

large number of official and private investigations. During the last three or four years in particular an exceptionally large number of persons have been at work and scores of papers have been written; but the problem is one of extreme complexity and the great majority of the investigations which have thus far been carried out may be looked on as attempts to study specific aspects of the case rather than to deal with the matter as a whole.

The most important of the early investigations of the behaviour of coal in storage were carried out by Fayol¹ at Commeny in France. His report which appeared in 1878 is full of valuable information, but its most salient feature is the conclusive proof that when a pile of Commeny coal under ordinary conditions has attained a certain temperature (about 100°C.) ~~autogenous~~ or self-propelled oxidation begins. The influences which tend to raise the temperature of coal to this point have engaged the attention of all investigators of spontaneous combustion since Fayol's time.

The senior author of the present volume has been interested for several years in the particular problem of the safe storage of Nova Scotian coal, and to this end has conducted a number of practical experiments both in Montreal and at the mines. He has, fortunately, also been able to assign the subject for four years in succession to one or another of his departmental research assistants, and thus to carry out a considerable amount of exact laboratory work on certain features of coal oxidation. All of this original work is, however, but a fraction of what will have to be done before the problem can be considered finally solved.

This experimental work must, therefore, be looked on merely as a contribution to the general investigation that is being carried on throughout the world, and under ordinary circumstances the account of it should have been published as a paper in the transactions of some suitable technical society. So much public interest has, however, been aroused of late in spontaneous combustion that it has seemed desirable both to the Director of Mines and the author to attempt to present in a single volume a general statement of what is now known on the subject, and a considerable part of the present work is, therefore, a review of the most important papers that have been published on coal weathering.

The author has tried to present this matter in logical sequence, and to state the views of the several writers as fairly as possible, although he has not refrained from comment or criticism where either seemed desirable. He recognizes, however, that his essay is by no means above criticism itself; the literature of the subject is very voluminous, and on the whole very unsatisfactory, and all that can be claimed for the present volume is that it is

¹ Études sur l'Altération, etc., de la houille exposée à l'air. Paris, 1879.

This work has been reviewed and abstracted in English in the following publications:

Report New South Wales Royal Commission on ships carrying coal, 1897.

Review by Tarefall, Jour. Soc. Chem. Ind. Vol. 28, 1909, p. 763.

² This term autogenous oxidation is frequently misunderstood. All natural oxidation is in a sense autogenous, but for coal which has been stored, there is some particular temperature for each particular coal and each particular condition of piling, above which the rate of oxidation is so rapid that the heat of the mass is no longer kept down by natural radiation, etc., but rises more and more rapidly until actual ignition takes place. This matter will be considered at length in another part of this book.