most of the circumstances of vegetable life, the materials which serve as primary nourishment to plants, seem almost reduced to nothing when we compare the tenuity of these materials with the solidity of vegetables.

A number of plants grow upon solid rocks from which we might suppose they can derive nothing. Such is the primary vegetation of lichens and mosses, upon quartz and granite, where it would appear their whole nourishment must be derived from the air, as it cannot be conceived that solid silix would contribute to their nourishment.

Thirdly—The same observation may be extended to those vegetables and trees (sometimes of great size) which grow in fine sand, or which grow and push deep roots into compact grindstone-rocks, or in the fissures of excessively hard lavas. Nor need we be surprised to find the stones of buildings covered with vegetation, when the contact of air alone, seems sufficient to their existence. Mustard may be grown for salads on board of vessels at sea in certain temperatures, by sowing the seed on wet cloths: some have supposed from the circumstance of plants growing in water, that the ground was only serviceable to plants in supporting them erect. This opinion however exhibits very superficial reasoning, as I shall now endeavor to demonstrate.

Air and water are undoubtedly the principal agents in vegetation. The ground not only serves the purpose of holding plants erect, but is also the great laboratory, where the food is prepared by fermentation and decomposition. Without the action of air and water, fermentation and decomposition cannot go on. When we say that air and water, are the principal agents in promoting the growth of plants, we must bear in mind that these are compound elements. *Water* is composed of two parts of Hydrogen and one of Oxygen. *Common Air* is composed of twenty parts, by bulk, of Oxygen, and eighty parts of Nitrogen. Humic acid is composed of carbon and Hydrogen. Ammonia is composed of three parts Hydrogen and one part Nitrogen. Lime is composed of a metal called Calcium, and Oxygen. Potass is composed of a metal called potassium, and Oxygen. *Potass, Lime,* and *Ammonia,* are often combined with carbonic acid gas, which is also contained in small quantities in common air.

Perhaps the most important of all these simple principles is *carbon*, the chief ingredient in humic acid. It is this carbon that constitutes the greater proportion of the solid substances in all plants, while water constitutes the chief fluid portion; and hence—Hydrogen, which is contained in water, in humic acid, and in ammonia, is so important.

The mineral part of the soil which, exclusive of lime, is composed of clay and flint, earth in the form of sand, and gravel of various degrees of fineness, together with magnesia, iron, and some other metals, contributes little or nothing to the food of plants. These portions of the soil appear to be chiefly useful in dividing and diffusing the nutritive parts arising from decayed plants in natural soils, and from various manures in artificial soils. This proves in another point of view, the usefulness of lime, when laid upon artificial soils. *Plaister of Paris,* is also an excellent agent in fixing the ammonia which escapes during fermentation, and which, if allowed to escape in large quantities, occasions a serious loss of plant food, as ammonia and humic acid are the principal ingredients in promoting the growth of plants. By the free action of air and water, these ingredients are prepared in the soil as I have already said, by fermentation, and reduced to such a state of fluidity as to be easily taken up by the spongelets of the roots.

Reasoning upon this principle, enables us to account for the beneficial effects of fine culture, which we are apt to think is only necessary for covering the seed. I have said that every good soil must contain a certain portion of air and water in an active state. Consequently to admit of this action, the ground must be loose and friable to imbibe the rains, and condensed vapours of the atmosphere and also to allow a free filtration of superfluous moisture,—which, if allowed to stagnate, gorges the sap vessels of plants, as will be seen illustrated in instances where people keep the saucers of flower-pots continually full of water.

This reasoning also proves the use of summer fallow, by breaking down the hard texture of the soil, and rendering it the more susceptible of heat and moisture. It also proves the advantage of frequent hoeing among green crops. It also enables us to understand why many unproductive soils are rendered fertile by culture alone.

This leads me also to remark, that great error generally prevails, respecting what is generally termed exhausted soils. Ground often becomes unproductive, by requiring it to produce plants of the same species in succession. Certain classes of plants requires a greater portion of lime, for instance, than others, and repetition soon exhausts the soil of that ingredient; hence the ground fails to yield that species of crop, although it would mature a good crop of a different one. This is not the only evil attending repetition. Every plant when growing gives out certain excrementitious matter, highly injurious to its own species, although harmless to other classes. By repetition, the ground becomes so highly charged with this excrement, that it acts as a poison to the crop, as the filth accumulated on the human body proves injurious to the system.—These remarks may enable us to understand the advantages of what is called alternate husbandry, and teaches us that we cannot violate the laws of nature with impunity,—and also, that until we know the kind of food best adapted to the system of different species of plants, and the best means of administering to their wants, we cannot boast of perfection in agriculture. By the valuable discoveries of Sir Humphrey Davy, Fourcroy, De Condoll, Liebeg and others, many of the mysteries of vegetable physiology have been laid open, and great advantages to the human family must result. Indeed, I do not despair of seeing Agricultural chemistry introduced into our national system of education. But from the very nature of things, anything approaching to perfection in the science can never be accomplished, for Nature works by such imperceivable means, as to render it far beyond the reach of human capacity to trace her sublime and undeviating system.

