promoted the advancement of agriculture. If we cannot adopt the "mineral theory" of Liebig in full, we must at least give him full credit for having done more for promoting a knowledge of the true art of culture than any other man.

Before his time agriculture derived little aid from science, and he is entitled to the credit of instituting a new era in its progress.

In reference to the "mineral theory," I may say that in some lands in Europe, cultivated for one or two thousand years, there must have been large amounts of the mineral constituents of plants taken from the soil. Our Maryland soils, however, are not yet in this exhausted state, and are only deficient in one or two constituents. The very fact that lands have been so long cultivated in Europe, without in many cases other manures than those made from them, (with the exception of lime, and within the last one hundred years gypsum,) proves the existence in soils of large supplies of the minerals required.

A few of these, however, are exhausted by crops under constant cultivation more rapidly than they can be prepared by the natural chemical changes in progress.

A careful study of the subjects connected with the "mineral theory" brings us to this conclusion: *that if a soil naturally contains or be supplied with every mineral essential, in such states as to be available to plants, they will flourish to a certain extent.* The atmosphere will supply carbon, hydrogen, oxigen and nitrogen, in sufficient amount *for a normal or natural growth.* But this does not satisfy the wants of man crowded into populous countries, and whose very existence depends upon an *abnormal* or excessive growth of crops.

Experience has, in my opinion, demonstrated that this abnormal growth, or in plain English very *heavy crops cannot be raised during long periods of time without supplying the soil with manures containing at least nitrogen or ammonia.* And we may add, also, that if the soil be constantly cultivated it must be supplied with matters capable of furnishing humus and carbonic acid in order to produce *heavy* crops.

Experiments have been made with artificial soils entirely deprived of animal or vegetable matter, but supplied with all the requisite mineral matters in the proper state. Seed planted therein vegetated, and the plants grew and perfected their seed.

As plants existed before animals, the first plants on the earth must have derived all their organic elements from the air and water. After the death of these plants, and the animals that fed upon them, their remains were returned to the soil to aid in the growth of their successors. In this way soils have been enriched from the commencement of organic