

Classification of  
analyses.

Analyses of coal may be divided into three classes ; (a) practical analyses in the large way, or the determination of the proximate constituents of the coal, that is, the moisture, volatile matters, coke and ash, by burning a large quantity ; (b) proximate analyses in the laboratory, or the result of the drying, coking, and incineration of a few grains in a small crucible ; and (c), ultimate analyses, being the careful determination of the ultimate elements of a coal or other fuel, such as carbon, hydrogen, oxygen and nitrogen ; the class (c) being, of course, the most satisfactory for calculations of the theoretical value of a coal.

Of the analyses now given, by far the greater number belong to the second class, (b) in which may be included all those made in the Survey laboratory, as the great expense and amount of time necessary for their completion has rendered both practical and ultimate analyses out of the question. Although far from satisfactory as accurate *measures* of the true value of coals, the crudest analyses enable us to form some idea of their character, and, in the absence of practical trials, furnish us with elements on which to base an approximate opinion as to what practical service they are best fitted to perform.

Method of  
analyses.

The method of analysis pursued in the examination of the samples of coal obtained in the Pictou coal-field by myself, was somewhat as follows : Drying in a water-bath at a temperature of  $212^{\circ}$  Fahrenheit, to expel moisture ; heating to bright redness in a closed crucible to obtain the percentage of volatile combustible matter ; and finally incineration in an open crucible to obtain the amount of ash. In most cases two different samples of each coal were examined, one being coked by a sudden application of a high heat, to obtain the largest possible amount of volatile matter or *gas*, irrespective of its character, the quantity of coke being thus reduced to a minimum ; while in treating the second, the heat was applied with the greatest care, and raised very gradually, by which treatment the gases obtained are more highly carburetted, and in smaller quantity than when the heat is suddenly applied. In a few cases, determinations of sulphur have been made, but from this impurity the greater part of the coals now worked in the Pictou region are quite free. The general very light colour of their ashes attests their freedom, when properly selected, from sulphur in combination with iron, as *pyrites*, and among the coals examined, the ashes of but few contain an appreciable amount of sulphate of lime, being generally very silicious or sandy in the best coals, and therefore not inclined to form a clinker adherent to the grate-bars. No full analysis of the ashes of any of these coals has yet been made, so far as I am aware.

Theoretical  
evaporative  
powers.

The calculations of the *theoretical evaporative power* of the different coals analyzed, are based upon the fact, that in burning bituminous coals of the class under consideration, in an ordinary furnace, such as has always been

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