

and bears seeds in a normal way, but by the quantity of grain and straw which the acre has actually yielded, and thus reduce it to a mere question of dollars and cents. This difference in object and success of two practical pursuits of similar character, is the more necessary to be observed and fairly to be distinguished, as their identification has principally originated the apparent but erroneous contradictions that have been supposed to exist between the results of practical experience and the laws of scientific agriculture. A soil which contains all the requisite nutriments for plants but ammonia, or such matters as are capable of producing ammonia, is, as to its productiveness, equal to a soil which contains all the nutriments without exception, but its mineral constituents in a state of combination which makes them unfit for ready action. Plants growing upon the one are solely referred to the supply of ammonia from the atmosphere, and the progress of their development must therefore be in a strict ratio to the quantity of ammonia thus furnished to them; whilst the growth of the plants upon the other soil, rich in ammoniacal compounds, must necessarily depend on the advancement of the degradation of its mineral constituents, and is consequently in proportion to the quantity of soluble salts, which become liberated by this process. Now, if direct experiments have shown that the plants on both soils will once reach maturity and become normally formed, it certainly proves that there is enough of ammonia in the atmosphere to support vegetable life, and that beyond doubt, the ammonia of the atmosphere takes a specific part in the nutrition of plants generally. But there is, at the same time, no reason to suppose that this result of observation, because true in itself, should dictate the rules for practical operations unless scientific agriculture be contradictory to practical farming. If this result is, in fact, of no applicability in practice, it merely proves that the development of plants should not be made dependent on the supply of the necessary substances, but that, on the contrary, an abundance of the necessary substances should at once be offered to the plants, in order to enable them to regulate themselves their supply, according to their state of development; a conclusion which relates most particularly to the plants we cultivate, inasmuch as they have to reach maturity within a certain period of time, or will fail entirely to do so. The spirit of Liebig's mineral theory, against which this objection has been repeatedly raised, makes in no wise the fertility of a soil dependent on its mineral constituents exclusively, nor does it attribute to them any preponderance over ammonia in re-