ever, over and over again, that, judiciously used, a profit may be obtained from fertilizers. The question is net merely one of increasing the yield, but of obtaining the maximum yield at the minimum expenditure. In many instances an increased yield has been obtained with the cost of the fertilizer exceeding the value of that increase. Profits, therefore, are to be regarded in this work rather than yield, though naturally the two are as a rule closely associated. Fertilizers appear to pay best on high-priced crops, such as potatoes.

The best returns from fertilizers, that is the largest profits, do not necessarily result from excessive or even very large applications of fertilizers. In our experimental work, many ef the largest profits have resulted from comparatively small dressing from 300 to 500 pounds per acre. This points to the conclusion that the function of fertilizers is to raise the small  $\mathfrak{g}$  pervision of scalable plant food in the soil rathor than to increase materially the amount of the *total* plant food therein contained. If future work confirms this conclusion, the availability of the elements in the fertilizer is a matter of even greater importance than we at present deem it. It would seem from our work that it would be altogether too expensive to try to build up a soil, to materially increase its percentages of the elements of plant food, simply by the use of fertilizers.

## A COMPLETE FERTILIZER DESIRABLE.

Our experiments with fertilizers have included trials with various forms ef nitrogen, phosphoric acid and potash, singly and in combinations. Nitrate of soda alone and applied as a top-dressing early in the season has frequently proved beneficial for hay and grain crops on soils poor in available nitrogen. Similarly, superphosphate has occasionally given a good response on turnips and basic slag on old pastures. But in the larger number of instances, and more particularly on corn and roots, including potatoes, we have found it mere profitable to use a complete fertilizer, that is, one furnishing nitrogen, phesphoric acid and potash. We therefore are of the opinion, in general practice and unless there are special considerations, that it is wise to use a complete fertilizer; experience has shown that such entails less risk of failure.

## NITROGENOUS FERTILIZERS.

Probably the chief crop among those receiving fertilizers is that of the potato, and most of our recent work in this connection has been done primarily on that crop. The largor number of the experiments have shown that for the potato the nitrogen is best applied partly as nitrate of soda and partly as sulphate of animonia. This permits of a more or less continuous supply of nitrogen throughout the growing season. On land in fair cendition, as for instance one prepared by ploughing under a good clover sod which has been list investor of 75 pounds nitrate of soda and 75 pounds sulphate of ammonia per re, marks the approximate maximum dressing that can he given with profit.

Organic forms of nitrogen, such as fish waste and tankage, are more particularly useful on moderately heavy, warm, moist soils, promoting growth more especially during the latter weeks of the season. Hence, they are not ideal forms when a quick response is required in the spring or early summer, hut are better suited for longseasoned crops. A cold, wet spring retards their nit.ification and in some seasons their nitrogen may not become available till well on in the summer when the crop has passed the period of its chief vegetative growth. Similarly, they may be comparatively dormant in light soils during seasons of drought. More work, on different types of soils and under various seasonal conditions, is necessary before final conclusions can be reached as to the role and comparative value of these organic forms of nitrogen, but this much may be said that in several instances in which no appreciable response

1