

been considered unnecessary:—the obvious difference in the growth of plants according to the known abundance or scarcity of *humus* in the soil seemed to afford incontestible proof of its correctness.”

“Yet this position when submitted to a strict examination, is found to be untenable, and it becomes evident from most conclusive proofs, that *humus* in the form in which it exists in the soil does not yield the smallest nourishment to plants:” “The adherence to the former incorrect opinion has hitherto rendered it impossible for the true theory of the nutritive process in vegetables to become known, and has thus deprived us of our best guide to a rational practice of agriculture. Any great improvement in that most important of all arts is inconceivable without a deeper and more perfect acquaintance with the substances, which nourish plants, and with the sources, whence they are derived; and no other cause can be discovered to account for the fluctuating and uncertain state of our knowledge on this subject up to the present time, than that modern physiology has not kept pace with the rapid progress of chemistry.”

Respecting the theory that *humic acid* was absorbed by plants in the form of some salt containing the largest proportion of *humic acid*, as for instance the *humate* of *Lime*, or through the agency of rain water, whereby the quantity of Carbon which can be conveyed into plants in any conceivable manner by means of *humic acid* must be extremely trifling in comparison with that actually produced in vegetation:—

“Other considerations of a higher nature,” continues Dr. Leibeg, “confute the common view respecting the nutritive office of *humic acid* in a manner so clear, and conclusive, that it is difficult to conceive how it

could have been so generally adopted.”

Fertile lands produce Carbon in the form of wood, hay, grain, beets, and other kinds of growths, the masses of which differ in a remarkable degree. Dr. Leibeg ascertained by measurement that 40,000 square feet of forest land with an average soil, bore 2,650 lbs. Hessian weight, of Fir, Pine and Beech wood; that 40,000 square feet of meadow land bore 2,500 lbs. of hay—that 40,000 square feet of corn land gave from 18 to 20,000 lbs. Beet, or, 2,580 lbs. of Rye Straw, and that the

2,650 lbs.	gave	1007 lbs.	of Carbon.
2,500 “	“	1008 “	“ “
20,000 “	“	936 “	“ “
2,500 “	“	1020 “	“ “

The Carbon contained in the leaves and fine roots of the Beets was not included in the above calculation. He therefore concludes from those incontestible facts, “that equal surfaces of cultivated land of an average fertility produce equal quantities of Carbon,” although the growth of plants from which it is obtained are very different.

“Let us now enquire, whence the grass in a meadow, or the wood in a forest receives its Carbon, since neither manure or Carbon have been given to it for nourishment! and how it happens, that the soil thus exhausted, instead of becoming poorer, becomes every year richer in this element!

A quantity of Carbon is taken away every year from the forest, or, meadow in the form of wood, or, hay, and, notwithstanding, the quantity of Carbon in the soil augments, it becomes richer in *humus*.

It has been said that the Carbon taken away in the produce of cultivated lands is replaced by manure. But such lands yield no more Carbon than the forest or meadows, where it is not replaced. “It cannot be