

much after its first apparition, the greatest width attained being perhaps one-third of the diameter of the sun's disc. At the emergence of the orange-gold disc in the centre of this pale-green band, the two colours seemed momentarily to co-exist; this was probably persistence of vision, but indicates that there was no eye-fatigue.

The intensity of the green was never the vivid emerald of sunset which I have twice seen, once in the Mediterranean and once in Upper Egypt; it was the paler colour, which is less uncommon. Probably the actual intensity of the colour is a matter of luck. The fact of the flash appearing at sunrise seems finally to exclude any physiological cause, and agrees with the explanation of refraction through air layers of different temperatures. The apparent turbulence might well be real turbulence of the air, induced as the desert starts to be warmed by the sun's first rays.

W. LAWRENCE BALLS.

Cairo, Oct. 26.

#### Influence of X-rays upon Time-lags of the Faraday Effect and upon Optical Rotation in Liquids.

DIFFERENCES in the time-lags of the Faraday effect behind the magnetic field in various liquids have been measured by Beams and Allison (*Phys. Rev.*, **29**, 161; 1927). Certain considerations have led me to suspect that these time-lag differences might be affected, and even reduced to zero, by the action of X-rays on the liquid. A number of experimental tests very recently carried out demonstrate that the X-rays have such a property. It was found in every case that the time-lag differences of the Faraday effect between any pair of the liquids vanished so long as the liquids were exposed to the X-rays, and that the lags were restored with the screening off of the X-rays. The liquids thus far used are carbon disulphide, carbon tetrachloride, ethyl alcohol, xylene, and chloroform.

The method also affords a means of measuring the absolute time-lags of the Faraday effect, giving values for the various liquids which are consistent with the previously measured time-lag differences.

This work having shown an influence of X-rays upon the lag of the Faraday effect, it was decided to find out whether these rays could produce an effect in rotating the plane of polarisation of light in these same liquids. A preliminary series of tests shows that a beam of X-rays traversing the liquids does impart to them the power of rotating the plane of polarisation, though it is small.

These investigations are being continued, and it is hoped that a detailed report of them will be published in the near future.

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Oct. 11.

#### Synthesis of Rubiadin.

My attention has been directed to a paper in the August (1927) issue of the *Journal of the American Chemical Society* (p. 2043), in which Stauder and Adams have shown that rubiadin is not 1,3-dihydroxy-4-methylanthraquinone. It is of interest to record that we came to the same conclusion by condensing cresorsellinic acid with benzoic acid in presence of sulphuric acid.

1,3-Dihydroxy-4-methylanthraquinone melts at 265°-266° (not 251°, as found by Stauder and Adams) and the diacetyl derivative melts at 181°-182°. The deacetylation product melts at 265°-266°. We have also succeeded in synthesising rubiadin itself by condensing dihydroxyparatoluic acid with benzoic

acid (Schunck and Marchlewski's original method). Papers dealing with this work have already been communicated to the *Journal of the Indian Chemical Society*.

It is interesting to note that with the elimination of rubiadin from the list of  $\alpha$ -methylanthraquinone derivatives there is not a *single* natural product (of proved constitution) left in that list. Substances like emodin, chrysarobin, chrysophanic acid, etc., which have at one time or another been regarded as  $\alpha$ -methylanthraquinone derivatives, have all been since proved to be  $\beta$ -methylanthraquinone derivatives. It is curious to note in this connexion that while  $\beta$ -methylanthracene occurs in coal tar,  $\alpha$ -methylanthracene is a purely artificial product.

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Calcutta, Sept. 29.

#### Orientation of the 'Devil's Arrows,' Borough-bridge, Yorks.

At the recent meeting of the British Association at Leeds, Excursions Handbook Q was issued for members taking part in excursion No. 18 to Aldborough and the 'Devil's Arrows.' On pages 16 and 17 of this handbook there are remarks on this monument, and a plan of the positions of the three megaliths of which it is formed, for which we are responsible.

It is now found that the measurements and azimuths on which the plan was plotted are inaccurate, and that the positions of the three stones do not, as there shown, fall on the arc of a circle. The theory derived from this supposition, namely, that the three stones originally formed part either of a great stone circle or were the remains of the peristalith of a tumulus, must therefore be abandoned.

The 25-inch Ordnance Survey map of the site shows that the three stones are actually almost in alinement. From the northern monolith the azimuths of the other two lie between 151° 00' and 152° 30', approximately, while the distance from the northern stone to the middle one is 200 feet, and from the northern to the southernmost is 570 feet (also approximately).

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#### An Active Form of Oxygen.

AN active form of oxygen, presumably monatomic, has been produced by passing oxygen gas saturated with water vapour through a discharge tube. The oxygen was generated electrolytically and subjected to a discharge of about 1000 volts at a gas pressure of 0.4 mm. of mercury. The gas was removed from the discharge tube through a side arm, and its density measured by passing it through a small hole which was located at a distance of 25 cm. from the discharge tube. Pressure measurements at the small hole indicated a decrease in the density of the gas corresponding to about 8 per cent. monatomic oxygen. A platinum calorimeter mounted over the hole showed a decided rise in temperature during the passage of the discharge. These effects were continuous throughout one 3-hour experiment. This work is being continued with the object of determining the most favourable conditions of studying the chemical properties of this gas. It is also hoped that a measurement of the heat of association may soon be completed.

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