

a sincere attempt to summarize in a comparatively small number of pages, matter culled from some thousands of pages of reports, bulletins, transactions, etc., most of which are only to be found in the great public libraries.

The book deals also with the individual experimental work of the author and his associates. This work was highly special and concerns only a few points in a very complex matter, but the results are offered for what they are worth. The author believes that they have definite value as settling one or two questions and casting light on some others on which opinions have been at variance.

ORIGIN AND COMPOSITION OF COAL.

The generally accepted theory of the formation of coal is as follows:—Vegetable matter of all kinds, but particularly the remains of ancient Equiseta such as Calamite, and Lycopods such as Lepidodendron and Sigillaria with their huge root-like stigmata, accumulated in thick layers and became massed together under conditions approximating those of swampy jungle of the present day. Eventually this vegetable matter was covered by the deposition of silt and mud, and this in turn by other stratified deposits often of great aggregate thickness. Through the agencies of heat and pressure in the earth's crust, the mass was next subjected to some sort of destructive distillation involving a gradual loss of water, oxygen and other constituents and resulting in the slow formation of coaly material, approximating more and more to pure carbon as time passed on. Anthracite is the last product which may be termed coal, further action of heat and pressure producing graphite. A coal which has arrived at the anthracite stage, will thus have passed through all the other stages during its formation: that is, first growing plants, then peat, lignite, bituminous coal and anthracite.

A great deal of light has been cast on the origin of coal by the study of thin sections under the microscope. By this means the original vegetable forms have been identified and studied, and the coaly material has been shown to consist very largely of accumulations of spores altered of course by heat and pressure, but still perfectly distinguishable.

Quite recently a very interesting contribution to this branch of the subject has been made by Lomax,¹ who has studied coals microscopically with especial reference to their liability to oxidation and spontaneous combustion. Still more recently a most valuable general work on the origin of coal has been published by the United States Bureau of Mines.²

As might be expected from its formation, the chief elements occurring in coal are also those which went to make up the plant body, although the proportions of course do not correspond, since the process of the formation

¹(A). The Microscopical Examination of coal and its use in determining the inflammable constituents present therein. T. I. M. E. Vol. XLII, 1914, p. 2.
(B). Further researches in the microscopical examination of coal especially in relation to spontaneous combustion. T. I. M. E. Vol. XLVI, 1914, p. 592.
²The Origin of Coal, by David White and Reinhardt Thiessen—with a chapter on the formation of peat by C. A. Davis. Bull. 38, U. S. Bur. of Mines, 1913, pp. 1-304 and 54 photographic plates.