upon the space cleared by the hoe; another well-directed blow, a pull of the hoe as it returns, will clear away the rest of the bunch, and then, of the two or three helpless plants remaining, one may be selected, and the rest cut off. A field thus treated looks very forlorn immediately after hoeing, but the advantage of the rough treatment shows itself in a very few days by the vigorous growth of the young plants.

We shall speak more fully, when on the subject of Turnip culture, of the advantages of repeated horse-hoeings as long as the rapidly-growing leaves of the plants will permit it. At present, we leave the cultivation of the Field-Beet till its harvest time.

ON THE FERTILISERS OF COMMERCE.

To the farmer who reflects that all increase in his crops beyond the average which covers his costs of cultivation, &c., is clear profit to himself, any mode by which such increase is likely to be effected should be matter of serious consideration. Attention has lately been called to the very extraordinary returns from some of the manures of commerce; from the many which have been published I shall content myself with citing the following instances.

From nitrate of soda, applied to Wheat, the increase has frequently been great. Mr. Bubb, in the report of the Gloucester Farmers' Club for 1842, shows a profit of 19*s.* 5½*d.* per acre; for the last year he has informed us of still greater, and this upon a considerable scale. Mr. E. Solly, in the third volume of the "Transactions of the Horticultural Society," second series, reports an increase of more than ten bushels per acre; and on certain trials, which I reported in the second volume of the Royal Agricultural Society, I netted 2*l.* 17*s.* per acre.

In the "Transactions of the Highland Society" for July, 1843, in the report of some experiments (for which the Society awarded a premium of 20*l.*), made by Mr. Maclean, of Braidwood, on the increase of Hay, by the use of some of these manures, we find, among others, these results:

Manure applied.	Value of Increase, after deducting cost of application.
	£ s. d.
Rape Dust	1 6 0
Guano	3 18 0
Saltpetre	4 15 0
Nitrate of Soda ..	5 0 10

Mr. Hannam, also, from near Wetherby, in Yorkshire, in his elaborate series of experiments, for which the Highland Society awarded a premium of 50*l.* (V. "Highland Society Transactions," No. 4, new series), gives, among a great variety of other interesting results, the following:

ON TURNIPS.

Manure applied.	Quantity used per acre.	Increase per acre.
		ton. cwt. stone.
Bones crushed..	16 bushels	8 7 4
,, burnt....	16 ditto	9 16 4
Bones and Guano	12 ditto + 1 cwt.	10 7 6
Bones and Rape Dust ..	12 bushels + 6 ditto	10 14 5
Guano, drilled..	2½ cwt.	6 17 0
Guano, sown ..	2½ cwt.	14 19 5

ON OTHER CROPS.

Manure applied.	Potatoes.		Barley.		Hay.	
	Quantity applied.	Increase per acre.	Quantity applied	Increase p. acre	Quantity applied.	Incr. per acre.
		bushels.		bushels.		st. lbs.
Guano	5 cwt.	59·6	2 cwt.	15·54	2 cwt.	52 0
Nitrate of Soda ...	1½ cwt.	76·9	1½ cwt.	14 22	1 cwt.	72 12
Nitrate of Potash..	....	....	1 cwt.	11·16	1 cwt.	25 10

I have selected the above examples from amongst the most successful, merely to show, when they do succeed, how great the profit may be to the farmer. But it by no means follows that there is not another side of the question; doubtless there is—failures perhaps are even more numerous. These manures are very often most uncertain and capricious in their effects—and I would strongly advise that no one should embark in them largely without first ascertaining, by trial on a small scale, the probability of their success, both as regards the crop and soil to which he thinks of applying them afterwards.

Presuming, then, that this is ascertained in the affirmative, these manures would seem to be of the greatest importance to the farmer; especially in those districts like our Cotswold hills, where farm-yard or town manure is seldom to be obtained in sufficient quantities. The introduction of a substance which could be purchased at any market-town, as for instance guano, at 11*l.* or 12*l.* per ton, from 2 to 4 cwt. of which per acre would go as far as a fair dressing of common dung, would be no inconsiderable boon to the farmer. Now this is all very promising—but it is not all gold that glitters. There are other drawbacks against which due caution must be exercised. When we have ascertained one year that the manure in question is likely to succeed on a given crop, we are by no means sure the next year of getting the genuine article; thus a serious loss to the purchaser may be incurred, not only in the article itself, but still greater on the year's crop, which, under different treatment, might have given very profitable returns. Let us see how the case stands in figures. Mr. Potter, in a little pamphlet entitled "A word or two on the use of Guano," tells us that it is sometimes found to contain 40 or 50 per cent. of inert sand. I have heard of some said to contain 65 per cent. Dr. Madden states, in one of his lectures "On the advantages of extended Chemical Analysis to practical Agriculture," that samples of nitrate of soda have been analysed and found to contain as much as 26 per cent. of common salt. I have seen a specimen which has also been analysed and contains more than 30 per cent. of foreign matter. Mr. J. B. Lawes, who, as a manufacturer of superphosphate of lime from bones, consumes two tons of bones a day, and is therfore a competent witness, states in the *Agricultural Gazette* that bone-dust is sold containing about one-third of lime. Suppose a farmer about to manure 20 acres with these impure substances, what would be his loss?

