

five-dollar share in the existing company. Formed in 1896 under the auspices of the notorious London and Globe Finance Corporation, Lake View Consols acquired the Kalgoorlie properties known as the Lake View and Boulder East from a colonial company for \$1,100,000 in fully-paid shares. The quotation of the shares was soon soaring to great heights. In October, 1897, an interim dividend of \$2.50 a share was paid, and the five-dollar shares reached \$63 $\frac{1}{8}$. A further \$2.50 was paid in April, 1898. In 1899, \$12.50 per share, or 250 per cent., was paid, and the quotation reached its record mark of \$144 $\frac{3}{8}$. The wild fluctuations of the shares can be gathered from the fact that in the same year the price dipped to \$45 15-16. In 1900, during which \$6.25 a share was paid, the highest price was \$76 $\frac{7}{8}$. At the end of that year came the great Whitaker Wright crash, and on December 28, 1900, the shares were cut down by one fell stroke from \$65 to \$38 $\frac{3}{4}$. In the following year 50 per cent. was paid in dividends, but since then the distributions have amounted in all to no more than \$1.60 a share. The quotation reached its low record of \$1.50 in 1908. Now it is \$3.56.

British coal masters are being driven to a rapid improvement of their methods by the fact that the

days of plenty of coal are drawing to an end in this country as they must do with an annual output of 264,000,000 tons. Coal owners are being forced to open up extremely thin seams, and at the present time a seam of coal is being worked in Lanarkshire which is only 14 inches in thickness. To enable the collier to get at the coal it is "undercut" 5 inches, and so the man is favoured with a space 19 inches wide, in which he has to spend about seven hours per day. To get to his "place" he wriggles, or one may say swims, some 70 yards.

It will be realized that the cost of "getting" coal from a thin seam must be very much greater per ton than from a thick seam, and the problem which the colliery manager faces is how to reduce this cost. The result of studying this subject was, first, the coal cutter and, as a natural complement, the face conveyor. This problem of the coal cutter is largely one of compact and strong gearing, and it will be evident how far this problem is from a satisfactory solution when it is stated that a machine costing, say, \$1,000, may easily take \$500 per annum to keep it in repair. It must be remembered, of course, that a collier is no mechanic, and that from him machines need expect no gentle handling and very little sympathetic treatment.

THE VOLUMETRIC ESTIMATION OF SULPHUR IN IRON AND STEEL.

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(Paper read before the Iron and Steel Institute.)

The methods used in the analysis of iron and steel twenty years ago were largely gravimetric, whereas the majority of those in use at the present time — at least in a works laboratory — are volumetric, although in the estimation of sulphur in iron and steel no volumetric process has yet been discovered which is universally applicable, and the gravimetric process known as the "aqua regia" is still in constant use.

Whether the "aqua regia" or Bamber's method be used, the gravimetric estimation of sulphur is very tedious, and liable to error even in skilful hands. This is proved by the difficulty of obtaining results in agreement from different laboratories on the same sample, although variations in the method of working are probably responsible for some of the discrepancies.

The volumetric estimation of sulphur has received considerable attention during the last few years, and many papers have been written on the subject. Most of the work has been devoted to eliminating the loss of sulphur in the evolution method, generally thought to be due to the formation of organic sulphur compounds instead of sulphuretted hydrogen, on attacking the metal with acid.

Various suggestions have been made with a view to effecting this most necessary result. The chief are as follows: (1) The speed of solution should be as quick as possible. (2) The gases from the evolution flask should be passed through a hot tube to decompose any organic sulphur compounds, and then into an absorption flask. (3) The weighed portion of the sample should be annealed in a non-oxidizing atmosphere before treatment with acid. (4) The acid used to dissolve the metal should be concentrated hydrochloric acid of 1.19 specific gravity.

Schulte¹ and also Phillips² in 1895 suggested passing the gases through a red-hot tube.

In 1902 Walters and Miller³ first suggested the annealing of the weighed portion for analysis before treatment in the evolution flask. They placed the sample in a porcelain boat and heated to bright redness in a tube in a current of hydrogen for fifteen minutes, but if the sample contained an "appreciable amount of titanium," for half an hour.

In the same year Dougherty⁴ made the annealing more practicable, by suggesting the use of a covered porcelain crucible for the purpose, with a piece of filter paper placed on the drillings to provide the non-oxidizing atmosphere.

C. A. Seyler⁵ described his experiences with Dougherty's method, in a paper read before the Society of Public Analysts in December, 1902. He obtained the best results by annealing at 750 deg. C., although he stated that more experiments were required to obtain the best temperature. So far as I am aware, this is the only published instance where the temperature of annealing was measured.

S. S. Knight⁶ modified Dougherty's method in 1904, by mixing the sample with pure iron dust reduced by hydrogen. The mixture was placed in a porcelain crucible, covered with a little more iron dust and an ashless filter paper. The lid was put on, and the whole heated for ten minutes "at the highest heat obtainable by a blast lamp."

In 1906, J. MacFarlane and A. W. Gregory⁷ suggested the use of cream of tartar to mix with the drillings for annealing. They mixed 5 grammes of the powdered sample with half a gramme of cream of tartar, wrapped the drillings in filter paper, placed in a small porcelain