

5. *Dendrobæna rubida* (Sav.). Peira Cava; one beautiful specimen of this well-known tree-worm.

6. *Allolobophora caliginosa* (Sav.). Thouët, in a streamlet with Eiseniella as above. The same species as the next, but with modifications in the girdle.

7. *Allolobophora trapezoides* (A. Dugès). In the stream at Calacuccia with Eiseniella.

8. *Lumbricus castaneus* (Sav.). By stream at Thouët, April 20. All the foregoing are British.

I found a worm (probably *A. caliginosa*) at Lucéram, but it retreated into a rock-crevice before I could secure it, and so was lost. As my object was to explore the Alps, no time was devoted to the examination of the lowlands and seashore, where, doubtless, a considerable number of species might be discovered, both in Corsica and in the Riviera. Worms are used for angling in Corsica, but no one has determined the species ("The Impossible Island," 82).

HILDERIC FRIEND.

Solihull,  
July 25.

### The Tetrad Difference Criterion.

IN recent years the quantity  $F$ , called the 'tetrad-difference', has become very important in psychological investigations as to the possible nature of the underlying causes of mental activities. If there are four such activities, and  $r_{13}$ ,  $r_{24}$ , etc., the six correlation coefficients,  $F$  is defined by the equation  $F = r_{13}r_{24} - r_{14}r_{23}$ . The value of  $F$ , in practice, approximates to zero.

On the assumption that the activities are due to the operation of a number  $N$  of 'all or none' factors, and that the four activities in question involve the operation of the fractions  $p_1, p_2, p_3, p_4$  of these factors respectively, the most probable value of  $F$  is zero, but it is important to know how far we may, *a priori*, expect it to deviate from zero. In other words, if every possible arrangement of the  $p_1N, p_2N, p_3N, p_4N$  factors out of the universe of  $N$  factors be considered, and the tetrad-differences  $F$  calculated, we require the standard deviation of  $F$ . In the course of investigation the following results have been arrived at theoretically, and without approximations:

(1) The mean value of  $F$  is zero.

(2) The standard deviation of  $F = r_{13}r_{24} - r_{14}r_{23}$ , calculated on the above assumptions, is given by

$$\sigma_F^2 = \frac{1}{N-1} \left[ 4p_1p_2p_3p_4 - 2(p_1p_2p_3 + p_1p_2p_4 + p_1p_3p_4 + p_2p_3p_4) + p_1p_3 + p_2p_4 + p_1p_4 + p_2p_3 + \frac{2(N-2)(p_1-1)(p_2-1)(p_3-1)(p_4-1)}{(N-1)^2} \right]$$

If  $N$  be supposed large, and we put the  $p$ 's each equal to their average  $p$ , we have, as an approximation,

$$\sigma_F^2 = \frac{1}{N} \cdot 4p^2(1-p)^2.$$

JOHN MACKIE.

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July 16.

### The Spectrum of Gold Chloride.

VAPOUR from auric chloride ( $\text{AuCl}_3$ ) was introduced into a stream of active nitrogen. The observed spectrum consisted of intermingled green bands, shaded toward the red. The strongest band heads were measured and found to comprise two systems given by the formulæ:

$$A: \nu = 19113.8 + 312.0(n' + \frac{1}{2}) - 382.8(n'' + \frac{1}{2}) - 0.70(n' + \frac{1}{2})^2 + 1.30(n'' + \frac{1}{2})^2$$

$$B: \nu = 19238.3 + 316.3(n' + \frac{1}{2}) - 382.8(n'' + \frac{1}{2}) - 1.45(n' + \frac{1}{2})^2 + 1.30(n'' + \frac{1}{2})^2$$

(Half-quanta were not required for the accuracy of these data, but were used in view of the latest developments.) The identity of the coefficients of terms in  $n''$  shows a common final vibrational level which is probably the normal state of the aurous chloride ( $\text{AuCl}$ ) molecule.

Associated with each of the strong heads in the two systems were weaker heads corresponding to  $\text{AuCl}^{87}$ , taking the stronger heads to be due to  $\text{AuCl}^{85}$ . In this molecule, for the isotopes of chlorine,  $\rho = 0.9768$ . With the dispersion employed (around 28 Å.U. per millimetre), the isotopes of gold were not evident,  $\rho$  for this case being 0.9992. Gold lines at wave-lengths 4792.6, 3122.8, 3029.2, 2748.3, 2676.0, 2641.5, 2428.0, and 2352.7 Å.U. also appeared from excitation of this salt by active nitrogen. The intensities of the band heads in each system follow the usual distribution with changes in  $n'$  and  $n''$ . In the region 7000 to 2000 Å.U., no other spectrum from gold chloride appeared.

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### 'Oertling' Balances.

IT is generally admitted that there are few finer craftsmen than the London instrument maker. As employers, therefore, we regret to find a continental origin ascribed to any of his products.

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MALCOLM DUNBAR,  
L. Oertling, Ltd.,  
Turmill Street,  
London, E.C.1, Aug. 6.

### Petrified Forests.

THE interesting note in your number for August 13, p. 239, arising out of Miss Winifred Goldring's article on the Upper Devonian Forest of Gilboa, N.Y., suggests that readers of NATURE may like to know of the stump of one of these Pteridosperm trees, *Fospermatopteris textilis*, which was very kindly presented to the British Museum by Mr. Hugh Nawn, president of the Hugh Nawn Contracting Company, and found during the company's work of building the Gilboa Dam. Mr. Nawn informs me that this specimen, and one that he has sent to the National Museum of Ireland, are the only specimens outside the United States.

F. A. BATHER.  
British Museum (Natural History),  
S.W.7, Aug. 13.