her population, the clearing and cultivation of her forest lands, and the growth of her cities, towns and villages. This must be the true mode of estimating the prosperity of British America. Nothing but the settlement and cultivation of her land, can give her a numerous population, and flourishing cities, towns and villages. It is the produce of the soil that must supply what is necessary for the support of a numerous population, and means of carrying on commerce, the profits of which will give funds for the extension of the cities, towns and villages, and the establishment of such manufactures as would be likely to be profitable."

"To a country that has a thin population, and a territory of almost boundless extent, that can only be rendered productive by the labour and industry of man, an accession of population able and willing to work, not of the idle and worthless, *must be profitable.*—Whatever is produced from the labour of a man, applied to what would have continued unproductive, if he was not employed upon it, must add so much to the produce annually created, and increase the wealth of the country, by the amount produced over what he consumes. A full grown man then coming into a country capable of producing more than he consumes, under the circumstances I have above stated, is equal to a capital of the same amount that was required to support him from infancy to manhood, or a working state, because in every country what it takes to support the rising generation to be capable of working, or of being productively employed, must be so much unproductive consumption, and more particularly to the country that loses their services when they are at maturity, and capable of rendering service."

"I make a distinction in the value of emigrants to Canada. The industrious labourer, though poor, has in himself a certain amount of capital. The skilful agriculturist with limited funds, is still a more useful emigrant. The farmer who has both skill and capital, is of more value to the Province than either of the other of the class—not agricultural, who come with sufficient funds or industry are also valuable. It is only those who come with limited funds, and without any disposition to improve them by industry, that cannot be of any benefit to a country, where industry is the basis of prosperity; they add nothing to production, but on the contrary lessen the funds that should be employed in productive labour, and must therefore be injurious to a community such as that of British America."

Chemical Analysis of Soils.

The order in which the principal substances that enter into the composition of soils possess an absorbent power, is the following:

1. Animal and vegetable substances.
2. Alumina.
3. Carbonate of Lime.
4. Silica.

It appears, too, that the more perfectly a portion of the soil is comminuted, decomposed, and reduced, the greater is the power of absorption which it possesses.

But, although certain earths in their separate state have a greater power of absorption than others, it does not follow, that a soil consisting chiefly of that one earth would possess a greater power of absorption than a soil composed of mixture of earths, even though these earths should in themselves be less absorbent. Thus, a soil consisting chiefly of aluminous earth, though alumina is itself the most absorbent of all the earths, taking water up in the greatest quantity when exposed upon it, as well as retaining it the longest, is not really so absorbent as when it is mixed with other earths. Hence, the stiffer clays are not the soils which absorb water readily from the atmosphere. Such soils, when the weather is dry, become indurated upon the surface, which presents an obstacle to absorption; and thus we find, that the vegetation of very stiff clays is almost as soon injured by drought as that of sandy soils, and much more quickly than that of good loams.

A mixture of siliceous sand, then, with a very aluminous soil, although the sand is the less absorbent substance of the two, increases the general power of absorption from the atmosphere; so also does a mixture of lime, and, in an eminent degree, of animal and vegetable matter.

It is not, then, the prevalence of any one earth that constitutes a soil well fitted to absorb humidity. A mixture of certain proportions of alumina and silica, of carbonate of lime, and of vegetable and animal matter, appears to be the best suited for absorbing the humidity of the atmosphere, of preserving it, and transmitting it the most regularly to the plant.

Neither is the prevalence of any one earth in a soil favourable to its general powers of production. Too great a proportion of alumina forms a soil too stiff and tenacious—Such a soil will, from this cause, be found to be unproductive. A soil consisting of carbonate of lime only, as we see in the case of chalk, is a bad soil. A soil consisting of alumina and carbonate of lime only, as we see in the case of clay-marl, is unproductive as a soil, until mixed with other substances. A soil consisting chiefly of silica, is often so barren as to be incapable of sustaining vegetation at all.