MANURES.

The object of all well-conducted experiments in manures is to clear up doubts for the practical and experienced farmer, and to offer, to the young and unskilful, data, which may enable him to prosecute his labours with more confidence and a greater certainty as to his crop than he would otherwise be able to do. It is with great pleasure, therefore, that we see how frequently the results of various fertilizers are reported in the numerous agricultural works of merit which are continually issuing from the press; and though some, we fear, have seen the light through the instrumentality of those whose interest it is to *puff* into notice and so force a sale of the various inorganic materials in which they may deal, yet some are beyond any shadow of suspicion, and should be attentively considered by every farmer who is desirous of attaining eminence in his profession; amongst those latter we may unhesitaingly class the Reports of the various Agricultural Societies, which, under guise of a small premium for grain crops and roots, have been the means of collecting information of the most valuable kind, in reference to the various manures and fertilizers. These reports are too often laid aside by the general reader, as interesting only to the members of the various societies, and of value but in their several localities. That this is a serious mistake we will show by reference to the report of *The Cornwall Agricultural Society,* for the present year, which now lies before us. By reference to it we see that 120 bushels of lime, 6 loads of sand, applied to 2½ acres, first combed, then skimmed and burnt; the seed sown broadcast, so late as the 2nd of November, produced 45 imp. bushels per acre of best white wheat.—That after Swede turnips, the land dressed with 20 loads of dung with a mixture of carweed, sea sand, and earth, and 1½ quarters of bone dust mixed with ashes, applied to the same extent of land, 36 imp. bushels per acre of other wheat were produced from seed sown in February.—That 78 imp. bushels of oats per acre were produced after barley, the land dressed with rich dung and earth mixed in equal quantities, 30 loads per acre, the seed sown on the 5th of March.—That an old lay field, skimmed and burnt, and dressed with 30 loads of dung and earth mixed to the acre, seed drilled eighteen inches apart in the rows, produced 25 tons per acre of Swedish turnips, sown on the 15th of June.—That on 2½ acres of mangold wurtzel, manured with 25 tons of compost dung, and 15 bushels of bone dust, the dung put into the drills and covered by the plough, and the bone dust dibbled in with the seed—drills 2 feet apart, sown the last week in May, the produce was 37 tons, 6 cwt, 20lbs.—That 1½ acre of barley arish subsoiled, manured with 15 loads of dung, and 6 loads of sea weed mixed with earth, the seed drilled 12 inches apart, produced 30 tons of carrots per acre, sown on the 15th of April. All that is wanting to render this very interesting report complete is a statement in each case of the nature of the soil and subsoil; and whether any, and if any, what expense has been incurred in subsoil ploughing or draining?—*The Farmer's Herald.*

CARROTS FOR HORSES.

We were lately told by the proprietor of one of the most extensive livery stables in this city, that he has had an experience of several years in feeding the common yellow carrots to his horses, and that he considers them the most valuable article for winter feed that he has ever used. He considers a peck of carrots and a peck of oats worth more for a horse than half a bushel of oats alone; and for horses that are not constantly employed, the carrots alone are far preferable to oats. He would purchase carrots for his horses, in preference to oats, even if they cost the same by the bushel; the price of carrots, however, is generally about half that of oats. His horses eat the carrots with a far better relish than oats,—so much so, that if a peck of each are poured into the manger, they will eat all the carrots before they taste the oats. When fed constantly on carrots, a horse will drink scarcely a pail of water in a week. The culture of carrots is recommended to our farmers, as worthy of their attention.—*Farmers' Gazette.*

SCOURS IN ANIMALS.—A writer in the Maine Farmer, recommends for this disease, finely pulverized bone. We have never seen it tried, but from the nature of the substances that constitute bone, such as lime to correct the great acidity, and gelatine to smooth the irritated surfaces, it is probable its employment would be useful.