

hypoglycaemic power. Benzylcarbonyl chloride readily inactivates insulin, probably just as rapidly as does phenyl isocyanate, and in this inactivation also it seems probable that the loss of hypoglycaemic power by the insulin is due to the blocking of the free amino-groups. This appears to offer additional support for the view that the active groups of insulin contain free amino-groups, and that the latter are essential for the activity of the insulin (cf. Jensen<sup>5</sup>). Attempts are now being made to activate these inactive insulin derivatives.

The amount of benzylcarbonyl chloride required to inactivate insulin is very small, and 100 mgm. of insulin of potency 19,500 units per gm. (kindly supplied by Messrs. Boots Pure Drug Co., Ltd.), can be completely inactivated by 150 mgm. of this reagent. The minimum amount of benzylcarbonyl chloride needed to react with all the free amino-groups of insulin, calculated on the basis that insulin contains 1.0 per cent of free amino-nitrogen<sup>6</sup>, is approximately 12 mgm. per 100 mgm. of insulin.

This smaller amount of acid chloride causes partial loss of hypoglycaemic activity only, possibly because some of the reagent may be destroyed by the water present. It is possible, however, that the reaction with benzylcarbonyl chloride is not confined to the free amino-groups of the insulin, and further investigations are being made to decide this point.

W. E. GAUNT.

G. HIGGINS.

A. WORMALL.

Department of Physiology,  
University of Leeds.

<sup>1</sup> Hopkins, S. J., and Wormal, A., *Biochem. J.*, **27**, 740 and 1706; 1933. **28**, 228; 1934.

<sup>2</sup> Hopkins, S. J., and Wormal, A., *NATURE*, **134**, 290; 1934. *Biochem. J.*, **28**, 2125; 1934.

<sup>3</sup> Jensen, H., and Evans, E. A., *J. Biol. Chem.*, **108**, 1; 1935. cf. also, *Physiol. Rev.*, **14**, 188; 1934.

<sup>4</sup> Bergmann, M., and Zervas, L., *Ber.*, **65**, 1192; 1932. cf. Bergmann, *NATURE*, **131**, 662 and 698; 1933.

<sup>5</sup> Jensen, H., *Science*, **75**, 614; 1932.  
<sup>6</sup> Freudenberg, K., Dirscherl, W., and Eyer, H., *Z. physiol. Chem.*, **202**, 128; 1931.

### Points from Foregoing Letters

SIR JAMES JEANS compares the observed eccentricity of the orbital motions of binary stars with that calculated from the principle of equipartition of energy. He points out that there is a good agreement between the calculated and observed figures, which supports the long time scale ( $10^{13}$  years) for the life of the universe.

To explain certain observations on blood group inheritance, Ffoulkes Edwards and Etherington have suggested the existence of a fourth hereditary unit (allelomorphic gene). Prof. J. B. S. Haldane points out, as one alternative explanation, that in some individuals the three known allelomorphs may be carried by three chromosomes, instead of by two, and he suggests ways of testing this hypothesis of 'trisomy'.

Prof. V. F. Lenzen offers a few remarks on the philosophical basis of science upon which, he hopes, all philosophers of science can agree.

Mr. A. E. Needham shows that Weldon's case of change of proportions in the growth of young shore crabs is due to heterogonic growth in the individual, and is not a mere average effect produced by natural selection.

The incidence of rickets in a new strain of 'rex-coated' rabbits (with mole-like fur) is described by W. King Wilson. Attempts to prove the recessive nature of the disease by mating individuals suffering from rickets were unsuccessful.

Vitamin C (ascorbic acid), in concentrations of 1 to 5 parts in 10,000, is found by László Havas to accelerate the growth and increase the length of the shoots of germinating wheat.

Prof. H. Munro Fox and Mr. H. G. Newth describe the swarming behaviour of two common species of gregarious vorticellids. All the individuals in a group become free-swimming simultaneously and form a swarm which is held together by mucous threads secreted by the swarmer. When the latter again settle down, they do so in close contiguity owing to their mucous attachments.

Prof. E. W. Scripture submits reproductions of sound-film tracks for various vowels. He points out that they support the 'puff and profile' theory,

according to which vowel vibrations are produced by the action of glottal puffs on the air in the vocal cavity, and the perception of vowel characters depends on the unanalysed profiles of the vibrations.

Prof. S. Ramachandra Rao finds that the diamagnetic susceptibility of colloidal copper is greater than the value for the massive metal. The critical diameter of particles below which the susceptibility shows a rapid increase is  $0.8 \mu$ . The results support the conclusions of Honda and Shimizu that colloidalisation has the same effect as cold-working so far as the magnetic properties are concerned.

The protective effect of aluminium upon the oxidation of copper at red heat is described by I. Iitaka and S. Miyake, who have studied the oxidised surfaces by means of cathode ray reflection. Copper alloys containing more than 2 per cent of aluminium can be heated to a red heat for several hours without forming oxide scales. An alloy containing about 10 per cent, when heated with an insufficient supply of oxygen, becomes covered with a thin film of oxide.

From the hyperfine structure of certain lines of the arc spectrum of iridium—the only element the isotopes of which have not hitherto been identified—Prof. B. Venkatesachar and L. Sibaiya infer the existence of two isotopes of masses 191 and 193 with nuclear spins of  $\frac{1}{2}$  and  $\frac{3}{2}$  respectively. A rough estimate of the relative abundance of the two isotopes is 1 : 2, which in the absence of a higher isotope would lead to an atomic weight of less than 193 for iridium.

By means of the ionic tube designed by Kunzl and Dolejšek, for the detection of the longer X-ray waves and with a new focusing method, Dr. V. Kunzl has observed several new lines in the X-ray spectra of magnesium and sodium. He now ascribes to sulphur certain 'white lines' previously classified as due to the absorption spectrum of tantalum.

The observation that Bergmann's reagent (benzylcarbonyl chloride) inactivates insulin is considered by W. E. Gaunt, G. Higgins and Dr. A. Wormal as additional support for the view that the free amino-groups of insulin are essential to that compound's power of reducing the sugar content of the blood.