Manure.	Price per ton.	Impurity per cent.	Quantity used per acre.	Loss to Buyer on 20 Acres.
	£ s. d.		About	£ s. d.
Guano	11 0 0	50 Sand.	3 cwt.	16 10 0
Nitrate of Soda..	19 0 0	25 Salt.	1 cwt.	4 15 0
Nitrate of Potash	25 0 0	25 (?) Salt.	1 cwt.	6 5 0
Rape Cake	8 0 0 p. quarter	15 (?)	8 cwt.	6 8 0
Bones.....	1 0 0	33 of Lime.	20 bushels	16 10 0

Thus a farmer purchasing guano or bones for 20 acres of land would be a loser, first of 16*l.* 10*s.* on the article itself—and would only have half a crop on the land to which it was applied. Any one using 20 tons of foreign Rape-cake for food for cattle, which is said to be sometimes mixed with sand, if it contained only 10 per cent., would be a loser of 16*l.*, to say nothing of the injury which his cattle might sustain. It is by no means intended that these instances of impurity are altogether the result of adulteration. Indeed, it is known that most of these manures, in their natural state, are found mixed with large and varying proportions of foreign matter—and, if adulterated, that it is done before it reaches the hands of the merchant in this country; still, the loss to the consumer is the same, no matter how it happens. But even this is not the worst feature of the case; a few instances of disappointment will bring the genuine article into disrepute, from which it will not easily recover, and the advantages which might have arisen be lost to the country for years to come. The question then is how to prevent it?

The Scotch have formed a society for the purpose of employing a chemist at a salary of, I think, 600*l.* a year, who is to analyse for its members, at the reduced charge of a few shillings for each analysis, substances interesting to farmers; amongst others, especially these manures of commerce, so as to give at once their agricultural and commercial value. Thus a member of the association, who is desirous of testing any of them, has only to inclose a very small sample by post to the chemist, with the amount of charge for having any particular question answered, from 3*s.* to 6*s.*, or thereabouts, and in a few days he will receive an answer, which will probably save him from all the losses and disappointment before alluded to; and instead of paying for the article some 25 or 50 per cent. beyond its real value on a large order, he would be sure of his money's worth. Moreover, the chance of an impure article being ever sent into the country where a chemist is appointed, would be greatly diminished by the knowledge that it was likely to be analysed on its arrival. I am not about to propose to you to enter on any scheme so great as that of the Association of Scotland; but in a much smaller way it has struck me that results equally useful to the practical agriculturist may be obtained. I have applied to my neighbour Mr. Gyde, who, as an analytic chemist, from the variety of delicate and elaborate analyses in agricultural chemistry which to my knowledge he has performed, I believe to be as competent to the task as any one, at least in this neighbourhood, to know whether it would not be worth his while to offer his services to the Farmers' Clubs in this neighbourhood on such terms as would come within their means; and I am happy to say that he consents, upon being appointed chemist to any Farmers' Club, with an annual retaining fee of 5*l.* 5*s.* from each Club, to analyse for its members on terms similar to those of the Scotch chemist. I am aware that the subscriptions to Farmers' Clubs are very small, but I think, when the important objects above named are considered, there will be no difficulty in raising such a sum yearly by a subscription for the express purpose, from the richer members, if necessary. For further particulars I refer you to the letter of Mr. Gyde, advertised in this day's Paper, and if any Club think it worth while to encourage the scheme, I will thank their Secretary to signify the same to me, or to Mr. Gyde.—*W. H. Hyett, Painswick House, March* 26, 1844.—[This valuable article appeared in the *Gloucester Chronicle* of March 30th, as a letter to the Farmers' Club of the West of England, and we are glad to have the opportunity of publishing it here at the request of its author.]

ON THE ORIGIN OF MOULD.

