

P. minus, though the former is much the larger. Such then are the facts as they appear from Cuvier's writings. The fact that this one skeleton of *P. minus* was found with the neck in the erect position may have been considered by Cuvier as hardly a sufficient reason for placing the neck of his restored specimen, which showed so many tapiroid peculiarities, in the same position. Now, however, that a second skeleton of a *Palaotherium* has been found, with the neck in a similar position, the probability that such a position is the natural one is immensely enhanced.

Two points, however, remain somewhat involved in obscurity; first, how is it that the skeleton of *P. magnum*, as found at Vitry-sur-Seine the other day, differs so much in the length of its leg-bones from the *P. magnum* of Cuvier, which it undoubtedly does if the drawings and descriptions of both are correct? and secondly, how was it that Cuvier, with such a perfect skeleton as that in the accompanying figure, should restore an animal with such short and comparatively stout legs?

Someone perhaps may be able to throw some light upon these points.

W. BRUCE-CLARKE

The Telegraph in Storm-warnings

THE idea of using the electric telegraph to give warning of cyclones approaching from a distance is generally supposed to have first occurred to Prof. Henry of the Smithsonian Institution in 1847 (NATURE, vol. iv. p. 390). This however is not the fact, for the same thing had been recommended in India fully five years before by the late Mr. Henry Piddington, in his sixth "Memoir on the Law of Storms," published in the Journal of the Asiatic Society of Bengal in 1842. Referring to a storm which was tracked from Macao to Shih-poo, and its estimated rate of travelling, he says (p. 703):—"If China was a country under European dominion, a telegraph might, when these storms strike the eastern coast, warn those on the southern that they were coming, and in India we might often attain the same advantage. Our children may see this done." In 1849, when he published the first edition of his "Sailor's Horn-Book for the Law of Storms," he had not yet heard of the fulfilment in America of his prophecy, which however he has duly noticed in subsequent editions.

FRED. NORGATE

Corydalis claviculata

A SHORT additional note on *Corydalis claviculata* may be of interest. A sprig placed in a glass of water and out of the way of insects continues to grow and to bear flowers and fruit with nearly as much regularity as if still rooted to its native bank. The flowers do not gape spontaneously; and, as most of the older ones that I have examined in a state of nature have their lips depressed, I think it certain evidence of the agency of insects, though I have not yet been so fortunate as to witness their operations. All the flowers that I have seen are of a greenish white, but dried specimens acquire the yellow tint described in systematic works, a fact which may help to throw light on the somewhat parallel behaviour of *Fumaria pallidiflora*.

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W. E. HART

POLARISATION OF LIGHT*

IX.

THE results of combining two or more colours of the spectrum have been studied by Helmholtz, Clerk Maxwell, Lord Rayleigh, and others. And the combinations have been effected sometimes by causing two spectra at right angles to one another to overlap, and sometimes by bringing images of various parts of a spectrum simultaneously upon the retina. Latterly also W. von Bezold has successfully applied the method of binocular combination to the same problem (*Poggendorff, Jubelband*, p. 585). Some effects, approximating more or less to these, may be produced by chromatic polarisation.

Complementary Colours.—First, as regards complementary colours. If we use a Nicol's prism N as polariser, a plate of quartz Q cut perpendicularly to the axis, and a double-image prism P as analyser, we shall, as is well known, obtain two images whose colours are complementary. If we analyse these images with a prism, we shall find when the quartz is of suitable thickness, that

* Continued from vol. ix. p. 508.

each spectrum contains a dark band indicating the extinction of a certain narrow portion of its length. These bands will simultaneously shift their position when the Nicol N is turned round. Now, since the colours remaining in each spectrum are complementary to those in the other, and the portion of the spectrum extinguished in each is complementary to that which remains, it follows that the portion extinguished in one spectrum is complementary to that extinguished in the other. And in order to determine what portion of the spectrum is complementary to the portion suppressed by a band in any position we please, we have only to turn the Nicol N until the band in one spectrum occupies the position in question, and then to observe the position of the band in the other spectrum. The combinations considered in former experiments are those of simple colours; the present combinations are those of mixed tints, viz. of the parts of the spectrum suppressed in the bands. But the mixture consists of a prevailing colour corresponding to the centre of the band, together with a slight admixture of the spectral colours immediately adjacent to it on each side.

The following results given by Helmholtz, may be approximately verified:—

Complementary Colours	
Red	Green-blue
Orange	Cyanic blue
Yellow	Indigo-blue
Yellow-green	Violet

When in one spectrum the band enters the green, in the other a band will be seen on the outer margin of the red, and a second at the opposite end of the violet; showing that to the green there does not correspond one complementary colour, but a mixture of violet and red, i.e. a reddish purple.

Combination of two Colours.—Next as to the combination of two parts of the spectrum, or of the tints which represent those parts. If, in addition to the apparatus described above, we use a second quartz plate Q_1 and a second double-image prism P_1 , we shall form four images, say O O, O E, E O, E E. And if A, A' be the complementary tints extinguished by the first combination Q P alone, and B, B' those extinguished by the second $Q_1 P_1$ alone, then it will be found that the following pairs of tints are extinguished in the various images.

Image	Tints extinguished
O O	B, A
O E	B', A'
E O	B', A
E E	B, A'

It is to be noticed that in the image O E the combination $Q_1 P_1$ has extinguished the tint B' instead of B, because the vibrations in the image E were perpendicular to those in the image O formed by the combination Q P. A similar remark applies to the image E E.

The total number of tints which can be produced by this double combination Q P, $Q_1 P_1$ is as follows:—

- 4 single images
- 6 overlaps of two
- 4 overlaps of three
- 1 overlap of four

Total, 15

Collateral Combinations.—The tints extinguished in the overlap O O + E O will be B, A, B', A'; but since B and B' are complementary, their suppression will not affect the resulting tint except as to intensity, and the overlap will be effectively deprived of A alone; in other words, it will be of the same tint as the image O would be if the combination $Q_1 P_1$ were removed. Similarly the overlap O E + E E will be deprived effectually of A' alone; in other words, it will be of the same tint as E, if $Q_1 P_1$ were removed. If therefore the Nicol N be turned round, these two overlaps will behave in respect of colour exactly as did the images O and E when Q P was alone used. We may, in fact, form a table thus:—