

THE REMOVAL OF CARBON-SULPHUR COMPOUNDS FROM COAL GAS BY WASHING THE GAS WITH OIL (Abstract).— By K. L. DAWSON, B. Sc. (N. S. Tech.), A. M. E. I. C., Superintendent, Gas Department, Nova Scotia Tramways & Power Company, Limited, Halifax, Nova Scotia.

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This address was built around so many lantern slides, graphs and blackboard demonstrations that it is beyond the scope of these proceedings to publish it in full.

The speaker discussed the development of the equipment now in use at Halifax for removing carbon sulphur compounds from the city gas supply. Through the use of this equipment it is possible to utilize about 6000 tons of Nova Scotian coal per annum which could not be used otherwise for gas-making because of its high sulphur content, 1.5 to 2.5 per cent. In addition he described the methods which were used to obtain an explanation of the physical and chemical aspects of the process.

Essentially the equipment exists in two parts, one to bring the gas and the wash-oil into intimate contact over a large surface for the purpose of permitting the transfer of sulphur compounds from the gas to the oil, the other, to bring the used oil into intimate contact with steam heating coils for the purpose of preparing it for further use by distilling off the absorbed sulphur compounds.

Attempts to establish, by means of chemical analyses of the gas and the oil at various points in the apparatus, the relationship between the temperature surrounding the transfer of the sulphur compounds from the gas to the oil and the quantity of sulphur transferred, failed probably because of the extreme smallness of the quantities to be determined. For instance, in the case of the sulphur in the oil no method was located by which the determination of one part in 60,000 could be made.

By blackboard demonstration and graphs Mr. Dawson showed how he developed a mathematical theory for establishing this relationship. This method involves the use of three fundamental laws of physical chemistry, linked together by the procedure of simple algebra, and the method of attacking problems

of this kind advocated by Prof. W. K. Lewis. The laws are Raoult's law of vapor pressure lowering, Dalton's law of partial pressures and the distribution law for dilute solutions.

Using graphs of operating results and lantern slides he indicated that this mathematical theory with formulae built on it, explains all the physical-chemical details encountered and enables the prediction of the results to be expected under given conditions.

From the standpoint of the chemist the absolute accuracy of this mathematical theory has not been proven owing to the fact that he did not have at his disposal a method for determining the minute quantities of carbon-sulphur compounds in the oil. From the standpoint of the operating engineer the theory is alright, because it explains the process and provides a vehicle for studying it; also, the theory has not yet been found wrong in any application of it.