

VI. During twenty-two hours, evaporation was reduced from 2·123 grms. to ·668 grm., or 68·5 per cent.

VII. During twenty-four hours, the reduction was from 2·460 grms. to ·180 grm., or 92·7 per cent.

VIII. In a period of seventy-two hours, the reduction was from 7·638 grms. to ·917 grm., or 88 per cent.

IX. In seventy hours, the evaporation was diminished from 7·732 grms. to 2·586 grms., or 66·6 per cent.

X. In forty-six hours, the diminution was from 4·973 grms. to 1·647 grms., or 66·9 per cent.

Experiments were also made with single drops of water suspended in loops of fine platinum wire, and placed in the bell-jar filled with dry air; but it was found that the oily film had a strong tendency to leave the drop and run up the platinum wire. In a comparative experiment, in which one of the drops was protected by a coal-smoke film, the unprotected drop lost 90 per cent. of its weight in two and a half hours at 16°·6 C.; whilst the protected drop lost only 37·8 per cent. at 17°·8 C. in the same time. Another drop, protected by a film of coal-tar, lost 37·6 per cent. of its weight in two and a half hours, the temperature being 14° C. in the bell-jar.

It is highly probable that if globules of water without any solid support (like those in cloud and fog) could have been operated upon, the retardation of evaporation would have been still more marked, or perhaps altogether arrested; for in all the above experiments the oily films manifested a tendency to break up and attach themselves to the solid support of the water, leaving the surface of the latter partially unprotected.

The results of these experiments point out a condition of very common occurrence, competent to produce "dry fog," whilst they also explain the frequency, persistency, and irritating character of those fogs which afflict our large towns; inasmuch as some of the products of destructive distillation of coal are very irritating to the respiratory organs, and a large proportion of them is scarcely if at all volatile at ordinary temperatures.

My thanks are due to my pupil, Mr. C. G. Matthews, for his assistance in the foregoing quantitative determinations.

- IV. "Note on the Inequalities of the Diurnal Range of the Declination Magnet as recorded at the Kew Observatory." By BALFOUR STEWART, F.R.S., Professor of Natural Philosophy in Owens College, Manchester, and WILLIAM DODGSON, Esq. Received November 18, 1878.

We are at present engaged in searching for the natural inequalities

of the above range, more especially for any of which the period is between 24 and 25 days. We find strong evidence of an inequality of considerable magnitude of which the period is 24.00 days, very nearly. We have also found preliminary evidence of the existence of two considerable inequalities of periods not very far from 24.65 and 24.80 days. These two appear to come together in about 11 years, but we cannot yet give the exact time of this.

We have not found a trace of any inequality with a period of 24.25 days.

V. "Some Experiments on Metallic Reflexion." By Sir JOHN CONROY, Bart., M.A. Communicated by Professor G. G. STOKES, Sec. R.S. Received November 18, 1878.

In the experiments made by Sir David Brewster, M. Jamin, Professor Haughton, and others, on the light reflected by polished metallic surfaces, the reflecting surfaces were in contact with air; and, as far as I am aware, the only observations which have been made when the reflecting surfaces were in contact with other media are those by Quincke, an account of which is given in "Poggendorff's Annalen," vol. cxxviii, p. 541, and in the "Jubelband," p. 336. He found that he obtained different values for the principal incidence and principal azimuth, according as the reflecting surface of a film of silver was in contact with air, crown glass, flint glass, water, or turpentine, and that the only connexion between the values of these angles and the refractive index of the medium in which the reflexion took place was, that in general with the same metal, the principal incidence and the principal azimuth became less as the refractive index of the medium increased.

I therefore hope that a short account of some attempts that I have recently made to determine the principal incidence for, and the principal azimuth of, the light reflected by polished surfaces of gold and copper in contact with different media, may be of interest.

The experiments are, I regret to say, incomplete, as, finding that my eyes were beginning to suffer, I thought it best, for the present at least, to discontinue them.

I used a Babinet's goniometer, to the arms of which two tubes containing nicols were attached, a vertical divided circle being fixed at one end of each, so that the position of the nicols could be read by a vernier to 5'. The goniometer had, in addition to the horizontal stage, a vertical one, so arranged that the reflecting surface could be placed in the axis of the instrument; toothed wheels, working into a pinion rotating on an axis fixed in one of the arms of the divided circle, were attached to the vertical stage, the position of which could