

is understood, we shall see that an "even-powered" stress in the surrounding æther is necessarily involved. What I do feel instinctively is that *this* is the direction for discovery, that what is needed is something internal and intrinsic, and that all attempts to explain gravitation as due to the action of some external agency, whether flying particles or impinging waves, are doomed to failure; for all these speculations regard the atom as a foreign substance—a sort of "grit" in the æther—driven hither and thither by forces alien to itself. When, some day, we understand the real relation between matter and æther, I venture to predict that we shall perceive something more satisfying than that.

OLIVER LODGE.

University of Birmingham, March 25.

#### Visual Sensations from the Alternating Magnetic Field.

THERE is no necessity to look to suggestion or other abstruse causes to account for this phenomenon. The electric currents induced in the head are quite sufficient to produce the effect.

As I pointed out in a letter to *The Electrician* on April 22, 1910, electrodeless currents in the body produced by electromagnetic induction from a coil carrying so-called high-frequency currents have been in use in medical practice for some years.

Employing as primary a coil of wire of many turns, and some 2 feet in diameter, carrying high-frequency currents from the discharges of a large battery of Leyden jars, and using as secondary the body and the two arms bent so as to form a circle, sufficient current can be induced in the circuit formed by the arms and body to light a miniature incandescent lamp connected between the two hands, or a sufficient difference of potential can be produced between the two hands to cause small sparks to pass visibly between them when they are held near together.

It is easy to produce the visual flickering effect by passing through the head the current from an ordinary continuous-current magneto generator, such as is supplied with the Evershed ohm-meter. One terminal of the generator should be held in one hand, while a wire from the other terminal should be held in the other hand in contact with a small piece of wet sponge, and the latter pressed lightly on one side of the head just behind the eye. If the generator handle is then slowly turned (and it is wise to turn it slowly to avoid unpleasant results) the flickering effect will at once become very noticeable, and as the frequency of the flicker increases with the speed of revolution, it apparently is connected with pulsations in the current due to the slow revolutions and the few segments on the commutator. The current through the head must be very small, as the bulk of that generated goes from hand to hand through the arms and body.

I first noticed this phenomenon some fifteen years ago when treating myself electrically for neuralgia, but I fancy that the effects of electric currents on vision have been known much longer than that.

Passing electric currents through the head in certain directions also produces a metallic taste in the mouth.

A. A. CAMPBELL SWINTON.

66 Victoria Street, Westminster, March 24.

#### The Angular Speed of Rotation of a Long-enduring Prominence.

THANKS to the note contained in the "Astronomical Column" of NATURE of March 9, my attention has been directed to the very interesting article under the above heading in the January issue of the *Astrophysical Journal*.

The prominence Mr. Evershed describes is the same as that under consideration in my letter contained in NATURE of February 23, and of which disc-spectroheliograms were given in the issue of February 2 in connection with the reproduction of M. Deslandres' address of June 12, 1910. The Meudon spectroheliograms add thus a plate to the series enumerated by Mr. Evershed on p. 3 (*Astrophysical Journal*, No. 1, vol. xxxiii.), and an additional date is further added by the spectroheliogram taken at Meudon on April 15, 1910. Both are beautifully reproduced in the fine memoir forming vol. iv. of the *Annales*

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of the Obs. d'Astr. Physique de Paris, of which M. Deslandres is the author.

The Meudon spectroheliograms seem greatly superior to those accompanying Mr. Evershed's article in the *Astrophysical Journal*, undoubtedly on account of the excellent and original instrumental combination resorted to by M. Deslandres, which aims at the absolute isolation of the central rays  $K_2$  of calcium or of  $H\alpha$  of hydrogen. Comparing the Meudon spectroheliogram of March 21 with what Mr. Evershed says (p. 5) as regards the appearance of the dark formation under discussion, one cannot help being struck by the seeming divergence of the evidence. Mr. Evershed says:—"On March 21 it reappears as a vague and ill-defined dark mass." Further, he states on March 25 that "the northern arm can indeed be faintly traced for a much greater distance in a vast circular sweep towards the eastern limb." Reverting, now, to the Meudon spectroheliogram of March 21, the dark mass is seen of quite immense breadth longitudinally, no fewer than 5 degrees, is pronouncedly distinct in its entire vast extent also latitudinally, shows well-defined western and eastern contours, both convex towards the west, and also shows the narrow extension towards the N.N.E. quite distinctly. This great difference of what the Kodaikánal plate for March 21 shows as compared with the plate taken on the same day at Meudon, creates in my mind a doubt as to the actuality of what Mr. Evershed suggests on p. 6, viz. the disappearance in its entirety of the dark formation between March 25 and 26.

With due deference to the able observer, I venture to say that possibly inaccurate relative setting of first and second slits, along with insufficient dispersive power or other optical inferiority to the Meudon spectroheliograph, has not allowed the Kodaikánal plates to be so sharp and rich in detail as the Meudon plates. This is further suggested by the striking absence on the Kodaikánal plates of many conspicuous dark calcium flocculi, which during those days infested the sun's disc all over, yet, of course, there is the possibility of their temporary absence; but, on the other hand, on each of the successive appearances of the large prominence on the east or west limbs, the formation exhibited the striking feature of a dark, flat cloud hovering over the bright prominence-range along its entire latitudinal extent, as described in my letter, suggesting, therefore, continuity rather than intermittent or "puffing" action. The Meudon plate taken on April 15 clearly shows the re-entry into the disc of the dark formation, with a more acute apex directed towards the west than during the previous transit, and the N.N.E. directed arm is not yet absent as it is on the Kodaikánal plate of April 18.

Incidentally, another exceptional feature of the sun's disc should be mentioned which was strikingly on view during April and May, 1910, viz. the fine circumpolar wreath of dark flocculi in the south. A formation of this kind goes a long way towards explaining the previously puzzling experience of observing for many days in succession prominences at apparently the same position-angles in comparatively low latitudes. These prominences are, as a rule, of the quiescent, brushy, and rather dull type.

ALBERT ALFRED BUSS.

"Barrowdale," 22 Egerton Road, Chorlton-cum-Hardy, Manchester, March 19.

#### The Flow of Thin Liquid Films.

IN the very interesting letter by Mr. W. G. Royal-Dawson in NATURE of March 23 on the above subject, the peculiar character of the stream-lines round a moving air bubble compared with those round a fixed solid obstacle may seem to some to require an explanation. As the writer of the letter offers none, may I be permitted to state what appears to be the cause of the conflicting currents shown in Fig. 4 of Mr. Royal-Dawson's letter?

It is stated that on pressing the cover-glass the bubble seems to increase in size. From this we may conclude that it is in contact with the glass surfaces top and bottom. It will therefore be more or less anchored. The result of this is that if it is to move it can only do so by the formation of new film on the front, or by the old film which is collecting in the rear from the top and bottom of the bubble moving to the front. As water offers