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THE
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The observations we submitted in our last, respecting the probable effects of the late change in the Corn-laws upon our future prospects, were made in order to show, that there was no alternative for the agriculturists of this country but to encourage manufactures here for our own wants, unless all restrictions and duties were taken off all articles that we purchase, as well as off agricultural productions. This is the only fair and equitable principle to establish that will afford all classes and interests equal justice, to be allowed to buy, as well as sell, in a free market of competition. Indeed we cannot imagine upon what principle any statesman or legislator would attempt to remove all protection and encouragement from the productions of agriculture while other productions are encouraged and protected, directly and indirectly, under the pretence of making revenue, it may be, but nevertheless it is protection to some interests that is denied to another. The navigation laws of England secure a complete monopoly to the commercial classes, and act indirectly in taxing to a large extent every article bought and sold by Canadian agriculturists. This monopoly is the greatest discouragement to our trade with the British Isles in the productions of our lands and labours. It reduces *unnecessarily* the value of all we sell, and enhances the price of all we may require to buy. We would not complain of these laws, if they were necessary to the power and safety of the Empire, so long as we enjoyed a favorable encouragement for our productions in the British Isles, but now that all such encouragement will be at an end, we will have to complain that we are indirectly taxed by the navigation laws, and that we shall be in rather a worse position than foreigners. We have constantly been taunted with taxing the people of the British Isles for our benefit, but this charge we unequivocally deny. It is time that this question should be fairly understood, and that a charge that is so utterly groundless should be no longer made. We shall not pretend that our connection with England was more beneficial to that country than to us, but we will take leave to say that the advantages were perfectly reciprocal and the connection fully as profitable to the British Isles as to us. If we have been injuriously burdensome to the mother country—then must the desire for "Ships, Colonies and Commerce" be a complete delusion, for if any colony was valuable for ships and commerce, Canada was the one, and also for providing for a surplus population that was burdensome to their father land. This burdensome population provides for themselves here, and are able to buy and pay for the protected manufactures of the British Isles. The agriculturists are not to be any longer imposed upon by the statistics of commerce. They are able to make a balance sheet that will satisfy themselves that their occupation is unprofitable, so long as the cost of production is greater than the price they receive for those productions, allowing for their own time in proportion to what other classes wish to obtain for theirs. A want of steady demand for produce deranges all the business, and system of the farmer. If there is not a remunerating price for grain, hay will be raised; and it becomes a drug, because cattle cannot be fattened with any certainty of disposing of them in a limited market that will be free to foreign competition. We know that it is expected at this moment in Montreal that hay will be sold for 10s. to 15s. the hundred bundles this winter, a price that is not sufficent to pay for the expenses of taking it to market, including road and city charges, and not allowing one penny to the farmer for the expenses of cutting and saving, or for the land which produced it. Are other articles which a farmer may require to purchase, reduced in price to correspond with this reduction in the value of what he has to sell? Certainly not, nor is there any disposition to do so. Matters cannot remain long in this state; they must be more equal, by balanced or all prospect of general prosperity will be at an end. We will have to introduce that sort of bartering system of buying, selling, and paying wages, that they find so convenient in the United States, and which we believe to exist to a great extent in Western Canada. We will have to pay our revenue also in produce. In fact our whole system will have to undergo a change, and the advocates of free-trade will find they shall have very little to trade with, unless every restriction is completely done away. The agriculturists in self defence require this, as it will be impossible for them to sell in an open market of free competition, and buy in one that is protected, directly and indirectly—no matter that the amount of protection may not be large, and be required for revenue,—the fact is so, that a protection exists to other interests and is to be taken away from agriculture. Other things are necessaries of life as well as the products of agriculture, and if it were not so, the whole population of the earth might be agriculturists. Therefore, if it is desirable that food should be cheap, so is it that all other necessaries should be cheap also. Every man who is really anxious for a free-trade in the productions of the earth and of man's industry and labor, must desire that all restrictions should be done away that would prevent this freedom of trade, and that revenue should be raised by direct taxation on every individual according to his means of paying. No matter what may be the pretensions of free-traders, if they come short of this, we tell them plainly, they are pretenders, and only advocate a principle so far as it will answer and serve their own private interest and the interests of their parties. We deny that partial free-trade can promote the general interests, or improve the condition of the poor, and we defy all the ingenuity of pretended free-traders to prove the contrary. Make all free or none, if you wish to be just towards all.

LECTURES ON THE APPLICATION OF CHEMISTRY TO AGRICULTURE.

ON OXYGEN.

BY J. C. NESBIT, ESQ., F. G. S., M. C. S. L., &c.

GENTLEMEN,—I shall have the honour of directing your attention this evening to one of the most interesting of the chemical elements. In the prosecution of our agricultural course, it will be necessary to take notice of those bodies which enter more or less into the composition of vegetables; and you will recollect that in my introductory lecture, I informed you that a certain portion of the elements of vegetables was taken from the soil, and that another portion was taken from the air. I also mentioned to you that the portion which was taken from the soil was called inorganic and that taken from the air, organic. The organic elements are four—oxygen, hydrogen, nitrogen, and carbon; and we shall commence this evening by taking into consideration the properties of the most important of these four, namely, oxygen: the consideration of hydrogen, nitrogen, and carbon will be reserved for another occasion.

Oxygen is found in the greatest abundance through the whole of this planet. It is found in the air, in the water, in the clouds, in the earth, and in minerals of every variety. It forms a considerable portion of all sand-stones, and clays, and oxides (or rusts) of iron. The fact is, all the oxides or rusts are merely combinations of this substance with different bases or metals; and its very presence in such quantities throughout nature, will sufficiently show the importance of its action. The affinities of oxygen for other bodies are more powerful, perhaps, than those of any element we know; of its action we shall have occasion to speak as we proceed.

The air contains one-fifth of its bulk of oxyegn, which, in that case, assumes the character of a gas: every five bushels of common air contain one bushel of oxygen. Oxygen, as a gas, is carried round the world, and penetrates every part; and the substances which require it are always sure to find something from which they can abstract it. Water, which is the next universally extended medium, contains a large quantity of oxygen: every nine tons of water contain eight tons of oxygen—not as a gas, but as a liquid; and in the generality of earthy matters, from one-third to one-half is composed of oxygen.

Having thus seen how generally oxygen is diffused through nature, the next point to conside, is, the method of preparing it. You may naturally ask, if oxygen be so extensively distributed in combination with other substances, can you not separate it from some of them and present it to us? It can be done: for, by taking some of the earthy matters, and acting upon them by means of heat, we can separate the oxygen and the base; and when separated we can examine their properties. If you take the black oxide of manganese (which is a compound of oxygen and a metal called manganese) and bring it to a red heat, it will part with some of its oxygen. One pound of oxide of manganese will, in this manner, furnish about 1,200 cubic inches of oxygen gas.

In this way oxygen may be prepared in large quantities, because oxide of manganese is very common. It is to be found in all parts of the world, and is to be had as an article of commerce in great abundance, being much used in the north of England to make chlorine for bleaching. Oxygen may be produced from other oxides:—If you take red lead (which you know is a combination of lead and oxygen) and bring it to a red heat, a portion of the oxygen will be driven off, and you can then ascertain its character. If you take an oxide of mercure, which is commonly called *real precipitate*, and heat it in a glass tube, a similar result takes place; you will get the oxygen liberated and the mercury likewise.

It is not necessary to show you all these experiments. I shall, hower, show you the one with the *real precipitate*, because we shall obtain not only oxygen, but mercury also; the two elements of which the oxide of mercury is composed.

Now, I will take the oxide of mercury, or *real precipitate*, and heat it over a lamp in a small test-tube; and as the oxygen is given off, it will drive the air out of the tube, because oxygen is heavier than air. We can now detect it by putting a bit of ignited wood into the opening of the tube; the wood will instantly inflame, for oxygen has a very great affinity for combustible bodies. Oxygen, in fact, is in nature the great supporter of flame and combustion.

By means of other substances, oxygen may be easily procured in the most simple manner. Many of these substances consist of various salts, which are combinations of acids with their bases. All the ultrates furnish oxygen in abundance. Thus the nitrate of soda contains a large quantity of oxygen, as does also saltpetre. If I heat saltpetre to a red heat, I get in place of it potash, and oxygen and nitrogen liberated; and in this way you can get from one pound of saltpetre

12,000 cubic inches of gas, two-thirds of which will be oxygen. If you employ the saltpetre, and do not urge the heat very much, you will have the pure oxygen, but not more than 2,000 or 3,000 cubic inches. When the heat is urged, the nitric acid is decomposed, and its constituents, nitrogen and oxygen, are both set free. When large quantities of oxygen are required, saltpetre will be found very economical. I used it myself for that reason many years since, for the exhibition of the oxy-hydrogen microscope, in the Mechanics' Institute, Manchester.

However, the best substance for procuring the oxygen gas in the *chlorate of potash.* This is a beautiful white salt, consisting of *oxygen*, *chlorine* and *potassium* When this compound is heated red hot, the oxygen is liberated ; and the chlorine and potassium having combined together, remain behind in the form of a white salt, called *chloride of potassium.*

I will place a little chlorate of potash in this test-tube. On applying the heat of a spirit-lamp the salt will first melt, and then effervesce from the gas escaping. The heavier oxygiett will drive all the common air out of the tube. If now a small piece of paper or wood be lighted, and the flame be blown out, so as to leave a little portion of the end *red hot*, and then be introduced into the tube, the paper or wood will immediately burst into a flame.

If a small piece of ignited wood, such as a piece of a lucifer, be dropped into the melted chlorate of potash, a most powerful action, attended with a vivid light, takes place, and the wood is, as you see, entirely consumed.

All experiments with the chlorate of potash should be carefully conducted, as it is apt to explode with combustible substances even in the cold.

When oxygen is required to be made from chlorate of potash in large quantities, it is preferable to mix about one-fourth of oxide of copper or oxide of manganese with it ; as the gas is then liberated at a much lower temperature.

