

1886

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Recommended Citation

Dodge, J. A. (1886). Some Analyses of Northwestern Coals. *Journal of the Minnesota Academy of Science*, Vol. 3 No. 1, 96-97.

Retrieved from <https://digitalcommons.morris.umn.edu/jmas/vol3/iss1/14>

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[Paper N.]

SOME ANALYSES OF NORTHWESTERN COALS.—J. A. Dodge.

[ABSTRACT.]

After a review of the methods of analysis of coal usually followed, namely, the method of *ultimate analysis*, whereby the carbon, hydrogen, oxygen and nitrogen are determined as elements by the processes of "organic analysis," and the method of *proximate analysis*, whereby the volatile matter, fixed carbon and ash are determined by a process of destructive distillation and subsequent combustion in the open air, and after the exhibition of certain tables showing the ultimate and proximate analyses of various well-known kinds of coal made by a number of well-known chemists at different times, the paper proceeded to the special consideration of some analyses recently made at the chemical laboratory of the University of Minnesota, by the author and by others, of some piles of coal received from officers of the Northern Pacific Railroad Company. A table of a few of these analyses is here given :

	Molature.	Volatile Combustible Matter.	Non-volatile Combustible Matter.	Ash.	Sulphur.
"Fort Benton" coal.....	2.23 %	25 25 %	65.68 %	6.03 %	.81 %
"Falls of Missouri".....	6.50 "	27.16 "	59.85 "	5.79 "	1.20 "
" " " In blk.	1.22 "	30.53 "	62.19 "	5.90 "	.16 "
" " " "	1.83 "	32.11 "	59.71 "	6.80 "	.05 "
Locality unknown, but from some part of Dakota	9.65 "	22.79 "	64.59 "	1.99 "	.98 "
"Turtle Mountain".....	14.05 "	30.93 "	35.02 "	18.72 "	1.28 "
"Sim.".....	27.01 "	29.23 "	35.61 "	7.70 "	.45 "
"Toston".....	4.69 "	33.87 "	37.93 "	21.96 "	1.55 "

Considering these analyses in comparison with analyses of coals just before exhibited by tables, we see that the first five compare favorably with a number of the bituminous coals, as for example with the Belleville coal of Illinois.

	Moisture.	Volatile Combustible Matter.	Fixed Carbon.	Ash.	Sulphur.
"Belleville" (Ill.) coal..	6.0 %	33.8 %	62.66 %	1.16 %	.85 %

(Analysis by Prof. W. R. Johnson, 1844.)

So far as the chemical, or at least, the proximate composition is concerned, there seems to be little or no reason why several of these coals of the upper Missouri region should not be designated *bi-*

luminous coal, as well as those of the carboniferous age in the locality just referred to. The "Turtle Mountain," "Sims" and "Toston" coals, on the other hand, would fall outside of the ordinary class of bituminous coals in virtue of their composition. Corresponding to the difference in composition between the five whose analyses are here first given and the other three, we observe also differences in physical properties, in aspect and texture. In the "Turtle Mountain" a wood-like texture is very plain; in the "Sims" it is perceptible, though not striking. These are unmistakably *lignites* or brown coals. In the "Toston" coal we have good specimens of the small lumps of resinous matter which is often found in these western coals.

Other qualities of these various coals have to be taken into consideration, besides their composition as learned by analysis, in order to settle their value for domestic use, or for mechanical purposes. Some of these coals crumble very badly when mined, or after exposure to the air, or when thrown upon the fire. Perhaps arrangements may be made for utilizing such crumbling varieties. One thing seems certain, that these coals are destined at some time to be much used in the Northwest. Their discovery in localities where other fuel is scarce has already promoted settlement and business. Their quantity appears to be very considerable, and their distribution quite extensive.

April 7, 1885.

[Paper O.]

SOME ALGÆ OF MINNESOTA, SUPPOSED TO BE POISONOUS.

J. C. Arthur.

The history of the investigation conducted in 1882 for the purpose of ascertaining the cause of a sudden mortality among domestic animals at Waterville, Minnesota, has been given in a former report.* The facts elicited were that quite a number of the animals, largely cattle, had died at a time when the lakes at that place were filled with a minute alga (then called *Riccardia hultans*, but now referred to *Glavotrichia Pisum*), disseminated through the water and forming a thick dark-green scum when

*See vol. II, Bul. IV, Appendix.