It is right that I should make this announcement without further delay, as the fact now mentioned necessitates some revision of my view respecting the nature of the impregnating influence, as expressed in the paper alluded to. This I propose to make, and to lay very soon before the Royal Society.

I remain, my dear Sir,
Yours very faithfully,
*Thos. Bell, Esq., Sec. R.S.* GEORGE NEWPORT.

2. "Further Experiments on Light." By Henry Lord Brougham, F.R.S., Member of the Institute of France, and of the Royal Academy of Sciences of Naples. Received March 5, 1852.

The author commences this account of his experiments by remarking, that "it is probable that some may consider the inference to be drawn from the following experiments as unfavourable to the doctrines of my former paper—I think I can explain the phenomena according to those doctrines—but be they ever so repugnant, we are of course in search of truth, and have no right even to wish that the balance may incline one way rather than another, far less to conceal any facts which may affect its inclination."

The leading experiment is this:—A speculum is placed in a beam of light and is inclined so that the reflected rays shall make a small angle with the surfaces. Near the speculum the axis of reflected rays coincides with that of the direct rays, but at a greater distance the two discs are separate. The speculum being placed horizontally across the pencil, coloured fringes appear both on the upper and lower side of the reflected disc. These two sets of fringes are alike in their colours and in the order of their colours, but the upper fringes are narrower than the lower, and they diminish in breadth with their distance from the disc, while the lower ones increase in breadth with their distance. If only one edge of the speculum is in the pencil there are only fringes on one side of the disc.

It appears that the breadth of the fringes is in some inverse proportion to the breadth of the speculum. When the speculum is a triangle with a very acute angle, the broadest fringes, and those most removed from the disc, answer to the points of the speculum where it is narrowest, and they increase regularly towards the point which answers to the acute angle or apex of the speculum. Their form is hyperbolic.

When the edges of the speculum are parallel, the disc near to it is filled with groups of fringes which vary in number, in breadth and in colour, at all the distances from the speculum. At one distance they form only a dark line running through the disc, and this is deep purple when examined closely. At a greater distance the fringes have other colours, and become broader again; and at a still greater distance they emerge into the shadow on both sides of the disc.

The phenomena of reflexion, it is stated, closely resemble those of flexion, as to the fringes, their colours, their magnitude, their variation at different distances from the bending edges, and at different distances of those edges from each other.

A convenient method of examining the variation of the fringes, whether of reflexion or of flexion, at various distances, is to incline the screen upon which they are received, so that it crosses the rays forming the fringes, which are exhibited upon it, at various distances from the edges. The line which each fringe describes being the projection of the line which the rays follow that form the fringe, we can in this manner observe if the course of these rays after flexion is rectilinear or curvilinear, the projection being, generally speaking, a line of the same kind with the original line; and at least never rectilinear if that original line is curvilinear.

If $y=f(x)$ be the line which the rays follow after flexion; $\phi$ the angle of the screen's inclination; $\frac{\sin\phi}{\cos\phi}=m$; and $x^1$ the abscissæ of the line of projection; then its equation is $y=f(\sqrt{1+m^2}\,.\,x^1)$. If the curve of the rays be supposed to be the equilateral conic hyperbola, the radius of curvature in the curve of projection, it is stated, must be less than that in the original line; and so the curvature is more easily discerned by the eye. As under no circumstances of inclination of the screen, and at no part whatever of the course of the fringes could the author perceive the least difference of form from all the other parts, he infers, either that the rays follow a rectilinear course, or that their deviation from it must be very small.

Though the phenomenon seem to indicate a crossing of the rays both in flexion and reflexion, at or near the distance at which the dark or deep purple line is formed, yet the author has never been able to observe that an obstacle placed between that point and the speculum (or the bending edges), made the fringes on the opposite side of the disc at the screen to disappear, but only the fringes on the same side with itself.

Referring to Fresnel's memoir, the author states that the principle laid down in it, "that the dilatation of the fringes depends solely upon the breadth of the aperture," will not afford an explanation of the phenomena described in his former paper respecting fringes formed by edges acting in succession, for he there showed that their breadth and their distances from the direct rays are in the inverse proportion of the distance of the edges; and if the edges are so placed that the rays pass parallel to each other, and not diverging, and the edges are moved to different distances in the same line, *e. g.* horizontally, then their distance from each other vertically being the same, the aperture is the same at all distances of the edges from each other horizontally, and yet the breadth of the fringes is inversely as the horizontal distance. Further, where the edges are not placed in succession, but directly opposite to each other, the breadths of the fringes do not appear to follow the exact inverse proportion of the distances of the edges (that is the size of the aperture), the observed breadths corresponding more nearly with the curve $y=\frac{m}{x}+\frac{m}{x^2}$, $x$ being the distance of the edges, and $y$ the breadth of the fringes.

The author considers that the internal fringes, or those of the shadows of small bodies, called fringes of interference, require a more full examination than they have received in certain respects. As regards the central space and the two deep black fringes or intervals on each side of it, he remarks that no examination with a magnifier, and no inclination of the screen, at all resolves these colours into purple as in the dark line before described. They appear to follow a different law from that of the coloured ones as regards their breadths in proportion to their distances from the pin or other small object, at least if they are caused by interference, and if the effect of interference is inversely as the difference of the length of the rays; for that would give for the breadths the curve $y=\frac{m}{\sqrt{a^2+x^2}-\sqrt{b^2+x^2}}$, which nowise agrees with the admeasurements.

The action of transparent plates on the rays, in bending them, resembles in every respect that of opake plates, except that there being no shadow, the external fringes are not perceived. But the shadow of the edge of the plate is surrounded by two sets of fringes resembling exactly those surrounding the shadow of a hair or other small body placed upon the plate's edge, and following its course, with this only difference, that this shadow of the transparent plate's edge has no internal fringes as the hair or other small body's shadow has.

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## May 6, 1852.

The EARL OF ROSSE, President, in the Chair.

In compliance with the Statutes, it was announced from the Chair that the following Candidates are recommended by the Council for election into the Society:—

Arthur Kett Barclay, Esq.
Rev. Jonathan Cape.
Arthur Cayley, Esq.
Henry Gray, Esq.
Wyndham Harding, Esq.
Arthur Henfrey, Esq.
John Higginbottom, Esq.
John Mercer, Esq.
Hugh Lee Pattinson, Esq.
Rev. B. Price.
William Simms, Esq.
Hugh E. Strickland, Esq.
John Tyndall, Esq.
Nathaniel Bagshaw Ward, Esq.
Captain C. Younghusband, R.A.

A paper was read, entitled, "On Periodical Laws discoverable in the mean effects of the larger Magnetic Disturbances."—No. II. By Colonel Edward Sabine, R.A., Treas. and V.P.R.S. &c. Received March 18, 1852.

From the discussion of the magnetic observations made at Toronto and Hobarton in the years 1843, 44, 45, the author in a former paper adduced evidence of the existence of periodical laws by which the principal disturbances of the magnetic declination appeared to be regulated. Having since had occasion to examine the disturbances of the Declination at the same two stations in the three succeeding years 1846, 47, 48, he states that he had the satisfaction of