

and also to examine and, if necessary, analyze specimens of each kind of mail, or other vegetable or mineral deposit, that may come to his knowledge, in order that his instructions may be of more practical utility."

The law in this section was not sufficiently explicit. Its letter could have been carried out, and not one single fact of practical value elicited. The farmer would have been as ignorant of the composition of his soil, of its defects, and of the manure necessary to supply these defects, as if it never had existed. The mere performance of an analysis would have been of no use, unless it could have shown the *quantity*, as well as the mere presents of the several constituents of a soil.

A qualitative analysis could have shown the latter, and done no good. A quantitative analysis was wanting, to show, not only the presence of the different substances necessary to a fertile soil, but at the same time to determine their quantity, to define their proportion, to see whether they existed in sufficient quantities to produce a crop, and to enable the farmer to supply any deficiency which might exist by the application of the particular substance or substances wanting. The quantity of the substance to be applied, depends, of course, upon the quantity of that already present, which can be shown only by a quantitative analysis. A qualitative analysis would have conformed to the letter of the law. This would have been of no use. A quantitative analysis only could carry out its spirit, which I have done in all of my operations, though it takes ten times the trouble, care, and labor, of a qualitative analysis. Another great defect of the law is, that sufficient time is not given to carry out its provisions. The quantitative analysis of a soil is said by Parneill, an analytical chemist of the highest authority, to be "the most difficult and tedious of all analytical operations." All who are at all familiar with chemical research, know the great care, labor, and time required to perform it. The utmost attention must be given to each step in the process. The most exact and cautious manipulation is necessary to avoid all sources of error, and its termination cannot be hastened, except at the expense of its correctness. Many different varieties of soil and mail had to be examined in some of the counties, which would take more time, of themselves, than that allowed by the law to remain in them; but, besides this, the different parts of each county had to be visited in person, a suitable place to be obtained for the erection of the apparatus to perform the analyses; lectures to be delivered in the different districts, and a report to be written; and, in addition, numerous enquiries by letter, for information, had to be answered; all in the short space of six weeks. Those, who attentively consider the nature of the duties to be performed, and the time allotted for them, cannot fail to be struck with its total inadequacy to that end. To have gone over some of the counties, in the time which the law allowed, would have been useless to the farmers, and have produced no present or future