As you have noticed a communication made by me to the Geological Society in 1837, on the Formation of Mould, I should be much obliged if you would correct an error into which I have fallen. In a postscript to that paper I state that marl was put on a pasture field, since ploughed, 80 years ago: I should have said 30 years, as I mistook the figures in the paper sent me. I found out this on visiting the place four years and a-half subsequently, and examining the old occupier of the farm. Wishing to ascertain the accuracy of the stated depth at which the marl now lies buried, I had three long holes dug in different parts of the field, and in each I found the marl, together with some cinders and broken pottery, in a layer 13 inches beneath the bottom of the potato-furrows, which were about four inches beneath the general surface; so that these substances are now buried at a depth of no less than 17 inches. They will never, probably, be undermined by the worms, to any much greater depth, as they almost rest on the general substratum of pure white sand. I particularly examined the occupier, whether the field had ever been ploughed to a greater depth than six or eight inches, and he positively assured me that it never had. My original informant, therefore, rather underrated the depth at which the marl now lies; although probably in the interval of four and a-half years, between our observations, some soil may have been removed by the worms from beneath the marl. In the other fields, formerly examined, I found that the layers of lime and cinders were, in almost every case, about an inch lower than they previously were. It was curious to observe in some of the holes how distinct three layers were preserved; the uppermost of cinders being two inches beneath the surface (on the former occasion one inch below), the middle layer of lime at four inches, and the lowest of cinders and burnt marl, at from 10 to 12 inches. I found this lowest layer wherever I dug, and likewise the other layers, but less regular, owing to different parts of the field having been limed and cindered at different periods. When digging in this field, after a long drought, I noticed, that one single clod of earth, about as large as a man's two hands, was penetrated by eight upright, cylindrical worm-holes, nearly as large as swan-quills, so that I could see through them. Now this shows the quantity of earth in a small space, which is often probably removed by the worms and brought to the surface. The boggy field mentioned in the postscript to my Paper, on which two years and a half before a thick layer of bright red sand had been strewed, and which, I was informed, was then buried three-fourths of an inch beneath the surface, I found four years and a half subsequently (*i. e.* seven years from the sand being put on) was exactly two inches beneath the surface. In that field (also rather boggy) which I have described in my Paper, as first reclaimed 15 years before, the burnt marl was buried at a depth of four inches; so that in these two cases the rate of sinking, or more properly of being undermined, has been nearly the same, namely, about two inches in seven years. In the fields, however, more particularly alluded to in this notice, in which the marl that was put on thirty-four years and a half before, then lay seventeen inches beneath the surface, the rate of being undermined has been much quicker, namely, three inches and four-tenths of an inch every seven years. This field is dry, and consists of black, poor, very light sandy soil. It has also been ploughed, which may make some difference; though it is clear, from the uniformity of the layer, that the marl must have sunk beneath the depth at which the plough could disturb it before the pasture had been broken up. I am surprised at the red sand on the most boggy field having been buried as much as two inches in the seven years, for I never saw a field on which there were so few worm-castings. One cannot, however, judge of the number of worms in a field from inspection at any one season.—*Charles Darwin, Down, Kent.*

ON THE CULTIVATION OF FLAX.—No. I.

THE cultivation of Flax engaged the attention of the farmers of Great Britain and Ireland at an early period, and in certain districts of these countries few farms were without a portion of it, while in others it was scarcely known. Before the introduction of cotton fabrics into general use, the linen manufacture was necessarily one of much importance, and, in fact, it is so still, but in a different point of view. Since the days of which we speak, the manufacture has entirely passed into other hands. Then, the farmer was not only the grower of the crop, but, to a certain extent, the manufacturer also; it was invariably converted into yarn by the farmer's family; and, especially in the north of Ireland, it was also manufactured into cloth, the linen-weavers there being invariably small farmers. The Flax crop, therefore, in those days, was one to which a peculiar value was attached, not only as proving remunerating as an article of culture, but also as affording employment for the female members of their families in its subsequent manufacture. A small patch, at least, was grown with a view of supplying the materials for the manufacture of the household linen, which every frugal housewife knew the value of having done under her own superintendence.

The extent of land devoted to the Flax crop has been for many years past annually growing smaller; and, were it not for the late vigorous movements to extend its culture and introduce a better system of management, its cultivation would soon have been entirely abandoned. By the extension of machinery of late, the quantity of Flax consumed in this country, both for the home and foreign market, has greatly increased, and the growth of the crop having been neglected in this country, the small portion grown being also badly managed, the manufacturers were obliged to look to other countries for their supply. The consumption of oil-cake too, was considerable; and for this also the British farmer was dependent on the foreign market. In the year 1841, the importations of Flax alone amounted to about 80,000 tons, at an expense of from 5,000,000*l.* to 6,000,000*l.*, and if the sum paid for seed and oil-cake be taken into account, the annual outlay could not have been less than from 10,000,000*l.* to 12,000,000*l.** The importance of raising this supply at home was too manifest to escape the attention of those most interested in the matter, and the inquiry instituted with a view of ascertaining how far this could be done, gave the impetus to its cultivation, which is now so rapidly spreading itself throughout the country.

The cultivation of Flax in these counties had, indeed, for many years past been almost exclusively confined to the north of Ireland, but from the defective system of cultivation in general use there, and the still inferior method of manufacture to prepare it for the spinner, the sample produced was generally of a very inferior quality, and consequently brought a low price compared with that paid for the imported article. The small returns thus

* See Reports of the Belfast Flax Improvement Society.