Oxygen gas is also given out in nature, from the decomposition of some of its combinations. The vegetable world is the great source of oxygen. Vegetables possess the power of decomposing two compounds of oxygen, *carbonic acid* and *water*, and of retaining the carbon of the one, and the hydrogen of the other, to form their own tissues. This operation, however, only goes on in the light of the sun or in the effulgence of day. The process is this :—Plants have roots and leaves. By the roots they take up moisture from the soil, and in this moisture are dissolved those substances which plants require for their subsistence. To form the organized parts of plants, however, it is necessary to have the assistance of the leaves, through the vessels of which the juices of plants must always pass, before they become converted into the substance of the plant. The leaves of plants have a peculiar function, namely, that of separating the carbonic acid from the other constituents of the atmosphere, of retaining the carbon of this carbonic acid, and setting its other ingredient, the oxygen, free. After the sap has thus been mixed in the leaves, with the carbon which the leaves derive from the atmosphere, it goes to increase the growth of the plant. The water taken up by the root undergoes a somewhat similar decomposition, its hydrogen being returned and its oxygen liberated.

In some of the products of plants, such as turpentine, all the oxygen of the water and carbonic acid have been liberated.

Oxygen is chiefly remarkable as a most powerful supporter of combustion : it is the substance which in natural operations, consumes and burns up all vegetable and animal matter. It is this oxygen which, by its action upon the carbon and hydrogen of our wood, coal, oil, &c., produces that light and heat which we feel to be so necessary. It is oxygen which causes this candle to burn at the present moment : if deprived of oxygen, it would be extinguished ; but if the supply be augmented, its brilliancy will be much increased. I will immerse the lighted candle in this jar of oxygen. In a moment you see the flame becomes brilliant, and burns with so much splendour as to dazzle the eyes.

A similar increase in the intensity of the action is seen, when other combustible substances, such as sulphur and phosphorus, previously ignited in the air, are brought into contact with pure oxygen gas. I will put some sulphur in this copper spoon, and will then ignite it over the spirit lamp. The combustion in the air is only slow ; you will see the difference the moment I immerse the spoon in this jar of oxygen. You perceive the intensity of the beautiful blue flame of the sulphur is much increased, and that it tinges all the surrounding objects.

The burning of phosphorus in oxygen gas is perhaps one of the most brilliant experiments that chemistry can produce. Phosphorus (the base of bones) is well known as the powerful substance used in the manufacture of lucifer matches. It burns with great vehemence in common air ; but when introduced into oxygen its combustion is increased to such an extent that it is quite impossible to behold the beauty of the flame with unshaded eyes. I will put this piece of phosphorus, which I have previously dried between folds of blotting-paper, into a cold copper spoon, ignite it with a hot wire, and then quickly introduce it into the jar of oxygen. The brilliant light produced is such as to illuminate the whole room as if by the light of the sun.

Iron, zinc, and other metals will burn in oxygen with great ease, as I shall have occasion to show you towards the close of the lecture.

It will not be difficult for you to understand why chemical action or combustion should be so much more intense in pure oxygen than in air. In the pure oxygen there is nothing to prevent the intimate contact of the two bodies which are uniting with one another, that is, the burning body and the oxygen ; and as fast as one portion of oxygen has acted on the combustible body, its place is supplied by another portion, which in its turn will be wholly expended on the burning body. In common air this is different. Before the combustible body can be acted upon by one cubic inch of oxygen, five cubic inches of the atmosphere must be presented to it, which, of course, will take up five times the time. But the four cubic inches of nitrogen have also the effectof cooling the burning body in passing through the flame with the oxygen. The amount of light and heat produced depends on the quantity of chemical action which takes place in a given time. It is quite evident that the greatest action in the least time will take place with the pure materials. If we, by any artifical means, can contrive to make common air pass in large quantities through the interstices of combustible bodies, as charcoal, coal, &c., previously in a state of ignition, we shall in a measure increase the action as if we employed pure oxygen, because we shall cause a greater action in a given period of time.

It must now be apparent to all of you that the more oxygen we can get through a common fire-place, or the more that can be brought in contact with the fuel in a given time, the greater will be the combustion, and the greater the heat. In the open air coals burn dull, and do not give out much heat or light in a given time. If coals be put in fire-place, more air gets through them in a given time, and a great heat will be produced; but then the coals will burn sooner. If you want to get more heat you must enclose the coals in a furnace connectdc with a high chimney, so that all the air is obliged to pass into the furnace through the bars at the bottom. You will thus have in the chimney a column of hot air, which is lighter than cold air. The cold heavy air will therefore force upwards the light air of the chimney, and endeavour to supply its place: and as the air can only get into the chimney by passing through the furnace, a large quantity of oxygen is in this way supplied to the fuel in a short time. But though you get more heat in a given time, you consume more coals. I will give you another instance—the common blacksmith's forge, where, I have no doubt, you have often seen the workmen blow the bellows till they were almost tired. The object is to send a greater amount of air (that is to say, to send more oxygen) among the coals, and by this means to produce a greater amount of heat in a given time; but in proportion to the rapid production of this heat will be the quantity of coals consumed. Now there is one fact in connexion with this which you will do well to note. A pound of charcoal, in uniting with oxygen, gives out always the same *amount* of heat, whether burnt quickly or slowly; and the same may be said of hydrogen and other combustibles; and whether the union be quick or slow, or whether a given amount of feel be consumed in five minutes or five hours, the sum total of heat evolved will be the same. But it is evident that if the fuel be wholly consumed in five minutes, the heat in this case will be very intense during its short continuance; but if it last five hours, the heat will not be intense, but low and continuous.

Now, wherever oxygen is absorbed, that is, when it comes into union with another substance, heat is given out. I will give you an instance where common vegetable matter will ignite spontaneously, merely from the fact of its being brought in contact and union with oxygen. If you take a pound or two of cotton, and mix it with linseed-oil or olive-oil (the best is boiled linseed-oil), and then lay it in a corner, the mixture will be on fire in twenty-four hours. The cotton exposes a great surface of the oil to the action of the oxygen of the air; and is at the same time, from its porous nature, a bad conductor of heat. Very well; the oxygen and oil begin to act on one another; a little of the carbon and hydrogen of the oil is slowly consumed, and a small quantity of heat is generated, which slightly raises the temperature of the whole mass; for the non-conducting nature of the cotton will not allow the heat to escape as it is produced. More oxygen acts on the oil, more heat is given out, and this goes on till the whole gets to a red heat; light is evolved, and the mass is set fire to.

In the north of England, where a deal of oil is used in machinery, and where it is cleaned by waste cotton, many mills were at one time burned down from the cause I have mentioned. The dirty oiled cotton waste was thrown into a corner on Saturday night, and the mill was burned down before Monday; and it was frequently believed to be the work of an incendiary. Persons have been blamed for the crime; while the real cause was that which I am now telling you. The manufacturers are now more cautious, and take care not to allow the oily waste cotton to accumulate.

Agriculturists are liable to accidents of a similar kind. How much money has been lost from the storing of hay in a wet state instead of in a dry! Wet operates like oil: it enables the oxygen to get hold of the woody matter of the hay, upon which it does not act in the dry. The hay is stacked in a great hurry, without being properly dried. Being damp and porous, the oxygen is absorbed and a little heat given out, which cannot readily escape; a little more oxygen is absorbed, and a little more heat given out, till a red heat is attained, and then fire breaks out. Now the difference between the oil and the cotton and damp hay is only this; that in the first case the first breaks out in a few hours (from twelve to twenty-four will be sufficient), while in the stack four or five days or weeks may sometimes be required.

I can show you another case. When farmers want to make manure, they heap up great masses of straw, litter and excrements; and what takes place? It begins to smoke and gets heated. And where does the heat come from; how is it generated? The mass decreases in bulk very much; in eight or ten months it will have diminished at least a half. But what is the cause? Don't you see this? The active and energetic oxygen is at work. You have vegetable matter moistened with water, you have oxygen absorbed, and it consumes the dung; but more slowly than in the case of the hay. I told you that hay may take fire in four or five weeks; but good farmers so manage it that the heat shall not exceed from 80 degrees to 90 degrees The farmer also wants his dung to decompose mildly and quietly. But what would take place if instsad of keeping the dung pressed down, he was to separate, and let the air come in? Practical menwill tell you that the heat would be largely incased; instances, indeed, have been known of such heaps taking fire. In fact, if these dung-heaps are not properly attended to, they will readily take fire. You see, from this, that oxygen has a deal to do with manure; for it is by this substance that the farmer gets his heaps diminished in bulk. He gets the most worthless portion taken away; that which is left is more easily carted and more valuable. You see, therefore, what an active agent oxygen is. It acts, too, upon all metals exposed to the air. If you take a knife or a spade, and expose it to the action of the air all night, you will find it next morning of a red colour. And what is this red substance? It is a compound of oxygen and iron, called the oxide of iron.

There are many other combinations which spontaneously take fire and give out heat from the absorption of oxygen. Iron pyrites, a compound of sulphur and iron, is found in large quantities throughout the globe. It is very bright and metallic, looking something like gold When exposed to air and *moisture*, oxygen is absorbed, which uniting with the sulphur, forms sulphuric acid, and with the iron, oxide of iron. These two again unite, and form the sulphate of iron, or common green vitriol. As oxygen is absorbed by the pyrites, you are also sure that heat is produced. In the manufacturing districts, where sulphate of iron is largely made from pyrites, care is taken not to allow it to get overheated; and if it should get too hot, water is thrown upon it. Bishop Walson, the celebrated chemist, tells a curious thing in his chemical essays. A man at Elland, in Yorkshire, collected a quantity of the pyrites, under the idea that it was gold, and put it into his barn in a heap. The barn, as was common enough in those days, was made of wood, and moreover the roof was a little leaky, and by this means rain was introduced. This generated a heat, and in the course of a few weeks the heap took fire, and burned down the barn. You see, therefore, how important it is that such things should be borne in mind.

There is another thing very closely related to what I have mentioned. Any of you who have been in the north of England must have seen, all round the great coals-pits of Newcastle, Durham, and other places, large heaps of small coals, covering many acres. Those coals have been deposited there, owing to their small value; and you will find that they are always on fire. Perhaps you will imagine that the coals were set on fire? No such thing: they took fire by themselves. When I state to you that the coal contains sulphuret of iron (iron pyrites) you will be at no loss to ascertain the cause. The action of oxygen on the sulphuret of iron is such as to produce heat, and the continued action of this heat causes the coal to take fire. Many singular phenomena of which we occasionally hear, as, for instance, smoking and burning cliffs, near the sea, are due to the action of oxygen on recently-exposed iron pyrites.

But more still. This oxygen, this universally-acting busybody, has something to do with volcanoes and earthquakes. We find that these volcanos burst out with tremendous force in some places, emitting large bodies of fire. Whence does this arise? This fire is doubtless the product of combustion. And what an enormous power must be generated to produce such awful results as the overthrowing of Herculaneum and Pompeii, the awful visitation of Calabria, or the destruction of the city of Lisbon!

