

the "fixed lines," so often above referred to, may be seen in them, and thus the wave-lengths, corresponding to the most conspicuous of these lines, ascertained with great precision. The violet ends of all the spectra are nearest to the central point, and the more distant spectra longer than the nearer, so that at length they overlap and confuse one another by the intermingling of the red end of one with the violet of that next in order.

(1110.) If the apertures of which the grating consists be formed by removing with a graver portions of an opaque varnish covering a glass surface, spectra exactly similar are seen accompanying the image of the luminous point reflected on the anterior surface of the glass from the polished portions laid bare. The same is observed, and with far more brilliancy, when a highly polished surface of metal is furrowed in equidistant parallel grooves by a graver or diamond point (which destroys the polish of those lines), and if the metal be hardened steel, the furrows so formed are transferable by violent pressure to the polished surface of a softer metal, which then in its turn exhibits similar appearances, and thus are produced the "buttons" above spoken of. Mother-of-pearl, too, which consists of exceedingly thin layers of calcareous matter superposed, and agglutinated or otherwise held together; when ground and polished, has these layers, which lie very little oblique to the general surface, torn up at their edges, where they crop out; which remain rough and unpolished, however brilliantly polished the general surface. The polished surface, therefore, is lined all over with