ROTATION OP CROPS.

I propose to give you a series of short papers on the agriculture of the Lothians, in the hope that they may prove interesting to your numerous readers.

I am unwilling to suppose that there is nothing in the experience of a district, so long famous for its agriculture, that may not be studied with profit, even by individuals possessed of great skill and knowledge in the most useful of arts; but at the same time I am aware that the most valuable parts of our system, may have already been transplanted, and may even now be flourishing in the United States, with all the luxuriance which a virgin soil imparts.

Trusting to your indulgence, I shall therefore devote this letter to some introductory remarks on the rotation of crops. I am fully aware that the sanguine expectations of some, as to the application of chemistry to agriculture, lead them to believe, that at no distant day, rotation of crops will be numbered with the things that were—that the finger of science will point out to us, not only the substances removed with each crop, but also how we may replace them in an economical manner. I am too ardent an admirer of chemical science to doubt its power to do this, but I cannot believe that it will very materially affect the axiom that a sound and philosophical system of rotation is the basis of all judicious and profitable agriculture; for even were we so far advanced in chemical knowledge, as to be able to grow luxuriant crops of wheat year after year, on the same land, without deteriorating it, it is evident that the supply of this sort of grain would soon exceed the demand. From thus being the most remuneting of crops, owing to the limited extent of land on which it can be grown, it would gradually become less so, while the supply of the other corns which are less remunerating, owing to the facility with which they can be grown on moist land, would be shortened, and the price of course enhanced; and when that point was reached, at which the profits were equally balanced, the further application of the principle would be arrested. I apprehend therefore, that the legitimate occupation of chemistry is to point out to us how we may avail ourselves of the large amount of inorganic substances laid up for us in our own soils by supplying those of which they may be in want—to show us how to draw upon nature, so that our drafts may be honored—how to pay the interest, that we may have the use of the principal, rather than that we are to look upon our fields, as a mere extention of space—the floor of a manufactory, into which we are to bring from without, *all* the raw materials required, for the production of the substance we propose to obtain.

The theory upon which the rotation of crops is based is, that different plants require different series of the inorganic substances contained in the soil, for their growth and development; but as these substances require the action of tillage and the *seasons* to reduce their particles to that minute state of division, in which they can be absorbed by the spongioles of plants, therefore the less frequently those plants which require the same series of inorganic substances are reared on the same soil, the more copiously will they be supplied with properly prepared food when they are reared.

The following table from the transactions of the Agricultural Chemistry Association of Scotland, shows the amount of inorganic substances contained in three different soils, and that a fertile soil contains at least 9 or 10 of these substances.

	Very fertile.	Fer. with manure.	Barren.
Organic matter - - - -	97	50	40
Silica (in the sand and clay)	648	833	778
Alumina (in the clay) -	57	57	91
Lime - - - - - - -	59	18	4
Magnesia - - - - - -	8½	8	1
Oxide of iron - - - -	61	30	81
Oxide of manganese - -	1	3	½
Potash - - - - - - -	2	a trace.	a trace.
Soda } Chiefly as com salt	4	0	0
Chlorine }	2	0	0
Sulphuric acid - - - -	2	¼	0
Phosphoric acid - - -	4½	1¼	0
Carbonic acid combined with the lime and magnesia -	40	4¼	0
Loss - - - - - - -	14	0	4⅛
	1000	1000	1000

Now it must be evident to every one, that if we go on for a length of time raising any particular crop which carries off a larger quantity of any of those elements than the relative proportion of it in the soil, we must by and by reduce the fertile soil, to the state of the barren one. As an example, we may take potatoes, which contain a large quantity of lime, magnesia, potash, soda, and phosphoric acid. Now it will be seen that these very substances are almost all wanting in the barren soil; we may therefore conclude that if we go on raising potatoes year after year without adding the whole substances removed, we will reduce the fertile to the state of the barren soil.

From what has been stated, it must be obvious that a proper course of rotation is that which removes equal relative quantities of the different substances composing the soil, and which places those plants, which feed on the same substances, at as great distances from each other in the rotation as possible. This holds good even in the vicinity of large towns, where, from the facility of obtaining manure, a large portion of, if not all the substances carried off, are returned to the soil; as by adhering to a judicious rotation even in this case you present such a profusion of aliment to the different classes of plants, as to convert *good crops* into *luxuriant ones*. In forming a correct judgment of any course of rotation, we must also take into consideration the facilities it affords for eradicating weeds, and keeping the land in that state of absolute freedom from them, which, while it adds profit, so it ought to be the pride of every agriculturist.