the name of which was similar to that of the tower and city from whence the dispersion had taken place; whilst the inference that the two places were identical, deduced from the mere similarity of their names, is entirely rebutted by the following words of Scripture: "So the Lord scattered them abroad from thence upon the face of all the earth: *and they left off to build the city**," from which the only legitimate conclusion to be drawn is that the City and Tower of Babel were left unfinished, and probably were altogether deserted. The ground of the tradition which has thus improperly connected these three places, may without difficulty be discovered in that vanity with which the history of all nations (that of the Jews, from the nature of its records, forming the solitary exception,) is replete.

XXIV. *Facts relating to Optical Science.* No. I. *Communicated by H. F. TALBOT, Esq., M.P., F.R.S.*

1. *Microscopic Cleavages in Talc or Mica.*

IF a thin transparent film of talc or mica is held in the exterior flame of a candle, it speedily becomes white and opaque, like chalk. This opaque portion is separated from that which remains transparent by a sort of penumbra. Now if we examine this penumbra with a powerful microscope, it is seen to consist of myriads of minute fractures, each of which exhibits the form of a cross. These microscopic crosses are all similarly disposed, and pointing in the same direction. This direction indicates, therefore, the line of least cohesion, or of most easy cleavage, in the crystal, while the opposite arm of the cross indicates another line of a similar nature. Two opposite angles of the cross contain spaces which are a good deal darker than the other two; which shows, if I am not mistaken, that the *plane* of the cleavage is oblique to the eye. This, however, disappears if the crystal is immersed in oil, because the refraction is thereby considerably diminished. It would be desirable to ascertain the position of these cleavage lines with respect to the axis of the crystal.

2. *Optical Properties of Chromium.*

Sulphate of chromium is a liquid which is green by daylight and reddish by candle-light, as was first noticed, I believe, by Sir David Brewster. The cause of this peculiarity is pleasingly exhibited by the following experiment. If a hollow prism of a small refracting angle, as five or ten degrees, is

* Gen. xi. 9.

filled with this liquid and a candle is viewed through it, instead of one, two candles are seen, one of which is red and the other green. It is a very striking experiment, for the rest of the spectrum being wholly absorbed, it in a manner imitates double refraction. Now in ordinary cases, as when this liquid is examined in a bottle, the two images are superposed, and in the day-light the green tint prevails over the red, while the reverse takes place by candle-light, because the green rays are *proportionally* more abundant in day-light than in candle-light.

3. *Purple Crystals from a green Liquid.*

If to a solution of common bichromate of potash be added a mixture of sulphuric acid and alcohol, it is well known to chemists that the liquid changes its colour from yellow to dark green. The compound thus formed is an impure sulphate of chromium. After standing a few hours it deposits an abundant crop of small, roundish, *purple* crystals. It is impossible not to recognise in this variety of colour the same peculiar action of chromium upon light which was the subject of the last experiment, but modified by circumstances, inasmuch as here both colours are exhibited by day-light.

4. *A Body in rapid Motion, yet apparently at rest.*

Let a small object be firmly fastened in front of a mirror; a thread, for instance, tied round the mirror, will do very well for the purpose of exemplification. Let the mirror be made to revolve rapidly, and let the thread be nearly parallel to its axis of revolution, at a little distance from it, however, on one side. Under these circumstances the thread will of course disappear. Now let a candle be placed some feet in front of the mirror, and in the band of light which it causes on the mirror, the thread will be plainly discerned, and apparently at rest.

This phænomenon, which I discovered in the year 1826, caused me at the moment, I acknowledge, the greatest surprise. Yet the explanation of it is easy; for it is only at one fixed period in each revolution that the image of the candle appears to pass behind the thread, and makes it visible. At that period it can, therefore, be distinguished, but only then, for during all the rest of its revolution it is projected against a dark ground, and invisible from its rapid motion. Is not this experiment capable of being applied to some useful purpose? There are many cases in which it might be desirable to see what passes in the interior or immediate vicinity of a body during the time of its being subjected to a swift motion.

Remark.—I have used the revolving mirror for many years as an instrument of optical and photometrical research; but the idea of applying it to determine the velocity of electricity belongs entirely to Mr. Wheatstone. The electrical experiment which I proposed in this Journal was distinctly stated to be founded upon his experiment exhibited at the Royal Institution, only proposed to be tried upon a much larger scale, (*viz.* with a wire of some miles in length,) but since Mr. Wheatstone says in his letter * (which I have only lately seen, having been abroad for some months,) that he had already tried an experiment upon the same principle, I most willingly yield to him the priority of it. It is a trifle, not worth a moment's hesitation.

5. *On the Flame of Lithia.*

Lithia and strontia are two bodies characterized by the fine red tint which they communicate to flame. The former of these is very rare, and I was indebted to my friend Mr. Faraday for the specimen which I subjected to prismatic analysis. Now it is difficult to distinguish the lithia red from the strontia red by the unassisted eye. But the prism displays between them the most marked distinction that can be imagined. The strontia flame exhibits a great number of red rays well separated from each other by dark intervals, not to mention an orange, and a very definite bright blue ray. The lithia exhibits one single red ray. Hence I hesitate not to say that optical analysis can distinguish the minutest portions of these two substances from each other with as much certainty, if not more, than any other known method.

6. *On the Flame of Cyanogen.*

For the opportunity of examining the optical characters of this flame, I am likewise obliged to the kindness of Mr. Faraday, who showed it both to Sir J. Herschel and myself at the Royal Institution. When viewed with a prism, this flame presents a very distinct and peculiar character, separating the violet end of the spectrum into three portions, with broad dark intervals between. But the most remarkable fact is this, that the last of these portions is so widely separated from the others as to induce a suspicion that it may be more refracted than any rays in the solar spectrum, a question which I should be glad to have the opportunity of deciding by direct experiment. This separate portion has a pale undecided hue. I should hardly have called it violet, were it not situated at the violet end of the spectrum. To my eye it had a somewhat whitish or grayish appearance.

* See Lond. and Edinb. Phil. Mag., vol. iii. p. 204.—EDIT.