In connexion with volcanoes, it should be borne in mind that they are always near the sea. You know that when you look for their positions on the map, you keep your eye to the coast. Etna, Hecla, Vesuvius, Stromboli, the burning mountains of the Andes, and the volcanoes in the East Indies, are all to be found near the coast. There can be no doubt that water has something to do with them; and water, recollect, contains a great deal of oxygen.

It has been supposed that the matter of the interior of the globe consists chiefly of the metallic bases of the earths: and these, it is well known, have the power to decompose water, uniting with its oxygen and liberating the hydrogen.

Now, if by any means the ocean water penetrates to these metallic bodies, most intense action will be the result; heat will be liberated, and effects produced quite sufficient to account for the phenomena of volcanoes and earthquakes.

There are a few other points which I wish to bring before you. This oxygen is the means appointed for the destruction of all vegetable and animal substances. Every one of us is undergoing its action. We breathe it, but we return less of it to the air than we took from it. What we inhale produces heat, and this is the reason why your bodies are warmer than the stone walls around you. Without any very great stretch of the imagination, or any very forced comparison, your bodies may be likened to litte steam-engines, or blacksmith's fires. Your lungs operate as a pair of bellows, your month is the chimney, and the food is the coal. Your bellows are always going; if you are prevented from breathing for two minutes you will die. Yet, if it were not for the action of the oxygen on your body, you could not live; for from its continual consumption of the muscles of the body, you derive your physical energy and power. If you did not eat, what would be the consequence? Would the bellows cease to work? No; they would go on working till every particle of available fuel (flesh, fat, &c.) was consumed. This shows that, if you take no food to supply the waste of the muscles, you must, like a fire, ultimately *go out*. If food be withheld, the parts of your body, such as the fat, the muscles of the cheeks, o. . e breast, and any other available parts, would be consumed by the action of the inspired air before the bellows would cease to work; and lastly, the brain would be attacked, and you would die. Now, this always takes place when, by any means, food is not taken or not properly digested. On the other hand, if the blacksmith overloads his fire, and does not blow his bellows enough, the flame goes out; and you, if you are always eating and never blowing your bellows enough, you are still liable to *go out*. You are putting on too many coals, and that is the reason why I recommend you to enjoy yourselves at play, without which you can never expect to grow strong. Our life, and the life of all animals, therefore, depend on the action of oxygen and the supply of food. When these two are in a state of equilibrium or balance, we are in a state of *health*. When either one or the other are in excess, our normal state of health ceases, and various maladies ensue, which continue until the cause is removed. Eventually, however, the oxygen obtains the mastery, and these bodies of ours, like those of our ancestors, will be overcome by this powerful agent, and their elements will be returned into the great laboratory of nature, to furnish the principles of life and existence to succeeding generations of animated beings.

All vegetable matters undergo a similar change, and they also are eventually decomposed, to furnish again the elements of vegetable life.

All animal and vegetable substances, therefore, unless preserved in some peculiar manner, are resolved into their original elements. But, if protected from the action of oxygen, they may be preserved for an indifinite period of time. Wood is painted to preserve it from contact with the oxygen of the air, and it thus lasts much longer. Again, coal is the remains of immense forests of primeval periods, and it has not yet been decomposed into its elements. These immense deposits of vegetable matter were, when deposited, covered with soft mud, so that the oxygen was prevented from coming in contact with them, and by the constantly-increasing pressure from superincumbent deposits, the mud became a rock, and the action of the oxygen became less and less for each succeeding year. The consequence is, the mass has been preserved for an immense period of time.

Animal matter may also be easily preserved out of contact with air. The finest salmon of Scotland, the most beautiful soups, game, fowls, and fish of all kinds, are now packed in air-tight tin cases, and can thus be sent to all parts of the world. The travellers across the desert of Suez, in their journey to the East Indies, often enjoy the luxury of *fresh* Scotch salmon.

Oxygen, then, is one of the most important elements that we know: everything else yields to it in importance; it is found to pervade all nature; it is necessary for the existence of animal life, and is an essential of vegetable growth; and, in order that you may be able to trace its effects, for practical purposes, in the economy of the farm, I have endeavoured to explain its properties and tion, not only on vegetables and animals, but also ..1 many elementary bodies not directly connected with vegetation.

Before I conclude, I shall submit a few interesting experiments, showing the very powerful affinity which oxygen has for some substances, and likewise the intense heat produced when oxygen and hydrogen gases are burned together.

When the two gases, oxygen and hydrogen, are mixed together in any vessel, a most violent explosion will take place, on the application of a light. This arises from an immediate union between the two, and the vapour of water is the result of the combination. If you try to cause the mixture to burn silently, like common gas, by means of a jet, the flame will immediately retreat through the jet, along the interior of the pipe, to the magazine of the mixed gases, and a most frightful explosion will be the result. Mr.

Hemming has, indeed, in a measure prevented this, by filling the interior of the brass pipe through which the mixed gases pass, with thin copper or brass wire; but still accidents may very easily arise in unskilful hands. It is, therefore, much better to burn the gases by means of the jet contrived by Mr. Maugham: by this contrivance, the gases are only mixed just as they issue from the mouth of the jet, so that it is impossible that any explosion should take place. Each gas is confined in a separate gassbag, made of the strongest India-rubber cloth of Mackintosh, and a pressure is given by the application of weights on the boards which rest upon the bags. I will now turn the stop-cock connected with the hydrogen, and ignite the gas as it issues forth. You will observe that the flame burns in an irregular manner, and that its edges are jagged. I will now turn on the oxygen. Observe the immediate difference: the jagged edges are at once gone, the flame is now sharp and pointed. We have in this little flame the most powerful heat that chemists can produce.

The most refractory clays, and gems of various kinds, as the ruby, the sapphire, the amethyst, &c., melt with the greatest ease in this flame. The diamond is immediately dissipated and lost. The metals all burn with remarkable brilliancy in this flame. I have here a piece of steel wire. I will introduce it into the flame, and you will see it immediately melt, and burn with the most vivid scintillations. I will now turn off the hydrogen, and allow the oxygen only to play upon the white hot metal. You perceive the scintillations are immediately increased, and that the effect is most brilliant.

(Mr. Nesbit then exhibited the combustion of various metals, such as zinc, copper, bismuth, tin, lead, antimony, &c.: the whole of which burned, in the gas, in the most brilliant manner, at the same time exhibiting as they burned various and beautiful colours.)

Mr. Nesbit then proceeded:—The flame of this blow-pipe exhibits very little light, though it produces so great a development of heat. You may be surprised at this; but it only requires the presence of some solid matter to produce the most brilliant light. If you pass common air through red or white hot tubes, the hot air issuing exhibits no light; but any solid body immersed in the current becomes red or white hot immediately.

The common candle and gas exhibit their light, in consequence of the particles of solid carbon which exist in their respective flames.

I will allow the jet of gas to play upon a piece of common tobacco-pipe. An intense light is immediately produced, and the pipe is melted, and converted into a sort of sapphire, which cuts glass with the greatest ease.

If we had any solid substance which could stand the heat of this flame without melting, we should then be in possession of the means of making the light continuous. Common lime happens to be a substance so refractory that it withstands very well the action of this flame.

I will now allow the jet to play upon a cylinder of lime. The light produced is most intense. The whole room is illuminated. But perhaps the best insight into the intensity of the light may be had by observing that the *flame* of the candle is actually *shadowed* against the wall.

This light has been proposed to be used for light-houses; and, with proper reflectors, can easily be distinguished at the distance of twenty or thirty leagues.

Though my object is not half exhausted, I must draw my lecture to a close. I have to thank you for your attention, and I trust you will endeavour to get practically acquainted, by reading and experiment, with all the properties of oxygen. Many things which I have found it necessary to present in this lecture may appear to you not quite relevant to the subject of agriculture; but allow me to state, that if at any time you wish to know the real boundaries of a kingdom or a country, you must constantly have recourse to a point of view from a neighbouring district.

HOW MUCH SHOULD THE PEOPLE HAVE TO EAT?

On the 17th February, 1846, Mr. George Kildy, of Quensborough, Member of the Royal Agricultural Society of England, proposed the following question for discussion at the Leicester Athenæum:—"The inhabitants of England and Wales are sixteen millions: what quantity of flour, butcher's meat, and ale, would each require daily (with the daily and yearly amount for the whole population) to nourish and keep up the body to an healthy standard?" On the 24th Mr. James Anderson, surgeon, &c. of Leicester, opened the discussion with the following paper:—

"Before we approach the question for discussion, let us inquire what the body requires for its formation and to supply its constant waste. The elements of the food of man are carbon, hydrogen, oxygen, nitrogen, phosphorus, sulphur, iron, chlorine, sodium, calcium, potassium, magnesium, and flourine. By the union of two, three, four, or more of these elements, are formed certain substances, which, on account of their use as food, may be denominated "alimentary principles."These are waters, sugar, gum, starch, pectine, acetic acid, alcohol, oil or fat, vegetable and animal albumen, fibrine, caseine, gluten, gelatine, and chloride of sodium (common salt). These alimentary principles, by their mixture or union, form our ordinary food which may be called "compound aliments." Thus, wheat consists of starch, gluten (vegetable mucilage), sugar, gum &c. Meat is composed of fibrine, albumen, gelatine, fat, &c. A living body has no power of forming elements, or converting one elementary substance into another; therefore, the elements of which the body of an animal is composed must be elements of its food. Nitrogenized foods are alone capable of conversion into blood. And of forming organized tissues; that is, in fact, they only are the "food," properly so called. Leibeg calls them, "the plastic elements of nutrition. The non-nitrogenized foods are incapable of transformation into blood; they are nevertheless essential to health; their functions are to support the process of respiration, and some of them contribute to the formation of fat.

