

## NOTE.

*Waddel's Erecting Microscope.*

By EDWARD M. NELSON.

IN the *Journal* for 1900, p. 115, I drew attention to the fact that Ahrens' device for erecting the Microscope image by means of Porro prisms had been figured and described in the *Journal* for 1888, p. 1020; but it now appears that priority for this idea must be accorded to Mr. Waddel, of Leith, because Brewster, in his *Edinburgh Encyclopædia* (1830), figures and describes Waddel's method of erecting the image by two right-angled prisms, one being placed in front of the objective, and the other in front of the eye-lens; and what is more remarkable, there is also a figure of a single prism, cut in such a manner as to produce the same effect, thus pre-dating that of Messrs. Zeiss.

I pointed out in the *Journal* for 1898, p. 382, figs. 70 and 71, that this plan of erecting the image by reflection in two planes was as old as the 2nd edition of Zahn's *Oculus Artificialis* (1702), but evidently since then it has been re-invented more than once. On April 5th, 1811, Cornelius Varley took out a patent for a "Graphic Telescope." This consisted of an astronomical telescope, having small power but a large flat field, in which the image was erected by reflection from two plane metal specula. It was by one of these instruments that the sketch of London was made from the top of St. Paul's for the panorama exhibited at the Colosseum, which probably some of us may remember. On December 4th, 1806, Dr. W. H. Wollaston patented his Camera Lucida, and the "Graphic Telescope" may be considered as an effort on Varley's part to improve it.

It is more than probable that the original publication by Zahn, in 1702, of the method of erection by means of reflection had long been forgotten, and it was Wollaston's camera which caused the re-invention of it by Varley in 1811. This gave Waddel the idea of adapting the same principle to the Microscope, and to the publication of Waddel's method in 1830, by Brewster, in a fairly well-known Encyclopædia, may be referred subsequent re-inventions, including that of Porro.