

of temperature on the rate of oxidation and the effect on the rate of oxidation of variations in the oxygen content of the air current.

Lomax¹ (1911 and 1914) whose work has already been referred to on page 4 studied coals under the microscope with reference to their composition and liability to spontaneous heating. He finds that coals which are particularly troublesome almost always contain dull-looking bands of amorphous material, and he believes that fires usually start in this material which is particularly pulverous. He suggests that these bands may be the result of forest fires at the time that the coaly matter was being laid down. He also discusses the effect of pyrite which he does not consider a primary cause of combustion in most cases. His papers are very interesting and suggestive.

Morris² (1914) discusses the experience of Lydbrook Colliery in the Forest of Dean with reference to underground fires. The seam is particularly liable to spontaneous combustion, and the method of mining had to be modified with a view to meeting this difficulty. Ordinarily the coal or gob took fire about seven weeks after its first exposure, but the length of time depended upon the degree of pressure and also of course upon the amount of very fine material. When the compression was very great so little air entered that little or no heating occurred, but if, even after some months of these conditions, the pressure was reduced or a new way opened up for the admission of air, heating immediately took place. He also notes that material which has once started to heat and has been checked is particularly liable to heat again.

SUMMARY OF CONCLUSIONS.

From the results as set forth by all investigators dealing with the subject of weathering, the main causes seem to be the following:—

- (1) The presence in the coal of complex and more or less unstable carbonaceous compounds such as resins, humus, etc., which oxidize readily.
- (2) The presence of pyrite and marcasite in the coal, these minerals being effective both as disintegrating agents and also as actual sources of heat.
- (3) The presence of moisture, which, whether or not it aids in the oxidation of the coal itself, certainly hastens the decomposition of pyrite which is always present to some extent.
- (4) The physical condition of the coal itself is of vast importance as oxidation is largely superficial, and fine coal, and particularly coal dust, presents an immense surface to the air as compared with an equal quantity of lumps.

¹ (a) "The Microscopical Examination of Coal and its use in determining the inflammable constituents present therein." T. I. M. E. Vol. XLII, 1911, 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.

² "Notes on gob fires, etc." T. I. M. E. Vol. XLVII, 1914, p. 195.