Nitrogenized Foods, or Plastic elements of Nutrition are—

		Per centage of Nitrogen.
Proteine (1) Compounds.	Vegetable Fibrine	15.809
	Ditto Albumen (of wheat)	15.920
	Ditto Caseine	15.672
	Animal flesh (beef roasted)	15.214
	Ditto blood	15.08

Non nitrogenized Foods, or elements of Respiration are—

Fat	Sugar of Milk
Starch	Pectine (vegetable jelly)
Gum	Wine
Cane Sugar	Beer
Grape Sugar	Spirits

"Nutrition is the grandest gift of nature, and the common and highest prerogative of the animal and vegetable kingdoms, by which they, beyond measure surpass all human machines. No artist can bestow the faculty, not to say of increasing and coming to perfection, but even existing independently, and repairing the incessant loss incurred from friction. By the nutritive faculty of the body its greatest and most admirable functions are performed; by it we grow from our first formation, and arrive at manhood; and by it are remedied the destruction which incessantly occur in our system during life. When food is masticating, it is mixed in the mouth with saliva (2), and, by the act of deglutition, is passed into the stomach, where, by the action of the gastric juice (3) it is formed into a soft pap or paste, called *chyme*, which passes through the pylorus (4) of the stomach into the duodenum (5); it there mixes with the bile and pancreatic juice, and forms *chyle*, which is absorbed by the mouths of the lacteal vessels, and becomes incorporated in the left subclavian vein, with the veinous blood; this is carried to the right ventricle of the heart, and from thence propelled to the lungs, where it becomes *arterial blood*, receives vitality, is fitted for nutrition, and being charged with caloric which enables it to maintain the temperature of the body) it is then conveyed to the left ventricle of the heart, and ultimately discharged into the aorta, and distributed through the arteial system of the body in general, to nourish and support it. It is the source from which every secretion of the body is separated.

"Gentlemen, we see now the use of food producing chyle, as it is that fluid substance from which the blood is formed.

"We shall now proceed with the calculations:—

1st. For persons of moderate health and constitution, but using little exercise or exertion, daily allowance of food 12 to 18 ounces—in nutritive matter equal to an average daily of 10 ounces.

2nd, Persons of good health accustomed to moderate labour (as sailors or soldiers on ordinary peace duty, or agricultural laborers or mechanics at their usual work, daily allowance of food 18 to 24 ounces–in nutritive matter equal to an average of 16 ounces.

3rd. Persons subject to hard labour or violent exertion, in good bodily health, 24 to 30 ounces of food—equal to 22ounces of nutritive manner. Therefore the average food for an adult is 21 ounces, and the average nutritive matter 16 ounces. Twelve millions of adults allowed the average amount of nutritive matter, and four million the one half, with the exception of ale, which is improper to be given to children.

"The aborigines of Britain used an infusion of barley for their ordinary liquor, and it was the favorite drink of the Anglo Saxons and Danes. When well fermented it is a wholesome beverage, and seems only to disagree with those subject to asthma, or any disorder of the respiration, and when used dietically, contributes to the production of animal eat, by yielding a large quantity of oxygen to burn the carbon in the lungs--notwithstanding, a cheaper fuel might be used in the vital lamp.

"Several writers have endeavoured to form a scale of equivalents, the value of which, if accurate, will be universally admitted. Boussingault has suggested one, founded on the quantity of nitrogen contained in foods.

Scale of nutritive equivalents.

Substance.	Equivalents.	Substance.	Equivalents.
Wheat flour	100	White haricots ...	56
Wheat...	107	Lentils...	57
Barley-meal	119	White Garden Cabbage	810
Barley...	130	Ditto dried at 212 deg.	83
Oats	117	Potatoes	613
Rye	111	Ditto kept 10 months...	894
Rice	177	Ditto dried at 212 deg.	126
Buck-wheat	108	Carrot...	757
Maize or Indian corn...	138	Ditto dried at 212 deg.	95
Horse-beans	44	Jerusalem artichoke...	539
Peas	67	Turnips	1335

"As flour, meat and ale, are not alone the articles of food used by man in this country, there is an allowance made of one drachm of nutritive matter for food that may be consumed not enumerated: the proportions of course will vary according to the price of the article, taking into connexion other circumstances.

"The foregoing are the data on which I have grounded my calculations, and I am humbly of opinion, it is the only method that can be adopted to approximate the quantities necessary to nourish and keep up the body to a healthy standard. They are here given in tabular form:—

Quantity necessary for each person per day.	Contains Nutritive Matter.	Quantity necessary for the whole population per day.	Quantity necessary for the whole population per year.
FLOUR.	oz. drs.		
12 millions.... 13oz. 4drs. / 4 ditto 6 10	12. 12	11,593,750 lbs. of Flour.	11,020,100 qrs. of wheat (6)
BUTCHER'S MEAT (sorted)			
12 millions.... 6oz. / 4 ditto 3	2 1	5,250,000 lbs.	1,916,250,000 lbs.
ALE.			
12 millions.... 20oz. / 4 ditto .... none.	1 2	1,500,000 gallons.	547,500,000 imp. gallons.
Allowed for any other food not enumerated	0 1		
Total	16 0		

"It would require 3,673,366 acres of land to yield the 11,020,100 quarters of wheat at 24 bushels per acre, and 1,710,937 acres at 32 bushels per acre to grow 49,579,166 bushels of barley to make 60,833,333 bushels of malt to brew the 547,500,000 imperial gallons of ale. Total 5,384,-803 acres."

After several nights' discussions, Mr. Anderson's plan was carried.

FIRE DETECTOR.—Among the latest additions to the Royal Polytechnic Institution is a most useful invention, called Taylor's Patent Fire Detector and Alarm. In size it is little larger than two fingers, and is perfectly harmless. In one form (for there are two) it consists essentially of a glas cylinder about three inches long, filled, or nearly filled, with mercury, and hermetically sealed. By a nice and somewhat difficult operation in the manufacture, it is arranged that the volume of mercury introduced should so nearly fill the cylinder that, on a slight increase above an ordinary temperature, it fills it completely. The point at which this takes place can be at any part of the scale; but the one usually adopted in the construction of the instrument designed for general use is 95° (Fah.) Below this point the mercury expands and contracts freely, as in the thermometer; but should the temperature ever exceed it by a few degrees, the immense force of the expanding mercury quickly overcomes the cohesion of the glass, and fracture inevitably ensues. The peculiar form of the cylinder, which has a bulb in its middle, insures that it shall break transversely and separate end from end. In the other form, the union is effected by a fusible cement, which suddenly liquifies at about 100°. The effect of an undue temperature upon both is the same—viz., to detach the box from its cover, and cause it to fall. The alarm, when discharged announces the existence of fire, is contained in the box, inserted in about two feet of strong tape—one end of which is made fast to the cover, and the other end to the box itself—so that, whenever the box falls, and reaches the end of the tape, it discharges the alarm by its momentum. The report which it produces would be heard throughout the largest building; either by day or night and it would be physically impossible for any serious fire to exist undetected. The price of them is exceedingly small, therefore places them within the reach of all householders.—*Mining Journal*.

The Canadian Agricultural Journal.

MONTREAL, JULY 1, 1846.

We expect the August number of our Journal will be put by the first of that month, and we promise our subscribers the remaining numbers to the close of this year shall be out regularly. We must beg to remind them, however, that our expenses have to be paid, and we have not yet received for this year, so much as would pay the expenses of two numbers. There is also three-fourths of the subscriptions for former years still due to us. We hope our friends, or at least those who are friendly to the cause we advocate,—the improvement and prosperity of the land we live in,—will remember our humble exertions in this cause, and send their subscriptions without delay. This is the very best proof they can give us of their approval of our publication and its object. We have applied by letter to many to whom we have addressed this Journal, but in most instances we were not favoured with reply or subscription. This will appear strange to those who know that agriculture is the chief dependance of Canada and her people.

AGRICULTURAL REPORT FOR JULY.

From the first of the month up to this date the weather has been favorable for vegetation, but there has been rather more rain than was necessary in the neighborhood of Montreal—and heavy crops of grain and hay have in consequence been much beaten down and lodged. We believe this rain has not been general, and therefore the damage may be confined to this neighborhood. The season, however, on the whole, has been most favorable for the farmer; and if it only continues until the crops are secured, there will be an abundant produce. All depends upon good harvest weather to save the crops. The farmer never can reckon upon the produce of his crops until he has secured them safe in his barns or stacks. Persons who are ignorant of the true state of the case are ever ready to estimate the produce and *profits* of farming, but they know very little of the casualties that the crops are liable to, and we are persuaded that no interest deserves or requires more protection than agriculture, to secure it against the casualties to which it is constantly subject, and from which no human precaution can protect it. The farmer has to pay a high rate of wages compared to the price of his products; but he would not complain of paying high wages if his products would afford him the means of dividing liberally with those whom he employs. This not being the case, he sees his property wasting away by degrees, unless he is able to do all his own work, and be worse paid for it than a sweeper of the streets. We do not color this picture too high, and those who may happen to doubt may ascertain the truth by making the experiment themselves as amateur farmers.

We have been told that the early sown wheat is much damaged by the fly, and we believe it to be the case, as we have that destructive insect since the 25th of June, and we know its propensity and power to do mischief upon wheat coming into ear about the period of its appearance. We have done all in our power to persuade farmers not to sow wheat too early, unless they are satisfied that they have a variety of wheat that cannot be damaged by the fly. It is possible that early sown wheat may escape, but it is owing to accidental causes that are too uncertain to justify the risk. A good crop of wheat may be raised here, sown about the 20th of May, if the variety sown be that known as Black-sea wheat, and when we can be sure of this, it is needless to incur the risk of any other. The barley is coming fast to maturity, and much of the crop will be fit to harvest before the end of the month. The oat crop is backward as usual, but the season is favourable for it. Potatoes look well, and have no appearance of disease, though we have been told that symptoms of disease have appeared in some early planted. It is impossible, however, at this moment to form any correct opinion as to the ultimate fate of the crop. Last year they were as healthy and promising at this period as they are now, and were diseased notwithstanding, This is a favourable time for turnips, as the season is sufficiently moist. The hay crop is very heavy on fertile lands, and has suffered some injury from being lodged and not yet cut. A high price has to be given for mowing, in consequence of the grass being much beaten down by heavy rain. Unless the weather is dry the crop will not be well got in, and the expense will be very considerable. We very much doubt that these expenses will not be fully remunerated to the farmer by the price that hay will sell for in the Montreal market. It will be advisable that farmers who have a large quantity of hay too far from market, to fatten cattle with it and grain, such as oats, and inferior barley. As there appears to be rather a scarcity of farm stock, both in Europe and America, the price of fat cattle and sheep is not likely to be very low for some time at least, but of course remunerating prices will encourage the growing of more stock. Well saved hay, fed in sufficient quantity to cattle put up in the fall in good condition, will keep them well and improve them, with the addition of a small quantity of grain, ground or bruised. The farmers of Canada should certainly be able to furnish abundant butchers' meat for our population, and they would have done so long ago, if the prices had not been reduced so exceedingly low by the importation of foreign cattle. This is the true cause that Canadian farmers did not turn their attention to growing cattle, the uncertainty of finding a market at any but ruinously low prices for them. The keeping and fattening of cattle would be much the most easy and agreeable mode of farming, if there was certain encouragement that they could be disposed of when fat, at remunerating prices. Hence it is, that depending upon foreign supply destroys all chance of a home supply, because the foreign supply being irregular, coming at one time in much greater quantity than required, reduces prices to almost any scale that the purchasers wish to bring it to. If there was any certainty of the quantity of foreign meat to be imported in any year, our farmers might act accordingly—but the supply may come in thousands, or it may not come in hundreds—as we are ignorant of the means of a foreign country to give a short or full supply. We may judge of the capabilities of our own country to furnish meat, but this knowledge is useless to us, while foreign supply may come to any extent. We write as a farmer, we admit, but we are certain nevertheless that it is the true policy of every country to encourage her own productions and resources as the most certain way to command a steady supply of all we may require, particularly when foreign countries will not be satisfied to trade with us on strict terms of reciprocity. We fear, however, that all we can say on this subject will not make any favorable change for our farmers, but that their interests will for a time be sacrificed to the mania of free-trade. The evil will be sure to cure itself before long, and this may reconcile us for the present to measures forced upon us that cannot fail to be injurious to us. The pastures are very good in the neighbourhood of Montreal, unless greatly overstocked. The supply of meat in market is abundant and excellent, and the prices not very high. Butter is sold 7½d. to 9d. and 10d. per lb. Notwithstanding the number of emigrants that have arrived this year, the wages of labor are high, and good men for farm labor are difficult to procure. We have not seen so many Canadians seeking employment this year as usual, but it is rather early for them yet.

