

per, asbestos and iron have been found, and now and then a gleam of gold excites and encourages the worker.

A question which bears with great importance upon the phosphate industry is, whether Apatite in its crude state is effective as a fertilizer. The usual method of treatment is to grind it and mix it with an equal quantity of sulphuric acid, by which it becomes superphosphate and is used as the basis for all manufactured fertilizers. By this treatment it becomes soluble in water and thus is more readily available for plant food. But many chemists state that after being placed in the soil the superphosphate reverts and becomes insoluble again, so that all the expense is gone to for a few hours or day's benefit, or, even if it continues soluble, a great portion is washed into the sub-soil or carried away by the rains; whereas, if very finely ground and placed in the soil, the acids of the earth and plants gradually act upon it and make it serviceable by degrees, so that in the end it confers a greater benefit. A great deal of testimony has been obtained in favor of the value of the crude phosphate, especially when used in connection with stable manure; and, if this fact can be established, it will secure to the farmer a reduction of one half of the cost of fertilizers and will enormously increase the use of phosphates, as, apart from the lessened expense, people feel more confidence in the use of a natural product than they do in a manufactured article, owing to the suspicion of adulteration that unfortunately has been warranted by experience.

The question of the origin of Apatite has long vexed the minds of geologists, some of them favoring the theory of its having been ejected from below by volcanic forces, others favoring the idea that it has been deposited by water, while others think that it has been formed in its present position by extraction from the surrounding rocks. Dr. R. A. F. Penrose, Jr., in his monograph on phosphates published by the U. S. Geological Survey, after long examination of the Canadian apatite veins, inclines to the latter opinion. The surrounding "mother rocks" are found, more or less, to contain phosphate of lime disseminated through-