CORRESPONDENCE

THE COMPOSITION OF NATURAL GAS.

To the Editor of The Canadian Mining Journal,
Toronto:

Sir,—I note your editorial in reference to my letter in Coal Age, and as my object is to obtain information I will ask you (1) to define the composition of natural dry gas; (2) the composition of wet gas; (3) the composition of the gas given off by heated crude oil; and (4) whether you consider that natural gas results from crude oil in the earth's crust, or from some other source; and lastly if the latter, then from what source it is created?

Yours, etc.,
JAMES ASHWORTH.

921 Drake St., Vancouver, B.C.,
Aug. 29, 1916.

In reply to Mr. Ashworth's several questions we have to say that it is clearly impossible to "define the composition of natural 'dry' gas," as it is neither a definite chemical compound as, for instance, water, nor a mechanical mixture of different elements in constant proportions like the atmosphere. It consists of a mixture of several different gases in very widely varying percentages. Thus some reliable analyses are published showing practically no nitrogen, while on the other hand there is one instance on record of a natural gas containing 98 per cent. nitrogen. Part of the Kansas field, for example, yields a gas containing over 40 per cent. nitrogen, and there is no doubt if our information were more complete we would have instances of every per cent. of nitrogen between 0 and 100. Natural gases containing over 80 per cent. nitrogen are incombustible and of no commercial value. With the other constituents there are also great variations. Sometimes methane is present to over 99 per cent. in amount. In the list of analyses given of Ontario dry natural gases (XXIII Report, Bureau of Mines) the lowest methane is 67.8 per cent. and the highest 93.7 per cent. Ethane varies from 3.3 to 18.0 per cent., propane from 0 to 3.5, nitrogen from 2.8 to 15.8, while fractions of a per cent. or carbon dioxide and hydrogen sulphide appear in some cases. Of course a scrutiny of other lists of analyses would extend all these limits given above.

The same thing applies to "wet" gas—it is impossible to define its composition. In general we may say that the higher members of the paraffin series, such as ethane, propane and butane, which do not appear to exist in "dry" gas in large quantities, are increased at the expense of the methane.

With regard to the composition of the gas given off by heated crude oil, it may be stated that in the manufacture of carburetted water gas in which gas oil is used the average composition of the product is approximately as follows: Carbon dioxide 2.9, heavy hydrocarbons or olefines or illuminants 7.5, oxygen 0.2, carbon monoxide 32.5, methane 13.7, hydrogen 36.2 and nitrogen 7.0. If there had not been any oil used in making the carburetted water gas the result would have been about half hydrogen and half carbon monoxide with a small amount of nitrogen, oxygen, etc. It is seen then that the effect of the oil is apparently to introduce heavy hydrocarbons and methane. Heavy hydrocarbons, it may be remarked, are not found in natural gas. Gas oil is crude oil from which the more volatile constituents have been distilled.

Mr. Ashworth's fourth question as to the origin of natural gas we must confess we are unable to answer. It would take immense space to discuss this. In the volumes of the Canadian Mining Institute will be found very interesting papers and discussions on this subject by Mr. Eugene Coste. It does not appear to us that any progress will be made in solving this question, as long as people are content to propound or accept some theory as to the origin of gas and neglect to find out what it is in our power to ascertain definitely, as for instance the correct composition of natural gas. It is for this reason that we will continue to protest against the acceptance and endless repetition of statements that are now known to be incorrect, such as were contained in the report which we criticized and which Mr. Ashworth defends.

THE COAL DUST PROBLEM

Editor Canadian Mining Journal, Toronto:

Sir,—Referring to Mr. Jas. Ashworth's notes in your journal, Aug. 1, on the writer's paper on "Coal Dust" which was read at the meeting of the Rocky Mountain branch of the Canadian Mining Institute held at Lethbridge, Alta., in April, 1916, the writer heartily thanks Mr. Ashworth. His notes on the paper are very helpful, and it would have given the writer great pleasure to have had Mr. Ashworth take part in the discussion on the paper when it was presented at Lethbridge.

The writer will endeavor to reply to Mr. Ashworth's notes in the order in which they were presented in your esteemed journal of August 1, 1916.

1.—"Adopt the panel system." The writer did not think it was necessary to present any plans or diagrams on this part of the subject, as the panel system is well known and carried out to some extent in the mines of the Crow's Nest Pass. The advantages the writer claims for this method of work are the few inlets and outlets in each panel section, which assists very materially in isolating one panel section from another. There is a solid barrier of coal between each panel which is only perforated by the main and counter entries at the lower end, and there is also one inlet for the intake air and an outlet for the return air from each panel section. If any panel section becomes dusty with coal dust and it is not practicable to moisten the coal dust in the chutes below what is considered to be the point of explosibility, then it is, the writer considers, a decided advantage to be able to isolate such panel section by means of only three inert dust barriers, one on the outbye side of the intake airway off the main entry, one on the outbye side of the counter entry and another one on the upper side of the return airway from the panel section in question. By the above means inert dust barriers would be erected in all roadways leading from one panel section to another.

A mine may be divided into districts in accordance with the Mines Act, but that does not necessarily mean that each district would be a panel section. Separate districts have been and are arranged by simply installing an arrangement of stoppings between one district and another and splitting the air. Should an explosion occur the stoppings would not offer very much resistance to an explosive force, and consequently the explosion would penetrate to every part of the mine. Mr. Ashworth omitted to state whether any steps had been taken to prevent propagation of an explosion in the South Wales mine that had been divided into panels, also whether the panels were separated by means of solid barriers of coal between each panel or simply by means of stoppings.