Cote St. Paul, 18th July, 1846.

THE ECONOMY OF MANURES.

BY MR. CUTHBERT JOHNSON.

(Speech delivered at the Monthly Meeting of the Farmers' Club, on Monday, 4th May, 1846.)

Mr. CUTHBERT JOHNSON immediately rose, and said —Mr. Chairman and Gentlemen, I respond to the call made upon me to bring the subject of this evening's discussion before you with every possible feeling of alacrity *(cheers)*; but I wish to state at the beginning that when the card was put into my hands, and when I came to examine the terms of the question, I was rather puzzled as to how I should best direct my attention to the subject. My difficulty arose not from a feeling that I should not find enough to say upon such a subject, but rather in arranging it so as to bring it within the limits of any ordinary discussion of this club. According to the terms in which the question is drawn up, the economy of manure is made the leading part of the subject. Now, that, if strictly construed, takes in the whole subject of manures, and includes the examination not only of organic manures, but those of a mineral or permanent nature, saline manures, those which are applied by the drill, and those of a liquid nature. Finding, therefore, it impossible to enter thus fully into the merits of this important theme, I resolved to confine myself to the preparation of farmyard manure, because I thought that this was a question of the most vital importance to every farmer, and concerned the interests of every occupier of the soil throughout the country. For, although some have the power and the intelligence (and that is not a small number) to employ fertilisers of an artificial nature, every one has the farm-yard: and any suggestion which I could offer which would excite discussion, and any advantage which might be derived therefrom, I knew would be spread into the remotest parts of the kingdom *(cheers.)* The subject is, in fact, of equal importance to those who only hold one field, and to those who hold their fields by the hundred. Therefore, by your permission

I will confine myself to the consideration of the manure of the farm-yard, its economy and application (*hear, hear*). The question then, gentlemen, which the Committee of the Farmers' Club have adopted for discussion this evening is one which they have justly considered to be of the highest practical importance, a conclusion in which I beg most warmly to concur, because it must be quite evident to every one connected with the cultivation of the soil, that upon the proper manufacture and the economical application of the manure of the farm yard rests the success of all great agricultural efforts. It is with much pleasure, therefore, that I take upon me the task of opening such a discussion; and I do this not with the feeling that I can propound any new discoveries of startling importance, but with the anxious diffidence which must be felt by every one who addresses, on any agricultural subject, the great and accomplished farmers who grace the list of this influential and highly important club (*hear*). My attention this evening shall be directed to a few chemical results which have been recently obtained, relating to the subject, and to the illustration they afford of the farmer's practical operations. The subject of this evening's discussion having been divided into two sections, the "manufacture" of the manure of the farm-yard first demands our attention. We shall, in furtherance of our object, simplify our investigation, if we divide this examination into two sections—First, the vegetable portion of the manure, and secondly, that which is composed of the excrements of animals. Now, as regards the vegetable portions, it is evident to every one that it is the straw of various grain that forms the largest portion of these—substances of little value as fertilisers, until mixed with the excrements of animals. It has been found, however, that the same quantity of the straw of different cereal grasses, consumed as food by live stock, produces very different weights of manure. This is of the highest importance to know. It has been a common phrase that "straw is straw," and many do not know that if a given weight of rye straw, or hay, or corn is used, there is a material difference in the weight of manure produced, as has been determined experimentally by Mr. Block. He ascertained that 100 lbs., of chopped rye straw, given as food to horses, will yield about 42 lbs. of dried excrements (fluid and solid), 100 lbs. of hay will yield about 45 lbs., 100 lbs., seeds of oats 51 lbs., 100 lbs. seeds of rye 53 lbs. The proportion of excrements produced by various animals naturally varies with the size of the animals, and the food on which they are fed; but it has been calculated from results of various experiments that an ordinary breed cow, fed in the usual way, produces about nine tons of solid dung in the course of one year. Upon this part of the subject you will find much valuable information in a blue book recently printed by the Government, the real object of which is to support the continuance of the Malt Tax, with the ostensible one of affording information to the farmer. Throwing, however, to the winds the real object for which the volume has been published, and the arguments it is intended to support, to which a complete answer might readily be found; throwing to the winds, I say, that object, there yet remains in the hundred folio pages of which the book consists, a great deal of instruction, highly valuable to the accomplished agriculturists of England. I therefore recommend those who are managers of Farmer's Clubs to apply to the proper office, and they will doubtlessly be furnished with a copy for the use of their institutions; a book so full of valuable information, relative to the respective qualities of excrements, that it will well repay a perusal—I mean in a scientific point of view, and not as having any relation to the Malt Tax (*hear, hear*). In the recent experiments of Dr. Thomson upon the fattening properties of malt and barley, he found that in fourteen days a cow, consuming 1426 lbs. of grass, produced exactly 1000 lbs. of dung—*Parl. Paper*, p. 45.) But when the same cow was fed for sixteen days on 3 lbs. of barley. 168 lbs. of malt, and 472½ lbs. of hay she produced 1259 lbs. of dung.—(*Ibid.*, p. 47) Again the food of this cow was varied; she was fed during 10 days with 90 lbs. of barley, 27 lbs. of molasses, and 274 lbs. of hay: the dung she now produced weighed 866 lbs.—(*Ibid.*, p. 49). She was then fed for ten days with 80 lbs. of barley, 40 lbs. of linseed, and 249¼ lbs. of hay; she now produced 785 lbs. of dung. —(*Ibid.*, p. 49.) This gives the proportion of solid excrement voided by a cow. Other persons have, in various experiments, investigated the amount of dung produced from a given weight of food and fodder taken together, and the results of one of these series of experiments have been given by Professor Johnston, in his valuable work, "The Elements of Agricultural Chemistry," p. 140. From these it appears that one ton of dry food and straw gives a quantity of farm yard dung, which weighs,

When recent, from	46 to 50 cwt.
After six weeks	40 to 44 "
After eight weeks	38 to 40 "
Half rotten	30 to 35 "
When pretty rotten	20 to 25 "

So that we see from these experiments that when only half rotten, farm-yard dung does dot weigh more than one half of what it does when in the recent state. This loss of weight is caused partly by the evolution of a quantity of the gaseous matters of putrefaction, and partly by the aqueous matter drained from the heap, or emitted in the shape of steam, a loss which can easily be diminished in amount, although not prevented even then in a considerable degree, by employing the manure of the farm yard in as recent a state as possible. The condition in which manure ought to be applied to the land, in what state of putrefaction or decomposition, is a point of the very highest importance, one well worthy of investigation by this society and upon which the more knowledge there is brought to bear the better (*hear, hear*). There is a very practical question, namely, the state in which the farm yard should be kept during its manufacture, and as to the value of the resulting compound produced. A great many of the farmers in my neighbourhood, in the county of Essex, believe that the farm yard cannot be kept too dry; and that was the opinion of a great farmer in Dengy Hundred, a tenant of the celebrated Mr. Cline, the surgeon; he covered in the whole of the farm yard with a roof. He, therefore, was clearly of opinion that to have manure in as dry a state as possible was most productive, and that it insured a manure of the most fertilising description. Others, however, are of a very different opinion (*hear, hear*). This leads me to another portion of the inquiry, as to the most desirable state of dryness or of moisture in which the dung of a farm yard can be kept while preparing. On this important point I have received very discordant opinions from practical farmers: many contending that it can hardly be prepared in too dry a state; whilst others have stated to me as their decided opinion, that if the escape of all *drainage* from the farm yard is prevented, that then the dung can hardly be kept too wet. There is certainly in favour of this latter conclusion the result of some recent experiments by the celebrated German chemist, Sprengel, which would lead to the conclusion that at least the putrefied urine of the farm yard becomes very considerably richer in ammonia when previously mixed with a considerable portion of rain water. This discovery shows the value of experiments, even when it may be thought that those researches can hardly lead to much good. For if any chemist had been asked, if by mixing a quantity of water with urine and then putrifying it, such a process would add to the bulk of ammonia, that chemist would most unhesitatingly have answered, "No," But that it does increase the bulk of the ammonia, and that not to a small, but to a very considerable extent, is beyond dispute (*hear, hear*). Now upon the quantity of ammonia contained in farm-yard manure, its fertilising powers to a very considerable degree depend. M. Sprengel analyzed urine in three different states—1. When fresh, 100,000 parts he found to contain 205 parts of ammonia; but after putrefaction this proportion of ammonia was increased to 487 parts, or considerably more than doubled; and when watered previously, it was then found to contain, after putrefaction 1622 parts of ammonia, or nearly eight times, the quantity it did when fresh. The following are the results of his analysis:—