It is an error to hold that the relative fertility of soils may be determined by their power under the circumstances mentioned, to absorb moisture from the atmosphere.—Peat-earth is a very absorbent soil, but it is not a soil of great fertility. To infer that the fertility of soils depends upon their powers either to absorb or to retain moisture, were to reason as if these were the only conditions of fertility in soils, which does not appear to be the case; and other experiments accordingly do not bear out the conclusion that the fertility of soils depends upon these properties. But this may be inferred, that all productive soils have a considerable power of absorbing moisture and retaining it when so absorbed, and that this property does not depend on the prevalence of any one substance, but on a mixture of several substances.

It has been found also, we have seen, that the fertility of soils, however produced, is not dependent on the prevalence of any one mineral in the soil, but on a mixture or combination of several. But what the precise proportion of these is which is most favourable to fertility, has not yet been determined.

Without detailing any of the numerous experiments of chemical analysis that have been made, with the design af ascertaining this and other points relating to the properties of soils, the following conclusions may be given as apparently deducible from the investigations that have taken place:—

1. Soils in which a large quantity of silica and alumina exists in the state of fine division, are comparatively fertile.

2. Soils in which the quantity of siliceous sand is large are comparatively infertile, while soils in which the sand is fine and only partially siliceous, are comparatively fertile.

3. Iron exists in all soils, but does not influence their fertility in proportion to its larger or smaller quantity.

4. An excess of the acid combinations of the oxide of iron, and certain other saline bodies, is hurtful to vegetation.

5. Carbonate of lime exists in the best soils, and, generally, though not always, in larger quantity in the better than in the inferior soils.

6. Certain earths possess the power of combining chemically with animal and vegetable matter, and of retaining it for a longer or shorter time. Thus, alumina and lime form certain compounds of greater or less insolubility with animal and vegetable matters, while silica will not enter into the same combinations, and hence it is that aluminous and calcareous soils retain for a longer time the manure applied to them than siliceous soils.

7. When water is in excess in the soil, and when vegetable matter is present, acid is formed which is injurious to the productive powers of the soil. Farmers are familiar with this effect, and say that the soil is soured

8. Soils, besides absorbing moisture from the air, appear to absorb carbon and other matters nutrimental to plants.

These are the principal results to which the chemistry of agriculture has conducted us with respect to soils. This branch of science, however, may be said to be as yet imperfect, and a large field of useful investigation still remains for the philosophical inquirer. Although it may be said that much has not been done with relation to the really useful, which observation and practice had not before shown, yet we have at least escaped from the errors of former opinions, and so far the path of further inquiry is more open to us.

Amongst other results to which this species of investigation has conducted us, we have seen—that the practice known to agriculturists of mixing together different kinds of earths, admits of explanation on principles founded on our knowledge of the composition of soils. that the beneficial action of manures depends upon a proper constitution and texture of the mineral portion of the soil, and that hence to derive the full benefit of manures, the province of the cultivator is to improve the texture and constitution of the soil. that the communution of the component parts of the soil is beneficial, as rendering the whole more pervious to the air, and the vapour, and other matters, with which the atmosphere is charged. and further, we have been enabled to render our common nomenclature of soils more precise, by distinguishing them by the terms Siliceous, Aluminous, Calcareous, Magnesian, and Ferruginous, as silica. alumina, lime, magnesia, and iron, prevail in their composition.

We might now proceed to consider the relation existing between the soils of a country and its geological condition. This is a subject interesting to the scientific agriculturist. But, however curious the investigation might prove, it is not necessary for that practical illustration of the subject of soils, which consists with the design of this work. Besides, to characterize the quality of soils, as affected by the geological nature of the country or district, is to view the subject in a somewhat more extended manner than is consistent with the common purposes of the farmer Although it is found that a relation may be generally traced between the nature of the rocks of a country or district, and its fertility—as, in the British Islands, between the new red sandstone and the finest districts of the country; between the coal formation, under certain circumstances, and a ferruginous and somewhat ungrateful soil; between the magnesian limestone and a tract of comparative infertility, between the lias formation and one of comparative productiveness, and so on—yet many degrees of quality may exist in the soils of the same series of rocks, and in the same country, and even all the contrast between great fertility and great barrenness may be found within the limits of a single field. We must, therefore, narrow our views when we examine the soils which we have occasion to cultivate, and regard, not their properties with relation to an entire district, but their minuter shades of fertility and character."—*Low's practical Agriculture.*