STORAGE OF COAL.

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The main interest in the question of storage of coal lies in the fact that coals, particularly those of low rank—bituminous, sub-bituminous and lignitic—are liable to spontaneous combustion and also to deterioration both in their calorific values and coking propensities. This is due to the fact that coals, especially the types mentioned above, absorb oxygen slowly and in the process, as a result of chemical reactions, heat is generated.

Formerly it was supposed that this generation of heat was due to the oxidation of iron pyrites in the coal and mineral matter and that the latter reaction was responsible for spontaneous combustion. Although the possibility of the effect of this reaction cannot be overlooked in those cases where pyrites occurs in a relatively large proportion and in a finely divided state, yet it can scarcely explain the liability to spontaneous ignition in the case of many coals that are known to be low in that mineral, including many of the Gondwana coals of India. The alternative explanation appears definitely more reasonable and is doubtless the main factor involved.

In the case of Indian coals, the tendency to spontaneous ignition is apparently relatively greater in the case of the Raniganj, high moisture coals, than with the Barakar, low moisture seams.

Although we are not yet in a position to speak with any degree of certainty on the question of the particular chemical reactions that take place gradually in the coal substance during the maturing of a coal seam, yet it appears that, while being transformed from lignites into sub-bituminous and bituminous types, certain complex chemical substances, which are particularly reactive to oxygen, are formed. Further chemical change, into high rank bituminous coals with strongly caking propensities, apparently results in the conversion of these reactive elements into more stable substances and the change towards anthracitisation renders the coal still further immune to oxidation.

Thus we find that the low moisture, well-matured bituminous coals of the Barakar measures of the Jharia, Giridih and Raniganj fields are much less liable to spontaneous combustion than the higher moisture, less matured, bituminous and sub-bituminous seams of the Barakar measures of other fields and of the Raniganj coal measures.

Relatively high moisture appears to be related to the question of spontaneous ignition only indirectly owing to the circumstance that the state of maturity attained by these sub-bituminous and low rank bituminous coals corresponds with an appreciable moisture content.

In connection with the question of spontaneous ignition in ships' cargoes, the data collected by two Commissions in Wales indicate that, apart from the chemical nature of the coal itself, fires may be expected to increase:—

(i) *pari passu* with the tonnage of the cargo and the temperature at which it is loaded;
(ii) with the fineness of division of the coal, and
(iii) with only *slight* ventilation during the voyage.

Also, the Commissions failed to find a single undoubted case of a spontaneous fire in a coal cargo having originated in any other place than under the hatchways, from which it follows that a heap of dust under the hatchways should be avoided.

The question of the liability to spontaneous combustion in Indian coals and of storage, particularly when in a finely ground state, is important in relation to washing and to their use as pulverised fuel. Regarding pulverised fuel, it would obviously be dangerous to store large quantities of the high volatile Raniganj coals for prolonged periods, and the direct firing system in which the pulverising mill and the burner is a self-contained unit may be preferable in many instances to the central grinding system which entails storage.