	Fresh.	Putrid.	Watered.
Urea	4,000	1,000	600
Albumen	10	...	...
Mucus	190	40	30
Benzoic acid	90	250	120
Lactic acid	516	500	500
Carbonic acid	256	165	1,533
Ammonia	305	487	1,622
Potash	664	664	664
Soda	554	554	554
Silica	36	5	8
Alumina	2	...	...
Oxide of iron	4	1	...
Oxide of manganese	1	...	...
Magnesia	36	22	30
Chlorine	272	272	272
Sulphuric acid	405	338	332
Phosphoric acid	70	26	46
Acetic acid	...	1	20
Sulphuretted hydrogen	...	1	30
Insoluble earthy phosphates and carbonates	...	180	450
Water	92,624	95,444	95,481
	100,000	100,000	100,000

These experiments seem to me to bear directly upon the question of the dry and wet preparation of manure—a point so important to be well understood that I should be glad to hear the opinions of those who will follow me in this discussion upon it. The more carefully in fact that we investigate the question which is the subject of this evening's discussion, the more important does it appear, and the more numerous the sources of loss to be guarded against. For as I have elsewhere remarked—Nothing appears at sight so simple as the manufacture and collection of farm-yard dung, and yet there are endless sources of error into which the cultivator is sure to fall if he is not ever vigilant in their management. The late Mr. Francis Blakie, in his valuable little tract upon the management of farm-yard manure, dwells upon several of them; he particularly condemns the practice "of keeping the dung arising from several descriptions of animals in separate heaps or departments, and applying them to the land without intermixture. It is customary," he adds, "to keep the fattening neat cattle in yards by themselves, and the manure thus produced is of good quality, becase the excrement of such cattle is richer than that of lean ones. Fattening cattle are fed with oil cake, corn, Swedish turnips, or some other richer food, and the refuse of waste of such food, thrown about the yard increases the value of the manure; it also attracts the pigs to the yard; these rout the straw and dung about, in search of grains of corn, bits of Swedish turnips, and other food, by which means the manure in the yard becomes more intimately mixed, and is proportionately increased in value. The feeding troughs and cribs should, for obvious reasons, be shifted frequently. The horse dung is usually thrown out at the stable doors, and there accumulates in large heaps. It is sometimes spread a little about but more generally not at all, unless where necessary for the convenience of ingress and egress, or perhaps to allow the water to drain away from the stable door. Horse-dung lying in such heaps very soon ferments, and heats to an excess; the centre of the heap is charred or burnt to a dry white substance, provincially termed *fire-fanged*. Dung in this state loses from 50 to 75 per cent of its value. The diligent and attentive farmer will guard against such profligate waste of property by never allowing the dung to accumulate in any considerable quantity at the stable doors. The dung from the feeding hog-sties should also be carted and spread about the store cattle yard in the same maner as the horse dung." *

I have ventured to read the remarks of Mr Blakie, because they come from a man who was a thoroughly practical farmer, and in the district in which he long excited considerable attention and exercised very great influence he did more for improving the preparation of the manure of the farm-yard than any other man in the north of Norfolk (*hear, hear*). I do not think it desirable in this discussion to attempt to exhaust the widely extending theme now before us. There are many questions regarding the econonical manufacture of manure, which can hardly be comprehended in one evening's discussion. Of this class is the enlargement of the bulk of the farm-yard compost by mixing it with peat, tanners, bark, and other slowly decomposing vegetable substances; a practice very advantageously followed in favorable localities, and easily available by the Lancashire farmers where they have access to the extensive cesspools of the manufacturers, yet the practice does not come within the reach of the majority of the farmers of England. As to mixing these substances, peat with ordinary manure, I think there are considerable doubts whether the practice has ever answered the porpose of those who have employed it. I therefore, from the causes I have assigned, venture to leave these branches of the inquiry out of this evening's discussion, and pass on to a still more important branch of the subject, viz., the enrichment of the farm-yard manure by improving the food of the live stock kept in it. This is a question peculiary interesting not only to the tenant farmers, but to the farmers' landlord. For when it is generally known amongst the landlords of England how much the quality of the manure is improved by the use of superior food, they will then see very speedily that it is the most wretched policy to discourage, or restrain, by a covenant in the lease, the exchange of straw and hay,

* These is no doubt of the superior fertilizing effect of horse dung. In an experiment with beans, in which six acres were manured with horse dung and nine with that from the cow-yard, the six yielded more beans than the nine (*Agri. Report of Essex*, vol. ii., p. 280). The same observation was made in Lincolnshire (*Sinclair's Agriculture*, p. 214). The heat produced by the fermentation of the dung of different animals has been made the subject of repeated experiment (*Farmer's Magazine*, vol. iv., p. 160). When the temperature of the air was 40 deg., that of common farm-yard dung was 70 deg.; a mixture of lime, dung, and earth, 65; and a mixture of swine and fowls' dung, 58.

for good dung made by corn-fed animals, one which in very many instances the farmer could effect with equal advantage to his own pocket and to the high cultivation of his land. Now the questions of the highest importance which are originated and discussed by this club are questions which should aid in the diffusion of knowledge not only among the farmers of England, but among the farmers' landlords; because I am perfectly aware that whatever goes on in this club, will through the usual public channels, find its way into their studies; and I hope that every niggardly landlord in this country (that is, supposing that such a person as a niggardly landlord does exist in England)— (*hear, and a laugh*) will consider whether it will not tend to the eventual enrichment of his own pocket if he omit all covenants from his leases which prevent the farmer from exchanging straw or hay for far better manure than he can readily make, and whether it would not be to that landlord's own interest to increase the quality of the manure now made in the straw-yard by the employment of oil cake and other food which would produce manure of a highly superior nature (*hear, hear*). Of course, when the landlord is once convinced of the soundness of this policy, this result will follow: he will take care to have no covenant introduced in his leases which will militate against such a practice, but see that if the tenant has not, by the custom of the district, a right to be paid for any outlay for oil cake, such a custom ought at once to be adopted; and if he cannot prevail upon his fellow landlords to give to their tenants what for shortness are called "rights," that he will at least provide that his own out-going tenant shall not be discouraged from employing oil cake manure, from the fear that when he leaves his farm he will not be compensated for it. I earnestly hope these discussions will lead to a better general feeling on this subject on the part of landlords, and lead them to perceive that the more liberally they agree to pay their tenants for any unexhausted improvements with regard to manure, the better it will be for their own interests (*hear, hear*). Gentlemen, I was just saying that it was the most wretched policy to discourage or restrain by covenants in the lease the exchange of straw and hay for good dung made by corn-fed animals, and I need hardly remind the farmers assembled in this room of the inferiority of the manure made by the lean stock of the straw yard to that produced by the corn or cake-fed stock of the stable or the bollock-houses. The increased value of manure made by stock fed with oil cake is considered by the farmers in my neighbourhood in Essex to be equal to one-half of the oil cake employed; and so well convinced of the importance of encouraging the farmer to enrich the manure of the farm-yard are Lord Yarborough and many other of the great and enlightened landlords of Lincolnshire that they have wisely encouraged their excellent tenants to use oil cake, by allowing them for one quarter of their outlay for all the cake used for fattening their stock during the two last years of their tenancy (*hear, hear*). They wisely avoid the error into which by far too many landlords are at present led in the valuation of the manure belonging to an out-going tenant, viz., that of regarding as of little consequence the quality of the food consumed by the stock which produced it; a delusion which I hope will speedily pass away when the landlords of England shall better understand, as regards the preparation of manure, their own true interests (*hear, hear*). To assist in this very desirable object, I would earnestly refer the landlords to a very valuable paper, which both the farmer and landowner can hardly read too often, by Mr. Williams, Lord Yarborough's agent, on "The Tenants's Right to Compensation for unexhausted Improvements," for its perusal will not only suggest several facts which it would be well if those connected with the tenure of land more constantly kept in view, but it will also give valuable support to one of the questions I am so anxious to impress upon the the farmers of England, viz., the false economy of preparing only straw-fed manure. Mr. Williams' paper is inserted in the "Journal of the Royal Agricultural Society of England," vol. vi., p. 44. He remarks, when speaking of what he well describes as the increasing importance of the subject, "The allowance (founded not on custom, but on special agreement) is based on the assumption that the manure is improved to the extent of half the value of the oil cake consumed; but to get a fair average of both quality and price it is made to extend over the last two years, and the allowance is two sixths of the cake used in the last year, and one-sixth of that used in the previous year, making together the half of a year's consumption." This clearly shows that among the noblemen and gentlemen to whom I have alluded no doubt is entertained of the advantage of encouraging an improvement in the quality of the manure of the farm-yard (*hear*), and I think it is a question which can hardly be discussed too often, or be too frequently brought under the attention of the landlords (*hear, hear*). Having thus rapidly glanced at some of the chief sources of improvements to be adopted in the manufacture of manure, the next division of my subject includes, according to the terms of this examination, the economy of its application. This is a division of my subject which is of the highest importance to the cultivator; it is one great branch of the farmer's endless avocations in which great losses are necessarily sustained, yet still more are incurred by needless neglects and want of consideration (*hear, hear*). For amongst the many sources of loss, we find that in too many instances the application of the manure is delayed until putrefaction has generated and evolved a large portion of the richest ingredients of the manure. Surely in many instances this loss might be prevented, but the practice unfortunately does not end here; the manure is carted from the compost heap, copiously emitting a stream of gaseous matters, which would if evolved in the soil, prove highly fertilizing to the growing crops, It exposure to the atmosphere, when spread over the land, adds still more to the mischief; the sun and winds conspire to reduce its value, until, when it is a length ploughed beneath the surface, its best, its most fertilizing portions have departed: and if this is the loss sustained by manure applied to arable soils, how much is that loss multiplied when the compost of the farm yard is spread over the surface as a top dressing to grass lands! How small a portion is absorbed by the growing crop, how large a portion destroyed by the combined action of the sun and the atmosphere! Now it appears to me that a remedy may be found for this loss; some implement surely can be produced, somewhat similar to the sub-turf plough, which shall by some simple improvement enable the holders of pasture lands not only to loosen the soil of grass lands, but, at the same time that this beneficial operations is effected, to deposit either well rotted compost or some of the drill manures beneath the surface of the land. By this plan the decomposition of the manure being rendered much less rapid, and applied in immediate juxta-position to the roots of the grass, its elements are as gradually absorbed and assimilated by the growing plants as they are produced; protected from the action of the sun and winds, every product of decomposition is turned to good account, and consequently a much smaller portion of the fertilizer employed is needed to produce a required result than by the common wasteful mode of spreading it on the surface, even aided as it commonly is by the very imperfect and ineffectual attemps to bush-harrow or roll it into the land. By such a mode of application too as that to which I have alluded, the use of the manure is very materially economized, for it is a means of extending a given weight of manure over a much more considerable extent of land than is practicable on the ordinary surface-dressing mode. And when we reflect upon the small proportion per acre of bone dust, of rape cake, and of other finely divided organic fertilizers, which are successfully applied by the drill, we can hardly avoid the conclusion that it is more than probable that by new and more economical modes of application great improvements are yet to be made in respect to the use of farm yard manure (*hear, hear*). I have been induced to lay great stress on the wasteful application of farm yard manure when used as a top dressing for grass, by having my attention drawn to the wasteful manner in which such manure is applied in my own neighbourhood. It is brought down from London in large quantities, and after being put in a pile and turned over is then spread upon the land; the attention of those who are farmers and of those who are not is drawn to it by the odious stench which it emits (for it is *mixed with a great quantity of the night soil of London* and admirable dressing for grass lands) and they are soon acquainted through their noses that an agricultural operation is going on (*hear, and a laugh*). This smell shows that a mixture of ammonia and sulphuretted hydrogen is being evolved from the manure, which by being dispersed is lost to the land, and lost to the grass, to which it is naturally so admirable a food (*hear, hear*). Now, if that ammonia, that sulphuretted hydrogen, could by *any process be brought under the surface*, the roots of the grass would absorb it as it was evolved, decomposition would be retarded, the gas would be evolved more slowly, and consequently evolved in such quantities as are not beyond the powers of the growing crops to consume. I therefore venture again to suggest that surely some implement may be constructed, that something like the sub-turf plough might be contrived, which would not only loosen the soil (a most excellent operation in the case of grass lands), but would also at the same time bring and bury under the surface the well rolled manure of the farm-yard—some of which might be prepared on purpose for the operation: and although it is commonly believed that organic manures must to produce beneficial results be strewed on the land in large quantities, yet long continued experiments have convinced me that the usual amount of organic manures, may, to the interest of the farmer, be very materially reduced in bulk (*hear*,) I am quite sure indeed, from experiment, that the application of manures to grass lands in particular may be very materially improved in the way I have suggested (*hear, hear*) I have, Mr. Chairman, thus rapidly touched upon the chief points in the manufacture and economy of farm-yard manure which appeared to be most likely to be productive of good in a discussion by the members of the Farmers' Club, and I trust that these imperfect observations will be the means of drawing forth the practical observations of those whom I see around me. The importance of the subject, I feel can hardly be overrated; it branches out into so many divisions, that I have ventured to touch upon one or two only, leaving it to others to enlarge upon my imperfect notices, and to supply my manifold omissions. In conclusion, I have only to thank the members of this Club for listening so patiently to me during the time I occupied their valuable attention, and if the observations I have made should have the effect intended, viz., that of drawing forth the remarks of the able practical men present in this room, my very humble efforts will be most abundantly rewarded (*loud and hearty cheers*).

