

MARITIME MINING RECORD

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SELECTED QUESTIONS AND ANSWERS.

GEOLOGY.

Q.—What is pyrites? Where is it found, and what are its characteristics?

A.—Iron pyrites is chemically known as bisulphide of iron or FeS_2 , most commonly called coal brassy. It is a compound of sulphur and iron and certain metals, sometimes called firestone because of its hardness, and capabilities of striking fire under concussion, or because it decomposes spontaneously, developing a considerable revolution of heat.

Iron pyrites is commonly met with in and near to the coal measures. In some districts it is very abundant, but in others it is scarcely met with.

It has numerous characteristics, being a compound of iron and sulphur, and is sometimes used as a source of sulphur in various manufacturing processes, such as sulphuric acid manufacture. If allowed to weather it is converted into copperas or green vitriol. The sulphur of the pyrites will also take up oxygen, and form sulphate and free sulphuric acid.

It is very undesirable in fuel, not only on account of the corrosive and noxious gases it produces, but because the remaining iron which in the form of an oxide fuses with the silica of the coal ash and forms clinkers; in coking and gas making, the sulphur which is in organic combination is converted into bisulphide of carbon through contact with the heated carbon during the process of combustion with a limited quantity of air. When the iron pyrites is found in the shales in abundance it is largely used in the manufacture of alum in the following manner:—The shales are exposed to the effect of rain and moisture, then the iron pyrites is converted into ferrous sulphide, which is a compound of iron and sulphuric acid, and sulphuric anhydride. This sulphuric anhydride acts upon the alumina of the shale, and forms aluminium sulphate, to which either potash or ammonia is added, thus forming alum. This is the double sulphate of aluminium and either potash or ammonia, according to which is used.

In some instances, notably in the Jurassic system on the sea coast of Dorsetshire, the oxidation of the iron pyrites generates sufficient heat to ignite the bituminous shales. These shales are found interstratified in the Kimmeridge clay, and, owing to their richness in carbon, they have been largely used for fuel; the oxidation of the iron pyrites has generated sufficient heat and has set fire to the bituminous shales, which in turn fired the cliffs.

Briefly, the characteristics are—an affinity for

oxygen; an objectionable and offensive odour; it decomposes very readily and develops a considerable amount of heat during such decomposition; it is of an objectionable nature in fuel owing to its clinking propensities, and its destructive action upon the firebricks, etc.; when found in coal seams the quality of coal is reduced owing to its presence.

VENTILATION.

Q.—How would you set about restoring the ventilation in a mine where an explosion of fire-damp or coal dust has occurred? The doors and air-crossings are destroyed, but the fan is intact. What precautions would you take to secure the safety of the working men?

A.—The above question seems to suggest that the preliminaries necessary in cases of this nature, such as communicating with the inspector of mines, calling together the under officials, etc., have been made. One gathers too, that inspections have been made both above and below ground, as the condition of affairs—the doors and air crossings are destroyed, but the fan is intact—both above and below ground are stated in the question. As the question only requires the restoration of the ventilation with safety to the working men, it is unnecessary to say anything here about 'rescue work' as that subject has been much dealt with in this Journal.

One of the first of the many items to be attended to at the surface is to see that medical aid is at hand in case any of the men working underground may be overcome by after-damp or some other accident occur.

The provision of a good quantity of materials necessary for the underground operations should be arranged for, and see that there is a sufficient number of hands at the surface to send the materials down the mine at the shortest notice, and that special persons be appointed for the preparation of the materials being sent down. It would also be necessary to see that the proper persons were stationed at the winding engine, fan engine, pit head and other departments, so that these particular duties would be carried out in a truly satisfactory manner.

Having seen those items carried out to my satisfaction, I would now set abt forming parties of the most practical and experienced men at my disposal. The parties to be made up of four, five, six, or more men. These parties I would divide into two classes, viz., the working parties, and the bearer parties; the working parties to work on the ventilating arrangements, and the bearer parties to convey materials to the scene of operations. The two classes of parties I would again divide into two, three or more shifts.