

uniformly hot so that it will not crack. These flasks crack when the least blast of air strikes them, owing to the high boiling points of the oils, but they are rarely broken when using this iron cover made of two deep sand baths.

APPARATUS FOR DETERMINING SULPHUR IN SPENT OXIDE.

BY DR. A. H. ELLIOTT.

The apparatus is a modification of that used by Dr. E. Graefe for determining the volatile sulphur in coal. It consists of a large bottle holding about 8 litres, fitted with a rubber stopper held in place by a flat brass spring



Fig. 4.

slipped on sideways. Through the stopper is a hole to carry a 100 c.c. separating funnel and two perforations for copper wires. One of these wires is short, reaching about one-third down the height of the bottle; the other carries a brass deflagration cup, as used in experiments with phosphorus in oxygen. At a point where the short wire comes near the longer one it is covered with platinum foil and the adjacent deflagration wire is also covered. Between these platinum terminals a connection is made with very fine iron wire, capable of being melted by the current from six dry cells.

Into the deflagration cup put a very little dry cotton wool, then connect the cotton by strands of cotton wicking with the iron at the terminals. Using 1 grm. of dry spent oxide mix it with 1 grm. of a mixture of chlorate and nitrate of potassium (3 to 1) and place upon the cotton. To start the apparatus the bottom of the bottle is covered with a little distilled water, and the bottle then filled with oxygen by displacement. The deflagration spoon and wires are inserted into the bottle, the spring adjusted and the charge fired by means of the battery. The action is immediate and the bottle must be cooled to condense vapours. The separating funnel contains 50 c.c. of 10 per cent. solution of sodium peroxide which is allowed to run into the bottle when it cools. The bottle is washed out and the solution made to 300 c.c. To 10 c.c. of this are added methyl orange and 5 c.c. of dilute hydrochloric acid, and the volume made up to 100 c.c. One grm. of barium chloride crystals is added, the whole allowed to stand 15–30 minutes and the turbidity determined. A table of barium sulphate turbidities is used for the determination. Or the solution may be filtered, the barium sulphate washed, dried, and weighed as usual.

PORTABLE BAR PHOTOMETER.

USED BY DR. E. G. LOVE, CHIEF GAS EXAMINER,
CITY OF NEW YORK.

This photometer consists of a wooden frame-work supporting a platform on which is placed the bar and sight

box, the candle balance, gas pillar, governor, and special small wet meter. The whole is enclosed with opaque-black curtains (not shown in the figure). In these curtains there are openings at the top over the gas pillar and the standard light. The operation of the photometer does not differ from that of any ordinary open bar photometer constructed for a dark room.

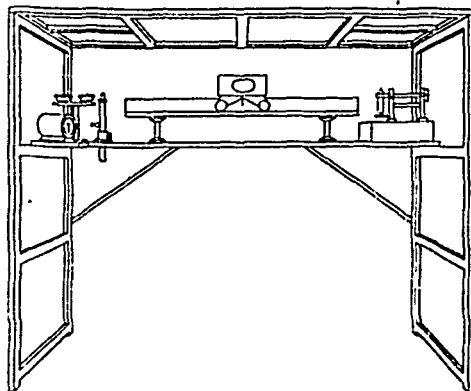


Fig. 5.

Mr. C. H. Stone, Gas Engineer for the Public Service Commission at Albany exhibited an excellent portable photometer and explained its uses. It is very compact when closed and shuts up into the space of a large dress suit case; yet when unpacked and set up in five minutes is a regular working photometer.

He also gave his experiences with the Jenkins sulphur and ammonia apparatus; testifying to its usefulness and accuracy in the case of sulphur and ammonia tests. This apparatus was described in the Journal of American Chemical Society, April 1906, and has been improved by Mr. Stone to include ammonia test simultaneously with the sulphur test.

THE ELLIOTT GAS ANALYSIS APPARATUS.

BY E. C. UHLIG.

Comparative results obtained with the Elliott and Hempel gas-analysis apparatus in my laboratory gave the following results:—

A volume of gas (3 cu. ft.) was taken into a 5 cu. ft. holder; the water in this holder had been standing there for about two years, the evaporation being replaced from time to time, so that the water was as saturated with gas as was possible. Samples of the gas were taken from this holder for both apparatus. These samples were analysed with the following results:—

	Elliott Per cent.	Hempel Per cent.
Carbon dioxide.....	3.6	3.7
Illuminants.....	13.6	13.4
Oxygen.....	0.6	0.6
Carbon monoxide.....	27.0	26.5
Hydrogen.....	20.3	20.3
Methane.....	19.5	18.6
Nitrogen.....	0.4	7.0

The above methane and nitrogen results were calculated from the explosion, using the regular contraction factors. Calculating the same from the residual nitrogen left after explosion and absorption of carbon dioxide and oxygen with sodium pyrogallol, the following figures were obtained:—

	Elliott Per cent.	Hempel Per cent.
Methane.....	19.6	17.5
Nitrogen.....	0.3	9.1

From the residual gas of the Hempel sample 20.2 c.c. of the gas were taken and mixed with 47.0 c.c. of air and