"The Iron Slave."—We have already, on more than one occasion, directed public attention to this wonderful machine, constructed on a new mechanical, labour-saving principle: but the invention has not yet received that examination in Jamaica of which we think it might be found eminently worthy, and therefore we have no hesitation in again bringing it before our readers. It is represented as intended as a substitute for the work formerly done by the human slave in warm climates, and has been made for the Tropical Emigration Society of England. If the account given of it may be depended upon, as we trust it may, *we should hold ourselves guilty of a culpable omission* were we not to endeavour to fix upon it the early attention of our planting friends. The first notice of this invention, which it is seriously alleged, will, at no distant period, altogether change the present system of agricultural labour, especially in warm climates, excited a good deal of interest. The machine is intended for agricultural purposes, such as ploughing, sowing, reaping; also for making canals, roads and tunnels. It is a frame of iron, four feet wide, and 20 feet long in front with a shaft of six feet six inches long behind, with two broad wheels, and a steering wheel on the extreme end. On the front shaft are feet similar to spokes of wheels, with buffers on their extremities; these enter the ground by the revolving of the shaft. This is caused by a long lever of 20 feet, swinging backwards and forwards on a spindle, and pulling alternately two levers of three feet, in a box on two wheels, fixed to the shaft, similar to the capstan on the Great Britain steam-ship, with the difference that the motion can be reversed, or the levers so blaced that they vibrate without the driving wheel. The power to work this machine is communicated by ropes, pulling alternately on the lever; these ropes at a distance of 100 yards were wound around a double drum, and corresponding ropes ran from the drum to the distance of a further 120 yards, to two cranks of a steam-engine. By this trial, a new mechanical principle was established, namely, the transition of power from a fixed point to a moving point, going in arbitrary directions at the will of one man at the steering wheel, which was thought impossible by scientific engineers. By prolonging or shortening the communicating ropes, the distance from the prime mover to the machine travelling on pulleys and rollers to diminish friction, and from the drum to the "satellite," they are held up by cars with poles if they extend to a great distance, to keep them from the ground. The trial itself proved fully the practicability of the machine. The machine is intended to work and move at the rate of three miles an hour. The trial was made on a square of 11 acres, on the properties of Mr. E. King of Blackburn, who kindly lent to the Tropical Emigration Society his steam-carriage, which, 11 years ago, was running between Hammersmith and London.—*Jamaica Times.*

Moisture in Plants.—The quantity of simple moisture, or rather pure water, which some plants raise from the earth is uncommonly great. This is beautifully exemplified in the organization of some creeping plants, in which the moisture is frequently conveyed to the distance of forty, or fifty, or a hundred yards, before it reaches the leaves or fruit, or perhaps the assimilating organs of the vegetable. A plant of this sort having been accidentally cut across, continued to pour out limpid and tasteless water, in such a quantity as to fill a wine glass in about half an hour.

TABLE OF MANURES WITH THE QUANTITIES TO BE USED, AND MODE OF APPLICATION

Name of Manure.	Nature and Composition.	For Farm Crops.	For Garden Crops.	Weight pr bush.
GUANO	The dung of sea birds, imported from Peru, &c. and containing various salts of ammonia and phosphates.	3 to 4 cwt. mixed with its own weight of ashes or mould, and drilled, or sown broadcast, for grass, turnips, mangold-wurzel, or other green crops.	3 lbs. per square rod, equal to 30¼ square yards. This, and all soluble salts, are best applied in solution, containing not more than 5 ozs. in 2 galls. of water.	80 lbs.
NITRATE OF SODA	Nitric acid and soda, a natural product imported from Peru, &c.	1½ cwt. per acre, sown broadcast with half his own weight of ashes or mould, for wheat, oats, grasses, &c.	1 lb. per square rod, in solution, like guano.	80 lbs.
NITRATE OF POTASS, SALTPETRE	Nitric acid and potass, a natural product, imported from the East Indies.	1 cwt. per acre, sown broadcast, in the same manner as nitrate of soda, for wheat only.	1 lb. per square rod, in solution, like guano.	80 lbs.
PETRE SALT	Common salts and nitrate of potass, the residuum of a manufacture.	5 cwt. per acre, sown broadcast, as a purifier of grass land.	1 lb. per square rod, in solution, like guano.	75 lbs.
GYPSUM, SULPHATE OF LIME.	Sulphuric acid and lime, an abundant mineral in several parts of England.	2½ to 3 cwt. per acre, sown broadcast on clover, trefoil, sainfoin, and other grasses.	3 lbs. per square rod.	80 to 84 lbs.
SULPHATE OF AMMONIA	Sulphuric acid and ammonia, the residuum of a manufacture.	2 cwt. per acre, mixed with a little mould, and sown broadcast, for clover, oats, &c., and drilled for turnips.	1 lb per square rod.	70 lbs.
BONE DUST AND HALF-INCH BONES	Phosphates of lime and magnesia, carbonate of lime and animal matter yielding ammonia.	1½ quarter to 20 bushels drilled, or sown broadcast, mixed with ashes, for turnips, vegetables, wheat, &c.	10 to 20 lbs. per square rod.	42 to 45 lbs.
CALCINED BONES	The same constituents as the above, with the exception of the animal matter.	For mixing with farm-yard dung, and other manures containing ammonia.		
PHOSPHATE OF LIME	Phosphoric acid and lime.	This manure is easily blended with farm-yard litter, &c.	3 lbs. per square rod	
SUPERPHOSPHATE OF LIME.	Phosphoric acid and lime in a more soluble state than in bones, prepared by dissolving bones in sulphuric acid.	For mixing in composts, fixing the ammonia of dung heaps and urine tanks, and forming phosphate of ammonia.	For garden culture, ½lb. to the square rod.	
PHOSPHATE OF AMMONIA	Phosphoric acid and ammonia	For mixing in compost, and furnishes from its constituents much nutriment to vegetation.	1 lb. to the square rod.	
MURIATE OF AMMONIA	Muriatic acid and ammonia.	Applicable in the same manner as sulphate of ammonia.	1 lb. to the square rod.	65 to 70 lbs.
MURIATE OF LIME	Muriatic acid and lime.	For mixing with compost heaps.	2 lbs. per square rod.	65 to 70 lbs.
SULPHATE OF MAGNESIA	Sulphuric acid and magnesia.	Mixed with night soil for potatoes, 1 cwt. per acre, or to 8 loads of stable dung.	¾ lb. per square rod.	
SODA ASH	Lime, magnesia, alumina, charcoal, silicia, and a few other ingredients in smaller proportion.	For destroying wire-worm, and other predacious insects, 1 cwt. per acre. This quantity must not be exceeded.	— ... —	60 lbs.

WHAT THE FRENCH SAY OF SMITHFIELD.—When the *Prefet de la Seine* decided upon erecting a new market Hall at Paris, previous to the plans being completed a commission was sent out to visit various countries, and study the establishments of that kind. It consisted of Messrs Anger, Inspector General of Market Halls of Paris; V. Ballard architect; and A. Husson, chief Clerk of the Prefecture de la Seine. Details are given by the Commissioners on the Markets of London, Manchester and other cities. While the advantages of our establishments are placed in relief, with the usual urbanity of Frenchmen, yet they could not quite blink the inconvenience of some of our *mediæval* concerns, amongst which Smithfield plays a conspicuous part. "Who should believe," they say, "that this immense metropolis has no exterior market place for cattle? It is in the midst of the city, a few paces from the cathedral of St. Paul's where all this host of animals are driven to and sold. Smithfield is the *beau ideal* of disorder in the way of markets—the shifting of cows, bullocks and horses; the perigrination of herds of sheep and swine; the escaping of half furious beasts; the howling of dogs, shouts of drivers, screams of frightened passers-by; add to this that the streets through which this world of beasts pass are choked by this throng, dirtied by their excrements, *et cetera*. Whence comes all this inconvenience? It is because the Corporation opposes its removal, leaning upon a statute enacted by Edward III.—*five hundred years ago!*"—*The Builder.*

PRIZE FAT SHEEP.

