serve. With this view, the author divides Light-houses into three classes: the first comprising Beacon or Warning Lights, placed in order to prevent the approach of vessels, and which consequently can never be nearer than three or four miles; the second being Guiding or Leading Lights, placed to guide a vessel, and therefore admitting of a very near approach; and the third including those which, according to the respective directions in which they are seen, have both these duties to fulfil. In the first we require great illuminating power, and a long duration of the brightest period, with a small angle of vertical divergence; in the second, less illuminating power, but a larger angle of vertical divergence are requisite, while the duration of the extreme brightness is of minor importance; and in the third, all these properties, namely, great illuminating power, a long duration of the brightest period, and a large angle of vertical divergence, are necessary.

May 11, 1837.

WILLIAM LAWRENCE, Esq., V.P., in the Chair.

Henry S. Boase, M.D., and William Tierney Clark, Esq., were elected Fellows of the Society.

A paper was in part read, entitled, "On the connexion between the Phenomena of the absorption of Light and the Colours of thin Plates." By Sir David Brewster, K.H., F.R.S.

The Society then adjourned over the Whitsun week, to meet again on the 25th instant.

May 25, 1837.

FRANCIS BAILY, Esq., V.P. and Treasurer, in the Chair.

The Rev. William Walton and Richard Westmacott, jun., Esq., were elected Fellows of the Society.

Sir David Brewster's paper was resumed and concluded.

The phenomena of the absorption of light by coloured media have been regarded by modern philosophers as inexplicable on the theory of the colours of thin plates, and therefore irreconcileable with the Newtonian hypothesis, that the colours of natural bodies are dependent on the same causes as the colours of thin plates. The discovery by Mr. Horner of a peculiar nacreous substance possessing remarkable optical properties, of which the author has already given an account, furnished him with the means of instituting a more accurate comparison between these two classes of phenomena. By a careful and minute analysis of the reflected tints of its first three orders of colours exhibited by a single film of the above-mentioned substance, they were found to consist of that part of the spectrum which gives the predominating colour of the tint mixed with the rays on each side of it. In analysing the transmitted beam, bands of the colours complementary to the former are seen, with intervening dark bands; and when the analysis is made with a high magnifying power, the

spectrum is observed to be crossed throughout its whole extent with alternate dark and coloured bands, increasing in number and diminishing in magnitude with the thickness of its plate. In the phenomena of periodical colours there are three peculiarities demanding notice; first, that the dark lines change their places by varying the inclination of the plate; secondly, that two or more lines never coalesce into one; and thirdly, that the colour of the luminous bands in the complementary spectrum are the same as those of the original spectrum when the thin plate is perfectly colourless. The author institutes a comparison of these phenomena with those of absorption as exhibited by a solid, a fluid, and a gaseous body; employing as an example of the first, smalt blue glass; of the second, the green sap of vegetables; and of the third, nitrous acid gas. No connecting link between these phenomena appeared to exist, excepting that both exhibited a divided or mutilated spectrum; but even this common fact has not the same character in both. The nacreous substance described by Mr. Horner, however, in some cases, when the plates were small, was found to produce bands perfectly identical with those of thin plates; while in other cases the bands were exactly similar to those of coloured media. By employing the iridescent films of decomposed glass, the author obtained combinations of films which gave, by transmitted light, the most rich and splendid colours, surpassing every thing he had previously seen among the colours either of nature or of art. These facts have proved that the transmitted colours, though wholly unlike those of thin plates, are yet produced by the same causes, and are residuary, and generally complementary to the sum of the reflected tints. Thus the author has succeeded in completely identifying in their primary features the two classes of facts; the one resulting from absorption, the other from periodic action. The minor points of difference, namely, the uniformity of the bands and tints of absorbing media at all incidences, and the non-appearance of the reflected tints in such media, are endeavoured to be explained by the introduction of several considerations, the complete discussion of which the author reserves for the subject of a future paper. From the phenomena of thin plates, of polarized tints, and of absorption, the existence of a new property of light is deduced, in virtue of which the reflecting force selects out of differently coloured rays of the same refrangibility rays of a particular colour, allowing the others to pass into the transmitted ray; a principle not provided for in either of the theories of light to which the phenomena of absorption are ultimately referable, and furnishing an explanation of certain remarkable phenomena of dichroism in doubly refracting bodies, in which rays of the same refrangibility, but of different colours, pass into the ordinary and extraordinary pencils.

A paper was read "On the hereditary instinctive propensities of Animals." By Thomas Andrew Knight, Esq., F.R.S.

The author adduces, in support of the principle he had advanced in his paper on the economy of bees, namely, that instinctive propensities to the performance of certain actions are transmitted, inde-