

Accuracy of the Curie-Chéneveau Magnetic Balance

I HAVE read with interest, in NATURE of January 26, the letter by Messrs. Gray and Cruickshank concerning the Curie-Chéneveau magnetic balance. I may mention that I published a small work on this subject so long ago as 1914¹. I found that measurements within one per cent could be made with the greatest ease, and that it was possible to increase the accuracy, with some care, up to a precision of some tenths of one per cent at least.

The principal cause of errors and fluctuations were due to certain hysteresis effects in the moving parts of the apparatus (though non-magnetic) and especially in the damping device. My work was done with a somewhat improved type of apparatus due to P. Weiss and A. Piccard (unpublished, so far as I know).

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¹ F. Wolfers, "Mesures Magnétochimiques". Mémoire pour le Diplôme d'Etudes supérieures, Faculté des Sciences de Paris, 1914.

Points from Foregoing Letters

NEW experiments by Dr. C. D. Ellis and Mr. W. J. Henderson with radionitrogen (the first radioactive element prepared synthetically by M. and Mme. Joliot by the action of α -particles on boron) show that its half-life period is 11 minutes and not 14 minutes; it is thus identical with the half-life period of the radionitrogen obtained from carbon bombarded with protons. The difference previously believed to exist between the two types of radionitrogen has been adduced as proof of the existence of negatrons (negatively charged nuclei).

Mr. R. W. Gray's suggestion that whales can descend to 2,500 fathoms or more without suffering from caisson disease is disputed by Dr. F. D. Ommanney. He remarks that observations upon the behaviour of whales struck by harpoons offer little indication of their normal habits, and that descent even to two hundred fathoms would involve compression of the lungs to 1/35 of their usual volume.

When α -particles hit nuclei of the lighter elements, they do not scatter according to Rutherford's rule (effective for the heavier elements). Prof. G. Beek and Mr. L. H. Horsley submit a diagram illustrating the electrical barrier surrounding the nucleus, with its various 'energy levels' which are thought to determine the character of the scattering effect; they also indicate the type of scattering that has been observed with various light elements (Be^9 , $\text{B}^{10, 11}$, C^{12} , F^{19} , Al^{27}). They infer that atoms of helium or lithium of mass 5 are unlikely to exist.

Dr. E. Gross and Mr. M. Vuks submit photographs of spectra of light scattered by crystals of benzene and naphthalene and by liquid benzene, supporting their previous interpretation of the 'wings' observed around the primary line of the spectra, as due in part to slow vibrations of the molecules and not to rotation. They point out that the central part of the 'wings', the intensity of which increases on heating, is characteristic of the liquid state.

The Wilson cloud chamber, in which condensed water vapour renders visible the tracks of electrified particles, has been one of the most useful instruments in studying subatomic phenomena. Mr. P. Kipfer has constructed a small high-pressure Wilson chamber in which gases compressed up to 100 atmospheres can be used. This should increase the probability of atomic collision and reduce the time necessary for observations and the expense of taking a large number of photographs.

Mr. J. W. Dunne has put forward the view that time is polydimensional; he considers a succession of 'time within time', and is led by those considerations to assume the existence of freewill and

immortality. Prof. Dingle, while viewing favourably the physical aspects of the hypothesis of 'serial time', considers Mr. Dunne's psychological interpretations not justified.

Prof. T. M. Lowry and Mr. J. T. Lemon describe an experiment which suggests that a higher oxide of nitrogen (NO_3) is formed transiently when a mixture of nitrogen pentoxide and ozonised oxygen is heated.

Synthetic male hormone is found by Dr. V. Korenchevsky to increase the weight of the atrophied prostate, seminal vesicles, etc., of castrated male rats and to influence the development of female rats from which the ovaries have been removed. It does not rejuvenate the male rats or induce oestrus in female rats, as reported for some of the testicular extracts.

According to Mr. E. L. Taylor, the spores of the staghorn moss, commonly known as lycopodium powder, form a useful indicator for the passage of food through the alimentary tract of animals.

Mr. D. L. Gunn has found that there is an increase of about 50 per cent in the rate of oxygen consumption of *Blatta orientalis*, the cockroach, just after its last moult. There is a similar rise in respiratory rate at the beginning and the end of the pupal period in insects which develop their wings inside the body until the pupal stage (Endopterygota).

From the relative intensities and delay time of radio pulses reflected from the F_1 electrically conducting layer of the upper atmosphere (about 200 km. high), Mr. T. L. Eckersley calculates the collision frequency of electrons and molecules in that layer.

The electrical resistance (impedance) to alternate currents, of concentrated suspension of white blood cells (from rabbits) has been determined by Dr. Hugo Fricke and Mr. Howard J. Curtis. From experimental results and from special theoretical considerations, they deduce that for low frequencies the resistance measured is that of the cell membrane, while at high frequencies the resistance measured is that of the internal fluid of the cells. The thickness of the cell membrane appears to be about 27 Å., assuming an arbitrary value of 3 for its dielectric constant.

Messrs. Sloane and Minnis have obtained instantaneous photographs of the spectra of the moving striations which are a familiar feature of many commercial gas-discharge illuminating tubes. They find that the variations of the spectra through the bright and dark parts of the striations are in accord with what is known of the electrical properties of this form of discharge.