The following table, showing the live and dead weights, and improvement, during ten months, of five Leicester shearling wedders, 21 months old, bred by Mr. Pringle, of Wholefield, near Kelso, and fed by the Duke of Northumberland, in Hulne Park, near Alnwick, Northumberland.

Nos.	LIVE WEIGHTS FROM TIME TO TIME.—TIMES OF WEIGHING:— 1845. Mar. 1	April 1	May 1	June 2	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1	1846 Jan. 2	DEAD WEIGHT when slaughtered.	Weight of Tallow.
	st. lbs.	st. lbs.	st. lbs.	st. lbs.	st. lbs.	st. lbs.	st. lbs.	st. lbs.	st. lbs.	st. lbs.	st. lbs.	st. lbs.	st. lbs.
1	13 8	14 12	15 2	15 11	16 9	18 5	19 10	21 3	22 4	23 12	24 3	17 6	1 4
2	12 10	13 7	15 2	15 8	16 3	17 5	18 7	19 10	21 0	22 6	22 12	16 10½	1 4
3	12 10	13 13	14 13	15 5	16 7	18 0	19 5	20 6	21 0	22 1	22 6	16 1	1 2½
4	12 0	12 5	13 7	14 7	15 10	16 10	17 6	18 12	20 4	21 11	21 6	14 4	1 8
5	11 11	12 11	13 5	13 2	14 8	15 0	16 11	18 4	19 12	19 10	19 11	14 3	0 10½
Totals	62 11	67 6	72 1	74 5	79 9	86 2	91 11	98 7	104 6	109 12	100 10	78 10½	6 1
Average	12 8	13 7	14 6	14 12	15 13	17 3	18 5	19 10	20 12½	21 13½	22 2	15 10½	1 3
												Total increase.	Aver. increase.
Increase of live weight in ten months	...	0 13	0 13	0 6	1 1	1 4	1 2	1 5	1 2½	1 1	0 2½	9 8	0 13½

The above, when lambs, were purchased at Yetholm fair on the 4th July, 1844, of Mr. Pringle, for His Grace the Duke of Northumberland. The four first on the list (with one that was slaughtered by Mr. Fettis, of Alnwick, on the 11th December, weight of four quarters 13 st. 12 lbs., having been lame about a month) obtained the first premium of £5 in their class, at the Northumberland Agricultural Society's show, held at Alnwick in October, 1845. The lambs when first brought home were put upon coarse grass on poor land, for the first month; after which they had a clover fog until the 1st of November, 1844, when they were put upon turnips with hay, and salt to lick, along with the regular flock of about 80. Commenced giving them a gill of oats per day on the 1st January, 1845, until March 1st, when they were separated from the flock, and had the liberty of going into a shed, with cut Swedes, oats, bean or pea meal, oil cake, hay and salt, until the latter part of May, when they were put upon new grass, with all the other sorts of food except turnips, which were nearly done, still having the use of the shed. They had turnips again early in August, which along with the articles above named constituted their food until January 5th, 1846, when they were delivered to Mr. March, of Greenside, Newcastle-on-Tyne, who purchased them of His Grace, and slaughtered three of them the same week, and the other two shortly after. It is accounted for, by their being shorn in May, that they made so little weight that month. It appears also that they had reached nearly to full maturity, as shown by their failing in progress during the month of December, having made only 2½ lbs. each, admitting the grass to have failed.

The Press.—The amount of intellect which is now brought to bear upon the public press of England, forms one of the striking features of our age and country. Whether as regards the lucubrations of the quarterly and monthly periodicals, or the more rapid productions of the weekly and daily journals, where is the Englishman who does not feel elated at the reflection, that all this array of talent, this exhibition of mind, is concentrated within his own native isle, and is, for the most part, constantly occupied in efforts to advance its literature, its science, its religion, and thus to promote its true glory and its enduring greatness. Such, indeed, is the reputation of the public press of Great Britain, and such the weight of its political influence, that it has, although imperceptibly, virtually introduced a new element into the constitution—a *fourth estate.* So that not only is it now necessary to the enactment of a new law that it should have the high sanction of Queen, Lords, and Commons, but also that the measure should previously have had the concurrence of the public press, as the organ of the popular mind and will, enlightened, moulded, and directed mainly by its intelligence and power. Public opinion, informed by and expressed through the press, now really governs in England.

Each Man has his Special Talent.—There is no power of expansion in men. Our friends early appear to us as representatives of certain ideas, which they never pass or exceed. They stand on the brink of the ocean of thought and power, but they never take the single step that would bring them there. A man is like a bit of Labrador spar, which has no lustre as you turn it in your hand, until you come to a particular angle; then it shows deep and beautiful colours. There is no adaptation or universal applicability in men, but each has his special talent, and the mastery of successful men consists in adroitly keeping themselves where and when that turn shall be oftenest practised. —*R. W. Emerson.*

Jonathan's last.—A gentleman travelling in New York State overtook a farmer dragging a lean, wretched-looking horned sheep along the road. "Where are you going with that miserable animal?" said the traveller. "I'm taking him to the mutton mill, to have him ground over," said the farmer. "The mutton mill! I never heard of such a thing. I will go with you and witness the process." They arrived at the mill, the poor sheep was thrown into the hopper, and almost immediately dispersed. They then descended to a lower apartment, and in a few moments there were ejected from a spout in the ceiling four quarters of excellent mutton two skins of morocco, a fur hat of the first quality, a sheep's head handsomely dressed, and two elegantly carved powder horns.

SUMMER IS NIGH.

BY E. COOK.

The richest of perfumes and jewels are mine,
While the dog-roses blow and the dew-spangles shine,
And the softest of music is wakened for me,
By the stream o'er the pebble—the wind in the tree.
Nature, kind mother, my heart is content
With the beauty and mirth thou hast lavishly sent!
Sweet Summer is nigh, and my spirit leaps high,
As the sun travels further along the blue sky.

If I murmur, it is that my home is not made
'Mid the flowers and drops in the green coppice shade.
If I sigh, 'tis to think that my steps cannot stray
With the breeze and the brook on their wandering way.
Nature, kind mother, I long to behold
All the glories thy blossom-ring'd fingers unfold,
None like thee can I meet, for all others will cheat,
With a portion of bitter disguised in the sweet,

The earth, the wide earth, will be beautiful soon,
With the cherry-bloom wreath and the nightingale's tune;
And the dreams without sleep and strange magic will come,
While the wood-pigeons coo, and the heavy bees hum.
O! Nature, kind mother, 'tis only thy breast
That can nurse my deep feeling and lull it to rest;
For my soul is too proud to be telling aloud
What to thee it can utter all weeping and bowed.

I see the rife buds on the wide spreading bough,
Soon, soon, they will shadow my thought-laden brow;
I see the bright primroses burst where I stand,
And I laugh like a child as they drip in my hand.
Nature, kind mother, thou hearest me breathe
My devotion at altars where wild flowers wreathe,
None other e'er knows how my warm bosom glows,
As I watch the young daisy-fringe, open and close.

I see thee blue violets peep from the bank;
I praise their Createor—I bless and I thank;
And the gossamer insect at play in the beam
Is an atom that bids me adore the supreme.
Nature, kind mother, my heart is content
With the beauty and mirth thou hast lavishly sent!
Sweet Summer is nigh, and my spirit leaps high,
As the sun travels further along the blue sky.

Russian Opinions of Sir R. Peel's Free Trade Policy.—We subjoin the following article, copied from the *St. Petersburg Commercial Gazette*, on the subject of Sir R. Peel's measures, and the consequences to be expected therefrom. "As the measures of finance Sir R. Peel has announced in the English Parliament, and which, from his great influence, will no doubt be adopted, even if a few unessential modifications are introduced, must lay the foundations of a new epoch in the trade of Poland, and generally in the whole commercial world, it may not appear inopportune if we devote, in the first instance, a few preliminary remarks to this new system of duties. The assertion which we have already expressed in this journal (some few years ago), and which was also transferred from this to others, that no concessions were to be made to England in order to induce her to effect a reduction of duties on corn and other articles of provision, as she would be sooner or later compelled to do so for the sake of her own interest, now receives the fullest confirmation. England feels that she has arrived at a point where, if she does not procure subsistence for her working classes at a far more reasonable rate, it will become still more difficult for her to maintain a competition with other countries, and this conviction must necessarily result in the adoption of the new measures of finance. If these, however, are in the highest degree conformable with the designs of England, they cannot, nevertheless, be so unconditionally and generally recommended, as the public journals will have it, to other countries, which find themselves in wholly different circumstances. England, after attaining a commercial eminence which towers far above all other countries, casts away the ladder by which she has climbed to it. Were other nations, which have not yet attained this Alpine altitude, to throw away their ladders also, they would certainly never reach the same elevation. The most immediate great results of the English measures will be in the first instance, a favouring of the trade and agriculture of the other countries of the world; but, on the other hand, a powerful depression of their manufacturing industry. An almost total freedom from *taxation of all natural products must infinitely animate trade* simultaneously with the culture of the soil from which they spring forth, and secure for them a richer, and consequently a more remunerating return, in the prices of their produce. By means of the more reasonable prices of provisions, the English manufactures of all sorts will become immensely cheaper, and thence their productions, as well as the population thereby employed, will rapidly increase. This simultaneously increasing, and now already unexampled prosperity of the country, must also extraordinarily enlarge the consumption of all natural produce. Wholly different, on the contrary, will be the effect of these financial measures on the manufacturing industry of foreign countries. If it has been already difficult hitherto for the majority of their different branches *to maintain a competion with England, it is certain that* the difficulty will now become far greater—ay, and for a time impossible—especially in those states which have only recently trodden the path of manufacturing industry in a larger proportion."

Singular daisy.—This week we have been shown a curious daisy, gathered on Monday, in Skircoat, having five perfect heads on one stem. The heads are all in one line, and the stem broad and flat, widening towards the flowers somewhat after the manner of a coxcomb. The gentleman in whose field this unusual daisy was gathered, has also in his garden a monster auricula, the stem of which is broad and flat, and must have on it at least fifty blooms not one-third of which, however, can find room to come to perfec'ion, except in regular rotation.—*Halifax Guardian.*

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