

Points from Foregoing Letters

SIR JOSEPH LARMOR makes critical comments on theories of magneto-optic rotation and suggests that valuable information might be obtained by the application of modern technique to the measurement of the intensity across the Zeeman spectral components (spectrum lines resolved and polarised by the action of a magnetic field).

Artificially produced radioelements can be partially separated by carrying out the transmutation in the presence of an electric field, according to Prof. F. A. Paneth and Mr. J. W. J. Fay. Using a gaseous arsenic compound, which by bombardment with neutrons gave radioactive arsenic, they were able, by the application of an alternating electric field, to concentrate 20,000-fold the radioactive material produced.

Accepting the view that primary cosmic rays consist of two groups of particles, namely, positive and negative electrons and positively charged hydrogen nuclei, Dr. Pierre Auger indicates that, as they penetrate through matter, their interaction with elements of low and high atomic weight leads to the production of secondary phenomena, such as the penetrating radiation and electron showers observed.

The power of proteins and similar substances (choline, betaine) of decreasing the fat content of liver is discussed by Prof. C. H. Best and Messrs. M. E. Huntsman and J. H. Ridout. They give results of experiments on rats which lead them to believe that Channon and Wilkinson have emphasised unduly the effect of moderate under-nutrition on the deposition of liver fat; they find that slight change in body weight does not affect the liver fat balance.

Mr. Alec H. Laurie, who has just returned from a whaling expedition, describes personal observations indicating that whales do not fill their lungs with water when diving (to prevent caisson sickness due to liberation of dissolved nitrogen). Mr. Laurie's previous experiments with whale blood have shown that it has the property of using up dissolved nitrogen.

The freezing point of a solution is no guide to the osmotic pressure it will exert across an animal membrane. Mr. J. Z. Young therefore advises that solutions used for hardening or 'fixing' tissues of sea animals should contain the saline constituents of seawater in the same concentration, in order to prevent distortion or bursting of the cells due to penetration of water.

Dr. W. N. Bond offers further evidence in support of his suggestion that the cause of the discrepancy between experiment and Eddington's theoretical value, M/m , for the electron, is that experiment measures not e/m but $136/137 e/m$. It is suggested further that since X-ray determinations and Millikan's method give different values for the electronic charge, approximately in the value $137/136$, the reason for this lack of agreement is the same as in the first case, namely, faulty analysis of a 'system' into 'parts'.

Mr. K. Mendelsohn and Miss Judith R. Moore describe the magnetic properties of a lead-bismuth alloy at temperatures near the absolute zero, when it becomes supra-conducting. A possible explanation for the phenomena observed is that the 'threshold value' (temperature at which supra-conductivity begins) is high in some parts of the alloy while the main part has about the same value as pure metals.

Such a model would act like a fine supra-conducting sponge, the meshes of which are formed by annular regions of high threshold value impenetrable for magnetic flux that has once been caught in them.

The electrical resistance of very pure aluminium just before it becomes supra-conducting has been investigated by Mr. H. A. Boorse and Dr. H. Niewodniczański; between 4.2° and 2.2° K., the resistance is constant.

Dr. F. P. Bowden and Mr. S. H. Bastow have measured the resistance to flow of thin films of water and of soap (ammonium oleate) solution, and have failed to confirm the rigidity deduced by Derjaguin from observations on the resistance offered by water to the movement of an oscillating lens. This, they believe, disproves the view that oriented chains of water molecules may extend to a distance of 5μ from the surface.

Using radioactive isotopes as indicators, Mrs. Alice Leigh-Smith and Dr. H. O. W. Richardson find that in compounds of metals with organic radicles, exchange of atoms of the same atomic number occurs without the break-up of the molecules.

A method of determining minor quantities of water, such as are produced during the partial decomposition of some organic compounds, is described by Prof. W. Swietosławski. It depends upon the lowering of the boiling point of azeotropic mixtures of certain organic liquids (mixtures which distil in a constant ratio) produced by small amounts of moisture. The method has been applied by Mr. M. Wojciechowski to the determination of small amounts of substances adsorbed at solid surfaces.

By means of a new optical method, Prof. H. Falkenhagen and Mr. Ch. Bachem have measured the compressibility of solutions. They find a linear relation between the apparent molal compressibility and the square root of the concentration of the electrolyte, in accordance with Gucker's theory, but the relation does not hold for non-electrolytes, such as sugar.

Dr. L. F. Richardson directs attention to a mathematical formula in which he has attempted to express the armament race between opposing nations or groups of nations in terms of a "defence coefficient", a "fatigue and expense coefficient" and a quantity depending upon dissatisfaction with treaties.

Messrs. F. T. Farmer and J. A. Ratcliffe have investigated the application of Appleton's theory of the ionosphere to radiation of wave-length greater than the critical value of 214 m. Observation of the ordinary and extraordinary reflected rays which have partially penetrated the E and F reflecting layers confirms the theory, and suggests that reflection occasionally occurs from an intermediate region at 150 km.

Mr. J. B. Loughnane and Miss Phyllis Clinch state that interveinal mosaic disease of potatoes is due to the combined action of two viruses, one of which is transmitted by the green fly *Myzus persicae*, whilst the other has no insect carrier.

Mr. D. W. Adamson and Prof. J. Kenner report the preparation, for the first time, of a number of compounds belonging to the diazomethane ($C_2H_2N_2$) series. These are highly reactive, poisonous and explosive substances.