

It is probable that similar phenomena may be seen in many, if not all, bodies which reflect coloured light after the manner of opals. A magnificent specimen of Lumacelli, or Fiery Limestone, from Italy, kindly presented to me by my friend David Forbes, shows two sharp narrow and parallel bands in the red. I have also observed similar appearances in mother-of-pearl. The effects can be imitated to a certain extent by examining "Newton's rings," formed between two plates of glass, in the spectrum-instrument.

June 3, 1869.

The Annual Meeting for the election of Fellows was held this day.

Lieut.-General SABINE, President, in the Chair.

The Statutes relating to the election of Fellows having been read, Mr. Balfour Stewart and Dr. Maxwell Simpson were, with the consent of the Society, nominated Scrutators to assist the Secretaries in examining the lists.

The votes of the Fellows present having been collected, the following Candidates were declared to be duly elected into the Society.

Sir Samuel White Baker, M.A.

John J. Bigsby, M.D.

Charles Chambers, Esq.

William Esson, Esq., M.A.

Prof. George Carey Foster, B.A.

William W. Gull, M.D.

J. Norman Lockyer, Esq.

John Robinson McClean, Esq.

St. George Mivart, Esq.

John Russell Reynolds, M.D.

Vice-Admiral Sir Robert Spencer
Robinson, K.C.B.

Major James Francis Tennant, R.E.

Prof. Wyville Thomson, LL.D.

Col. Henry Edward Landor Thuillier,
R.A.

Edward Walker, Esq., M.A.

Thanks were voted to the Scrutators.

June 10, 1869.

Lieut.-General SABINE, President, in the Chair.

Dr. J. J. Bigsby, Prof. G. Carey Foster, Mr. J. R. McClean, Mr. St. George Mivart, and Dr. J. Russell Reynolds were admitted into the Society.

The following communications were read :—

- I. "Researches on Gaseous Spectra in relation to the Physical Constitution of the Sun, Stars, and Nebulæ."—Second Note. By E. FRANKLAND, F.R.S., and J. N. LOCKYER. Received May 5, 1869.

We beg to lay before the Royal Society some further results of the researches on which we are engaged.

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I. The Fraunhofer line on the solar spectrum, named h by Ångström, which is due to the absorption of hydrogen, is not visible in the tubes we employ with low battery and Leyden-jar power; it may be looked upon therefore as an indication of relatively high temperature. As the line in question has been reversed by one of us in the spectrum of the chromosphere, it follows that the chromosphere, when cool enough to absorb, is still of a relatively high temperature.

II. Under certain conditions of temperature and pressure, the very complicated spectrum of hydrogen is reduced in our instrument to one line in the green corresponding to F in the solar spectrum.

III. The equally complicated spectrum of nitrogen is similarly reducible to one bright line in the green, with traces of other more refrangible faint lines.

IV. From a mixture of the two gases we have obtained a combination of the spectra in question, the relative brilliancy of the two bright green lines varying with the amount of each gas present in the mixture.

V. By removing the experimental tube a little further away from the slit of the spectroscope, the combined spectra referred to in II. & III. were reduced to the two bright lines.

VI. By reducing the temperature all spectroscopic evidence of the nitrogen vanished; and by increasing it, many new nitrogen-lines make their appearance, the hydrogen-line always remaining visible.

The bearing of these latter observations on those made on the nebulæ by Mr. Huggins, Father Secchi, and Lord Rosse is at once obvious. The visibility of a single line of nitrogen has been taken by Mr. Huggins to indicate possibly, first, "a form of matter more elementary than nitrogen, and which our analysis has not yet enabled us to detect*", and then, secondly, "a power of extinction existing in cosmical space"†.

Our experiments on the gases themselves show not only that such assumptions are unnecessary, but that spectrum analysis here presents us with a means of largely increasing our knowledge of the physical constitution of these heavenly bodies.

Already we can gather that the temperature of the nebulæ is lower than that of our sun, and that their tenuity is excessive; it is also a question whether the continuous spectrum observed in some cases may not be due to gaseous compression.

II. "On the Molar Teeth, lower Jaw, of *Macrauchenia patachonica*, Ow." By Professor OWEN, F.R.S. Received April 21, 1869.

(Abstract.)

The intraneural course of the vertebral arteries is limited, in the class *Mammalia*, to the Ungulate Series, and is present in very few of these. Of

* Phil. Trans. 1864, p. 444.

† Ibid. 1868, p. 544.