santonate of soda on the perception of colours. As is well known, a distinction is drawn between congenital and acquired anomalies of the colour-sense (colour-blindness); of these the first only gives rise to colour-blindness to red or green, while colour-blindness to violet is never observed as a congenital defect. On the other hand, it was supposed that, in the anomalous perception of colour which results from the action of santonin or santonate of soda, we had to deal with a typical case of acquired colour-blindness to violet. The speaker had hence been led to make a number of experiments with santonate of soda on himself, and, apart from the fact that as soon as its action is manifest all objects appear of a yellow colour, had established the following phenomena. The spectrum ceases to be visible on the hinder side of the blue, and not a trace of violet is ever visible; the neutral point, as deduced from closely-agreeing measurements, is situated at wave-length 573—that is to say, exactly at that point which is complementary to the missing violet. The speaker based upon these observations the conclusion that the visual phenomena which are observed after the administration of santonin are not really of the nature of colour-blindness to violet, but can be completely explained by the assumption that the violet rays are absorbed by those media of the eye which have been affected by the drug. Prof. Preyer was unable to agree with the above conclusion, speaking with the experience of the experiments he had himself made with santonate of soda in 1868. The fact that after the administration of the drug the violet part of the spectrum can be seen when it is looked at not directly but indirectly, is opposed to Dr. König's views—that is to say, when its image is allowed to fall upon peripheral parts of the retina. Moreover, Prof. Preyer stated that he experienced a distinct sensation of violet when he had taken the drug while his eyes were closed, and then opened them after the action of the drug had become manifest. He believes that the visual phenomena which accompany the action of santonin can only be explained by assuming that it affects the central nervous system, and that this view is supported by the abnormal gustatory, olfactory, and auditory sensations which are simultaneously observed.—The President communicated some instances of the occurrence of real gustatory and olfactory dreams.

**Physical Society**, January 25.—Prof. von Helmholtz, President, in the chair.—Dr. A. König spoke on the dependence of visual acuteness upon the intensity of light when objects are illuminated by spectral colours, his remarks being based upon experiments made by Dr. Uhthoff. Earlier researches have shown that, for red, yellow, and green light, the visual acuteness increases at first very rapidly, then more slowly, and then finally shows scarcely any further change as the intensity of the illumination is increased; and that the curve of visual acuteness on the abscissæ which represent the varying intensity of illumination is a parabola, whereas with blue light the curve is a straight line. Dr. Uhthoff had repeated these experiments with spectral colours, taking care that the several lights used were in all cases of equal intensity, a result obtained by altering the width of the slit. The speaker described fully the apparatus he had used, and the series of preliminary experiments he had made, by which he had proved that the narrower the slit is in the screen upon which the spectrum falls, the greater is the acuteness of vision, and that the observations are more trustworthy when a dark mark on a light ground is used as the object whose brightness is to be determined than when a light mark on a dark ground is employed. As regards the apparatus it may be mentioned that the dispersion is produced by a fluid-prism 1 decimetre in diameter. The result of these experiments, as of former ones, was that the visual acuteness increases with the intensity of light in the blue part of the spectrum. When the visual acuteness is compared in the different spectral colours, the intensity of light being in all cases the same, a curve is obtained with a maximum lying near its centre. When the intensity of the light is less, the curve of acuteness on the abscissæ of the spectral colours becomes more pointed, and the maximum moves simultaneously towards the red end. When the intensity of light is the least possible, the maximum for the visual acuteness coincides with the point of greatest brightness in the spectrum. The above holds good not only for the normal trichromatic eye, but also for the dichromatic or red- and green-colour-blind eye.—Prof. Kundt exhibited a photograph of the spectrum of cyanogen extending from the line H up to about the line L, which had been sent to him by Prof. Keyser, of Hanover. For size, beauty, and clearness of the several groups of lines, this photograph is scarcely likely to find its equal.

AMSTERDAM.

**Royal Academy of Sciences**, January 26.—M. Buys Ballot communicated the results of his observations during the last forty years at the Meteorological Institute at Utrecht, and stated how much temperature, air-pressure, and rain deviated to the right or left from the mean values, and how long this occasionally continues on a stretch before compensation comes about. —M. Beyerinck spoke on a method of determining the action of different substances on the growth and on some other vital functions of micro-organisms, and illustrated his assertions by preparations. The method consists in applying small quantities of various substances on gelatine plates, either pure or prepared for the purpose, and infected with yeast or Bacteria of some kind or other, and then watching if the micro-organisms in the centres of diffusion of those substances—whether remaining pure or meeting each other on their way—multiply or not, or if they do so in a greater or less degree.

## BOOKS, PAMPHLETS, and SERIALS RECEIVED

Electrical Trades Directory and Hand-book, 1889 (*Electrician* Office).—The Elementary Principles of Electric Lighting, 2nd edition: A. A. C. Swinton (Lockwood).—A Dictionary of Photography: E. J. Wall (Hazell).—A Manual of Cursive Shorthand: H. L. Callendar (Clay).—The Chemical Analysis of Iron: A. A. Blair (Whittaker).—Hourly Readings, 1886, Part 1, January to March (Eyre and Spottiswoode).—Greek Geometry from Thales to Euclid: G. J. Allman (Longmans).—*Challenger* Report, Zoology, vol. xxix. Text, 2 Parts (Eyre and Spottiswoode).—The First Ascent of the Kasaï: C. S. L. Bateman (Philip).—Therapeutics ought to become a Science: Dr. W. Sharp (Bell).—Therapeutics can become a Science: Dr. W. Sharp (Bell).—The Great Lake Basins of the St. Lawrence: A. T. Drummond.—La Pénétration de la Lumière dans les Lacs d'Eau Douce: Dr. Forel (Leipzig, Engelmann).—Die Zusammendrückbarkeit des Wasserstoffes: S. von Wroblewski (Wien, Tempsky).—Eskimo of Hudson's Strait: F. F. Payne (Toronto).—The Navajo Tanner: R. W. Shufeldt.—Journal of the Anthropological Institute, February (Trübner).—Natural History Transactions of Northumberland, Durham, and Newcastle-upon-Tyne, vol. x. Part 1 (Williams and Norgate).—Journal of the Royal Microscopical Society, December 1888 to February 1889 (Williams and Norgate).—Rendiconto dell' Accademia delle Scienze Fisiche e Mathematiche (Sezione della Società Reale di Napoli) Serie 2a, vol. ii. Fasc. 1° to 12° (Napoli).

## CONTENTS. PAGE