while, if the same soils are inoculated with cultures of these bacteria, tubercles are formed abundantly and a large assimilation of nitrogen takes place. It will be remembered that in Dr. Pugh's experiments the soils were ignited and washed to remove nitrogen compounds; in other words, he worked with *sterilized soils*, and, of course, obtained no assimilation of nitrogen. At that time the developments of modern bacteriology were undreamed of and the experimenters had no suspicion that by thus treating the soil they were radically altering the conditions of the experiment. It is still true that *under the conditions of their experiments*, plants do not utilize free nitrogen. What recent experiments have shown is that the conditions of their experiments were not those which prevail in nature. Another thing which is strikingly brought out by these more recent results is the fact that any belief regarding natural phenomena, which is widely prevalent among intelligent tillers of the soil is extremely likely to have some basis in fact, and that it is not safe to ignore the minute, if not always accurate, observations of the agriculturist. His belief may not be true in the form in which he holds it, but it is altogether likely that it contains at least the germ of a truth.

A paper by Nobbe and others, recently published, gives some additional points of interest regarding this most important agricultural process. For example, the methods of obtaining pure cultures of bacteria which are in use by the bacteriologist were successfully applied to these organisms, and plants grown in sterilized soils inoculated from these pure cultures developed tubercles and assimilated free nitrogen.

Perhaps the most interesting result however, was that the tubercles of leguminous plants are in all probability produced either by different species of bacteria or by different modifications of the same species, and that, for example, the bacteria of the pea failed to produce tubercles upon the lupine and *vice versa*.

In conclusion, a word may not be out of place as to the agricultural importance of the activity of these minute organisms. Nitrogen is not only indispensable to the formation of all organized tissue, but, agriculturally speaking, is the most costly and the most elusive element of plant food with which the farmer has to deal. Like the poet's gold it is "Heavy to get and light to hold." By leaching and drainage on the one hand it escapes into the rivers and the sea, and by fermentation and volatilization on the other hand it finds its way into the air, while its replacement in the form of fertilizers makes large demands on the farmers pocket-book. Indeed, from the standpoint of fifteen years ago, it seemed that the destructive forces had the upper hand, and that the stock of combined nitrogen in the world was steadily diminishing.

With our present knowledge the case is reversed. The world's supply of available nitrogen, instead of being a limited and perhaps diminishing quantity, is practically illimitable. In this, as in other cases, we are coming to recognize in these invisible organisms not only the deadly foes which give rise to consumption, cholera, yellow fever and other infectious and contagious diseases but, as well, the friends to whose activity we are indebted for many of the luxuries and even necessaries of life.

THE COLLEGE STUDENT AND READING.

In the newer college courses where a large part of the students time is absorbed with mathematical studies, and their application in laboratory work, reading is likely to be neglected.

I do not mean novel reading or even newspaper or magazine reading, but the loftier expression on the profound questions of life, that are found in only a few books, comparatively. While I do not think of suggesting a long list of books which a young man would be expected to wade through, as a duty, yet there are some authors whom he should read for the inspiration and the new awakening of the imagination which they give. Perhaps few authors are more provocative of thought