The Value of Careful and Complete Analysis of Rocks and Minerals.

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This short paper is a plea for an extension of this laborious work, engaged in by too few chemists, mineralogists, and lithologists—too few, because the field of investigation is so vast and the labor involved is so enormous that a large army of enthusiastic, patient toilers is required to carry it on.

I am using the words "rocks" and "minerals" in their scientific sense, a *rock* being defined as the material composing a layer, vein or other distinct part of the earth's crust, and a *mineral* as a more or less distinct chemical species found as a constituent of rocks. In the analysis of rocks it is possible, by taking advantage of differences in specific gravity, to separate the constituent minerals from each other before submitting them to chemical analysis. The minerals composing a rock can also be identified by examining thin sections under the microscope. The identification is aided by characteristic changes in appearance produced by addition of chemical reagents. Valuable information can be obtained by these and similar methods, the object of which is the identification of the minerals composing a rock; but this information must be supplemented by complete qualitative and quantitative analysis of the rock in order that our knowledge of its character may be complete. Such analysis involves an amount of labor which deters, no doubt, most chemists and mineralogists from devoting themselves to its pursuit. A man cannot do very many of them in a year. It may take the analyst six months to complete a research the results of which can be stated in a few lines of print.

I shall attempt briefly to show that such work pays both commercially and scientifically. The economic importance of minute chemical analysis of iron ores and fluxes is recognized by those engaged in the manufacture of iron and steel The properties of iron are so profoundly affected by even very small quantities of sulphur, phosphorus, manganese,