2. NOTES ON THE SPECTRA OF THE PRECIOUS EMERALD AND OTHER GEM-STONES.

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The spectrum of the true emerald consists of a broad pure-green transmission with three (new) very difficult hair-lines in the red. These are (*a*) and (*b*), a close pair near B, on the other side from the ruby-complex, *i.e.*, facing C: the approximate wave-lengths are λλ6805 and 6795; and (*c*) at about λ6330 (very faint). There is also a very hazy wider band between these, round about C.

The spectrum of Cr_2O_3 in a borax-bead contains a hazy band with a fairly sharp edge at λ6800, so that the colour of emerald may be due to chromium: chromium glass does not show this band, nor do beads of vanadium or uranium show anything. Chromium acetate solution shows a similar band, but slightly displaced towards the yellow.

The artificial emerald and the sapphire, either natural or artificial, have no hair-lines in their spectra. This is true also of the following coloured minerals which were examined: Rubellite, red spinel, amethyst, purple fluorspar, blue aquamarine, rose quartz, lepidolite, and topaz, and also purple titanium beads. Blue-green spinel has a broad band in the violet at about λ4550 to λ4600. The artificial emerald is merely a green sapphire (probably coloured with iron as well as titanium), and can thus be easily distinguished from the real emerald: wheras at present there is no satisfactory criterion between natural and artificial sapphires or rubies.

The well-known almandine spectrum has been measured, as the wave-lengths do not seem to have been published: (*a*) Very faint, about λ6150; (*b*) strong, λ5750; (*c*) broad, about λ5300; (*d*) strongest, λ5070 to 5050; and (*e*) very faint and broad, about λ4600.