices. The horses were numerous—much more so than I remember on show-day; to-morrow sales will take place. There was a greater number of the foal class than I remember to have seen here on previous occasions; some sales did take place, and for large figures:—

Captain Bolton, a chesnut horse............	£140
Mr. Huddersfield, a bay mare...............	150
Captain Barry, a bay horse..................	105
Mr. Nugent, chesnut mare..................	80
Mr. Dudley Persee.............................	105

The prices on all classes of sheep varied from 4s to 5s above those of 1844; and on Monday (second day) were so high as from 6s to 7s above the sales at that fair.

Horned cattle were above the prices of last October, from 15s to 20s on store stock, and from 20s to 30s on fat stock, which I find, upon reference to the prices in the official returns from which I have made the foregoing extracts, are fully as high as those obtained for similar stock within the period which I have limited myself to, and the number of unsold was small. The official return is in the possession of Admiral Trench, the baron of the fair, and goes back for more than the last half century, showing the prices and numbers of cattle, &c., sold and unsold in each class within that period.

The town fair takes place to-morrow, and I am inclined to think it will be confined to rather inferior stock, owing to the sales already made. A few horses will be on the green. To-day there were not many horses in town, and those were even very inferior, and few sales were made. There were no sheep whatever for sale, or to be seen in the fair.

Saltpetre for the Cure of Bacon.—The use of this salt is very strongly condemned by Professor Rofensque. His theory is, that the nitric acid of the salt is a deadly poison, and that the diseases common to mariners are owing to the use of this salt in the brine. He advises its entire disuse, and recommends sugar, which renders the meat more wholesome, sweeter, and equally as durable.

Government of the Thoughts.—Dismiss, as soon as may be, all angry and wrathful thoughts: they canker the mind, and dispose it to the worst temper in the world, that of fixed malice and revenge. Never recall the ideas or ruminate upon past injuries or provocations. This is the amusement of many in their solitary hours. They work themselves up to distraction—to hate every thing and every body. Anger may steal into the heart of a wise man, but it *rests* only in the bosom of fools.—*Dr. Horne.*

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