

## Points from Foregoing Letters

DR. H. T. FLINT points out that his principle, according to which intervals of proper times less than a certain value ( $h/m_0c^2$ ) have no physical significance, rules out the possibility of an electron moving with a high velocity in a strong field of force. If accepted, this principle would eliminate the probability of existence of negative states of energy, deduced by Bohr from the quantum theory.

Dr. C. Møller, on the other hand, accepts the probability of transition from a negative to a positive state of energy. In this process, it appears, a neutron can be transformed into a proton by simultaneous creation of two electrons, a positron and a neutrino. Møller calculates the ratio of positrons accompanying electrons in radioactive transformations and finds that the order of magnitude agrees with that observed by Alichanow, Alichanian and Kosodaew.

Prof. A. I. Alichanow, A. I. Alichanian and B. S. Dželepov now report the emission of electrons of low energy by radium E. They submit curves showing that the energy distribution in the case of electrons from radioactive elements of high atomic number (such as radium E) differs from that of the positrons from radiophosphorus,  $\text{RaP}^{30}$ , which is of lower atomic number.

Commenting upon a recent note dealing with a suggested improvement in the conductivity method for the determination of heavy hydrogen, Drs. A. and L. Farkas and Prof. E. K. Rideal state that the original method gives the desired accuracy.

From the anomalous scattering of X-rays (copper  $K\alpha$  wave-length) by cadmium, zinc and other metals, Dr. G. W. Brindley deduces a greater lattice vibration along the  $c$ -axis of the metallic crystals than normal to the  $c$ -axis. This agrees with the recent theoretical considerations of Zener and with the work of Grüneisen and Goens on the thermal expansion of zinc and cadmium.

The crystal structure of vanadium pentoxide has been investigated by means of X-ray analysis by Dr. J. A. A. Ketelaar. The existence of chains of oxygen tetrahedrons revealed in this structure may explain the tendency of  $\text{V}_2\text{O}_5$  to form rod-like or rather lathe-like particles in colloidal solutions.

R. J. Moon and Prof. W. D. Harkins propose to reduce the space charge for a given high-frequency potential on the duants (semi-circular electrodes) of a cyclotron (voltage multiplier) by further dividing the electrode into triants. Ions are then accelerated three times per revolution instead of twice, with reduced retarding potentials, leading to higher velocities and intensities, and an advantageous forward resonance which is not critical.

Using a new method for measuring the magnetic properties of gases, J. Shur and S. Sidorov find that, contrary to the results obtained by Vaidyanathan, the susceptibility of carbon disulphide has the same value in the vapour as in the liquid state.

From the known values of the velocity of light ( $c$ ), the mass of the hydrogen nucleus ( $H^1$ ) and the Faraday constant ( $F$ ) (the amount of electricity required to deposit, from a solution, one gram-

molecule of a uni-valent substance) and assuming the correctness of Eddington's theory, Dr. W. N. Bond derives a value of the Universal Gravitational Constant.

According to the kind of light they emit, stars have been classified into seven types,  $A$  to  $G$ . J. A. Hynek finds that those stars which rotate rapidly on their axes (as indicated by the uniform widening of their spectrum lines) are mostly about twice the size of the sun, and none of them belongs to type  $G$ . It appears that many stars lose their speed of radial rotation as they evolve from the  $F$  to the  $G$  type; it is possible that this occurs suddenly, owing to fission, but alternative hypotheses are available.

A critical survey of available information leads M. I. Tomilin to the conclusion that the average menstrual cycle of the chimpanzee is 35.5 days and the average period of gestation 236 days.

A detailed structure of the chromosomes in the nuclei of cells of the salivary glands of various species of fruit flies (*Drosophila*) is diagrammatically illustrated by S. L. Frolova, who among other characteristics describes ring-shaped bands or disks of chromomeres connected by 'genomeres' that pass obliquely through the chromosome.

N. Noujdin finds that the inert region of the  $X$ -chromosome (characteristic of the female-producing reproductive cell) has the same influence upon certain characters (mosaicism of scute-8) of the fruit fly, *Drosophila melanogaster*, as the  $Y$ -chromosome of the male producing reproductive cell. This indicates that the inert region of the  $X$ -chromosome is homologous with the  $Y$ -chromosome.

Young growing shoots of oats bend away from a gelatin block containing a small amount of skatole (a constituent of faeces), due to increased growth on the side in contact with the skatole solution. This, according to J. Glover, suggests that skatole may act in the plant as a growth-promoting substance.

J. R. Norman states that although he has identified the specimens of European fishes (including *Cottus bubalis* and *Ammodytes lanceolatus*), reported to have been caught off the coast of Burma, such an occurrence would be so widely opposed to all facts of geographic distribution that in his opinion the specimens must have originated elsewhere.

Zein has been considered to be a simple homogeneous protein. It is shown by C. C. Watson, Sven Arrhenius and Prof. J. W. Williams that the purified substance can be divided into three nearly homogeneous fractions by successive precipitations as water is added to its alcoholic solutions. The zein fractions have been characterised by their sedimentation constants, diffusion constants, electrophoretic mobilities and dielectric constants.

High-frequency impedance measurements on split-anode magnetrons are described by Dr. J. S. McPetrie. With variation in magnetic field there is change in the sign of reactance as the condition of oscillation is passed through. Below this condition, the capacity is negative, but changes to positive above. The resistance is negative, but at two regions of minimum negative resistance oscillation occurs.