It is important to notice that in obtaining the spectra of metals, the secondary gas spectrum is always present. Thus, by having the gas spectrum immediately above, and on the same plate, the lines due to the gas that might otherwise be attributed to the metal, could be easily picked out. When an intermittent arc, obtained by using a small current, was used, the time of exposure was longer and the secondary spectrum always came up strong, while when a high current was used, the arc remained much more steady and the secondary spectrum was much weaker relatively to that of the metal.

The length of the exposure ranged from 5 to 10 minutes for the metals. The steadier the arc remained, the shorter the time required. When being used, the arc could always be observed through a glass window sealed in the end of the casing of the arc.

The apparatus was connected up to a hydrogen tank so that when not in use it could be filled with hydrogen gas. The hydrogen gas, together with phosphorous pentoxide kept the interior free from moisture.

Results.

With the apparatus described above, the vacuum arc spectra of lead, tin, iron, nickel, cobalt, and thallium were investigated; also the spectra of copper, aluminium, zinc, and carbon, which were studied by Ainslie last year, were repeated, and the wave lengths of lines carefully measured again.

In calculating the wave lengths of the lines of these different spectra, certain lines previously determined were used as standards. From these lines, by means of graphical interpolation, the various lines were carefully measured. In working with a prism spectroscope it is necessary to use quite a large number of lines as standards, in order to get accurate results by graphical means. It is impossible to get results with this instrument by referring to a few standard lines, such as Saunders did using a grating spectroscope. For the region from 1850 down, hydrogen and aluminium lines measured by Lyman, and for the region above 1850, carbon monoxide by Lyman, and copper and thallium lines by Eder and Valenta, were used.

Copper.

The copper vacuum arc spectrum was obtained by using a current of about 9 amperes. With this current the arc was almost continuous. The results obtained agree fairly well with those of Eder and Valenta for the region covered by their work and from λ 1750 down they agree with the values of Handke[1] obtained by using a copper spark.

[1] Lyman, Spectroscopy of the Extreme Ultra-Violet, p. 122.