any experimental proof whatever, that the humus of the soil constitutes the chief source. These and other opinions were unfortunate and through the high reputation of Davy were accepted, and retarded the growth of the science for some years. His emphasis of the importance of the physical properties of soils with relation to soil moisture and temperature, was important and laid the foundation of what has developed today into the department of soil physics.

Up to this time experiments had been confined to either the laboratory or to small pots. However, about 1834 Boussingault commenced field experiments on his farm at Bechelbronn in Alsalce. He followed the quantitative methods of De Sausseure—used definite quantities of manures of determined composition and analysed the crops obtained. He determined the composition of crops at different stages of growth and the effect of manures upon their nitrogen and ash content.

A great deal of work was being done by other investigators but no conclusions of note were arrived at and no very great interest taken in plant growth.

This continued till 1840 when Liebig in his famous report to the British Association aroused the scientific world by bitter attacks on plant physiologists for their inaccurate and untrustworthy experiments and their failure to familiarize themselves with the accurate work of chemists, and censuring them particularly for clinging to what he considered the antiquated theory of humus as the source of the carbon of the plant. Liebig's invective and scorn laid the humus theory low, although it must in fairness be said, that no evidence has to this day been experimentally obtained to preclude the possibility that part of the plant carbon comes from the soil humus. Liebig's experiments which he published in his famous textbook "Chemistry and Its Application to Agriculture and Physiology" led him to the following conclusions: (1) Hydrogen and oxygen of the plant come from water. (2) Nitrogen comes from soil ammonia. (3) Certain mineral substances are essential as the alkali metals, phosphates for seed formation, and silicates for grasses and the straw of grains. (4) The composition of the ash indicates the needs of the plant, the mere presence in the plant being sufficient to indicate its essential character. (5) The good effect of lime and of cultivation is due to these facilitating the weathering of soil particles which is necessary in order to make the alkalies available. (6) In order to keep a soil fertile all that is necessary is to return to the soil the nitrogen and the mineral constituents which the crop has removed Liebig expanded this idea still further, and stated his belief that when sufficient crop and soil analysis have been made, it would be possible to draw up tables by which a farmer, from a soil analysis, could be told exactly what mineral constituents he must add to make his soil suitable for any given crop. And patent manures were even made up and placed on the market. The production of crops had at last apparently been reduced to a mere matter of soil analysis by a chemist. Dame Nature had at last been cornered by a German chemist and ordered to throw up her hands and surrender. Liebig should have waited long enough to actually witness the act of surrender on the part of the wily and elusive old dame. Instead he seems to have fallen into the German error of supposing that having placed her in what appeared to be a very embarassing position from which there was no apparent path of escape, she must of necessity surrender. At any rate he wrote all about the surrender in a book which passed through several editions in a short time. Here he insisted on the ability of the chemist to solve entirely the question of soil fertility by quantitative analysis. The determination of the constituents, particularly the alkali metals and phosphorus content of soil, would determine the soil deficiencies which could then be supplied by the proper application of Liebig's patent manure. It sounds like the prospectus literature of a modern oil company. Unfortunately for Liebig's mineral theory Mr. Lawes, afterwards Sir John Lawes, had just commenced his agricultural experiments at what was destined to be the most celebrated experimental farm in the whole world—the Rothamsted farm. Lawes, judging from his own experience, felt that many of Liebig's contentions were not