tribution of the Pierid butterfly *Colotis calais amatus*. The South Indian element is strongly noticeable in its insect fauna. In the diagram, the total for "Hymenoptera" includes only the Aculeates; three-quarters of the neuropteroid insects are dragon-flies.

In the space at my disposal it is not possible to consider any special characteristics within the various orders. I may mention, however, that much taxonomic and bionomic information has been accumulated (especially with reference to the termites), and the reader is referred to the various reports on the fauna of the island. A considerable number of new forms have also been described, including such interesting insects as the hemipterous termitophile *Termitaphis annandalei* Silvestri. At some future date a complete summary may be provided.

See Rec. Ind. Mus., xxii, pp. 313-421, 1921; xxiv, pp. 289-311, 1922; xxv, pp. 221-263, 1923; xxvi, pp. 165-191, 1924 (various authors). Also Annandale, Mem. As. Soc. Bengal, vii, p. 257, 1922.

CEDRIC DOVER.

London, July 25.

On the Spectrum of Ionised Potassium in Connexion with the Red and Blue Spectrum of Argon.

BY Zeeman and Dik (Proc. Amsterdam 25, 67, 1922), and Dik and Zeeman (Proc. Amsterdam 26, 500, 1923), it was found that in the electrodeless discharge (observations of McLennan, Dik and Zeeman) most of the lines of ionised potassium between 6594 Å and 3063 Å could be arranged in quadruplets.

If the frequency of the first line of each quadruplet is designated P, and the succeeding ones Q, R, S, it was found that

$$Q = P + 847$$
$$R = P + 1695$$
$$S = P + 2542.$$

For the red spectrum of argon, exhibited under the uncondensed discharge, and for λ below 4704 Å, Rydberg, in 1897, found a similar regularity. Paulson extended those results, and Meggers increased their accuracy. The frequency relations for the red argon spectrum are, with similar notations:

$$B = A + 846{\cdot}1$$
$$C = A + 1649{\cdot}3$$
$$D = A + 2256{\cdot}1$$

In both cases some of the "quadruplets" are incomplete. It is certainly remarkable that the number 847 occurs in both spectra.

We have extended the former investigation and have included an analysis of the "blue spectrum" of argon developed by the condensed discharge.

The following table contains the new results, together with those formerly given.

Argon, Red Spectrum (Rydberg).	Argon, Blue Spectrum.	Ionised Potassium.
A	p	P
B = A + 846	$q = p + 845$	Q = P + 847
C = A + 1649·3	$r = p + 1695$	R = P + 1695
D = A + 2256·1		S = P + 2542
	t	T
(411,57)	$u = t + 414$	U = T + 413

From this table it appears that the connexion between the spectra of ionised potassium and argon (blue) is closer than that between the spectra of ionised potassium and argon (red). We find the numbers 414, 845, 1695 characteristic for the blue spectrum of argon. The number 847 or thereabout occurs with red argon, blue argon, and ionised potassium; moreover, 1695 links blue argon to ionised potassium.

Then there is the number 414, which occurs, as we find, in numerous doublets of ionised potassium and argon (blue). It may be mentioned that Rydberg directed attention to the occurrence of the number 411·57 in the red spectrum of argon.

That there is a close numerical connexion between the three spectra considered seems proved, but the physical interpretation of the characteristic numbers is quite unknown.

Tables and calculations will be published elsewhere.

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P. ZEEMAN.

Amsterdam, August 15.

Anomalous Adsorption.

BILTZ and Steiner (*Kolloid-Zeitschrift*, 1910, 7, 113) have described several cases of so-called "anomalous adsorption," for example, the adsorption of Night Blue and Victoria Blue B. by cotton and charcoal. The adsorption isotherms rise to a maximum and fall off again with increasing concentration of the dyestuff. Hatschek in his "Physics and Chemistry of Colloids," 1922, p. 146, suggests that electrical factors may complicate adsorption "though these do not very readily account for the maximum." During a study of the dyeing of wool by Night Blue I have obtained adsorption curves of the same peaked form, using the same colorimetric method of estimation as Biltz and Steiner. On examining the dyed wool, however, it could not be said that the colour was any lighter in the case of the more concentrated solutions, and some defect was therefore sought in the method of experiment.

It had been noticed that the dyestuff solutions remaining after adsorption on the wool had a greenish-blue colour when viewed by transmitted light in the colorimeter, whereas the original Night Blue solutions were a pure blue; this gave the clue to the defect. Although Night Blue solutions appear to contain no free chlorine ions, the solutions remaining after adsorption were both acid and contained chlorine ions. Hydrochloric acid is probably produced during adsorption, and this has been shown to have a profound influence on the colour of Night Blue solutions. 1, 2, 3, and 4 c.c. of a very dilute hydrochloric acid solution were added to the same amounts of dyestuff solution and made up to the same volume with distilled water. These solutions were compared colorimetrically with a standard Night Blue solution of the same concentration but containing no acid. If we denote the concentration of the standard by unity, the *apparent* concentrations of the acid solutions in order were found to be 1·28, 1·50, 1·83, and 2·11. Furthermore, they showed the same greenish-blue colour noticed previously. In the adsorption of Night Blue by wool the amount of acid liberated will increase with the amount of dye adsorbed, but in consequence of this acid the apparent amount of dyestuff unabsorbed, estimated colorimetrically, will be increased. Since the amount of dye adsorbed is estimated by difference (original concentration known) the explanation of the peaked adsorption isotherms is self-evident, and "anomalous adsorption," as described by Biltz and Steiner, has probably no real existence. The determination of the true adsorption curve is in progress.

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