

PROCEEDINGS
OF
THE ROYAL SOCIETY.

1842.

No. 55.

November 17, 1842.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

The following gentlemen were, by ballot, elected Auditors of the Treasurer's Accounts, on the part of the Society: viz. Martin Barry, M.D., Henry James Brooke, Esq., Robert Brown, Esq., D.C.L., Rev. James Cumming, M.A., and John Thomas Graves, Esq., M.A.

James Scott Bowerbank, Esq., and Charles Towneley, Esq., were balloted for and duly elected Fellows of the Society.

The following papers were read, viz:—

1. Postscript to a paper "On the Action of the Rays of the Solar Spectrum on Vegetable Colours." By Sir John Frederick William Herschel, Bart, F.R.S., &c.

An account is here given of some additional facts illustrative of the singular properties of iron as a photographic ingredient, and also of some highly interesting photographic processes dependent on those properties, which the favourable weather of the summer has enabled him to discover. The author also describes a better method of fixing the picture, in the process which he has denominated the *Chrysotype*, than that which he had specified in the latter part of his paper. In this new method the hydriodate is substituted for the hydrobromate of potass; and the author finds it perfectly effectual; pictures fixed by it not having suffered in the smallest degree, either from long exposure to sunshine or from keeping.

He next considers the class of processes in which cyanogen, in its combinations with iron, performs a leading part, and in which the resulting pictures are blue; processes which he designates by the generic term *Cyanotype*. Their varieties appear to be innumerable, but one is particularly noticed, namely, that of simply passing over the ammonio-citrated paper, on which a latent picture has been impressed, very sparingly and evenly, a wash of the solution of the common yellow ferrocyanate of potass. As soon as the liquid is applied the negative picture vanishes, and is replaced, by very slow degrees, by a positive one, of a violet-blue colour on a greenish-yellow ground, which, at a certain moment, possesses a high degree

of sharpness, and singular beauty and delicacy of tint. From his further researches on this subject he deduces the following conclusions : first, that it is the heat of the rays, not their light, which operates the change ; secondly, that this heat possesses a peculiar chemical quality, which is not possessed by the purely calorific rays outside of the visible spectrum, though far more intense ; and thirdly, that the heat radiated from obscurely hot iron abounds especially in rays analogous to those of the region of the spectrum above described.

The author then describes the photographic properties he has discovered to belong to mercury, a metal which he finds to possess, in an eminent degree, direct photographic susceptibility.

2. "Observations de la variation de la déclinaison et intensité horizontale magnétiques observées à Milan pendant vingt-quatre heures consécutives, le 22 et 23 Juin, le 20 et 21 Juillet, le 26 et 27 d'Aout, le 21 et 22 Septembre, et le 19 et 20 Octobre, 1842," rapportées par Robert Strambecchi, premier élève adjoint.

A letter was also read from Sir John F. W. Herschel on the subject of Photography, addressed to S. Hunter Christie, Esq., Sec. R.S.

November 24, 1842.

FRANCIS BAILY, Esq., Vice-President, in the Chair.

The following papers were read, viz :—

1. "On certain improvements on Photographic Processes described in a former communication." By Sir John Frederick William Herschel, Bart, K.H., F.R.S., &c., in a letter to Samuel Hunter Christie, Esq., Sec. R.S. Communicated by Mr. Christie.

The present memoir, which is a sequel to the last by the same author, is accompanied by a series of photographic impressions illustrative of the chrysotype, cyanotype, and other processes formerly described by him. Some improvements which he has introduced into these processes are given, together with a few remarks on some other points treated of in the former paper, in relation to the influence of *thermic rays* as distinct from *calorific rays* ; the former being rays, which in the spectrum accompany the red and orange rays, which are also copiously emitted by heated bodies short of redness, and which are distinguished from those of light by being invisible. The author thinks they may be regarded as bearing the same relation to the calorific spectrum which the photographic rays do to the luminous one, and would propose to designate them by the term *parathermic rays*. He conceives that these may be the rays which are active in producing those singular molecular affections determining the precipitation of vapours in the experiments of Messrs. Draper, Moser, and Hunt, and which will probably lead to important discoveries as to the intimate nature of those forces, resident on