mitochondria, whereas the main bulk of the coarse granules are rejected. In dealing with such a small cell, and when such small quantities of material are involved, it is not possible to be more explicit. It can be said with certainty that the middle-piece is formed from definite granules which do not appear to be secreted *per se* in the ground cytoplasm.

J. BRONTË GATENBY.

Trinity College, Dublin,
February 10.

Intermetallic Reactions in a Lead-base Bearing Metal.

AN investigation into the influence of pouring temperatures and mould temperatures on the microstructure of a lead-base bearing metal of the following percentage composition (lead, 82·5; antimony, 11·0; tin, 5·5; copper, 1·0) has shown that it is possible for the antimony to unite either with the tin, to form cubes of the compound SnSb, or with the copper, to form needles of the compound Cu_2Sb (Regulus of Venus). Three different pouring temperatures have been employed in this investigation—500° C., 400° C. and 300° C. It has been found that chill castings poured at the higher temperatures—500° C. and 400° C.—contain but slight traces of the tin-antimony compound, whereas chill castings poured at 300° C. contain but few of the purple needles of the copper-antimony compound. If a chill casting containing the tin-antimony compound (that is, one poured originally at 300° C.) be melted and poured at 500° C., the tin-antimony cubes are almost completely replaced by copper-antimony needles. If, however, a chill casting containing the copper-antimony compound (that is, one poured originally at 500° C.) be melted and poured immediately on arrival at 300° C., the copper-antimony needles persist. That the copper-antimony needles may, however, be replaced by tin-antimony cubes is shown by the fact that when a sample of the alloy is heated to 500° C. and allowed to cool slowly to 300° C. before pouring, cubes of tin-antimony compound are found in the chill casting produced.

It is believed that the above observations are new. I should be glad, however, to hear if reactions of a similar nature have been observed in alloys of this or other systems.

O. W. ELLIS.

University of Toronto,
Toronto, Canada,
February 9.

The Auroral Green Line.

(By Cable.)

DR. SHRUM and I have observed in the spectrum of a mixture of air and helium, with the latter in excess, a line at 5577·35±0·15. Mixtures of oxygen and helium give the line enhanced approximately to one-half the intensity of each of the yellow lines of helium.

A long discharge tube was used, surrounded over part of its length with liquid air, and the best results were obtained with a pressure of about five millimetres of mercury. The line was not observable in the spectrum of purified oxygen, hydrogen, nitrogen, or helium. No mixtures of any two of these gases other than oxygen and helium gave this spectral line.

The line is narrow, very sharp, and well defined, and these characteristics, together with its wave-length and the conditions under which it is observable, point to its identity with the auroral green line.

J. C. MCLENNAN.

University of Toronto,
March 10.

Demonstration of the Heating Effect of a Magnetic Field.

To demonstrate the heating effect of a magnetic field, Tyndall revolved between the poles of an electro-magnet a copper-pipe filled with an easy melting fuse: the heat disengaged in it by eddy-currents melts the fuse and the liquid metal is sprayed out in visible globules. To render the heating effect of eddy-currents even more conspicuous, it occurred to me to make the revolving body to glow, and I adopted, after some trials, the following arrangement.

I used as a rotor (Fig. 1) a copper-ball fixed to a

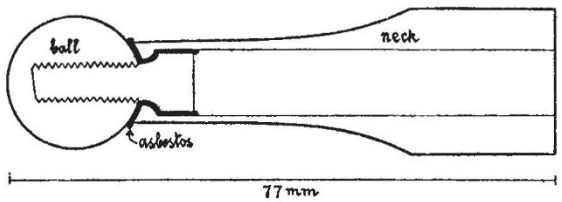

FIG. 1.

copper-neck, and insulated from it by asbestos. The rotor was fixed by the neck to the shaft of an electro-motor—the neck being sufficiently long to allow the ball to be placed in the magnetic field between the poles of the electro-magnet.

Revolving a ball 22 mm. in diameter in a field of $5·7 \times 10^3$ C.G.S. at a rate of $5\frac{1}{3}$ thousand revolutions per minute, the ball begins to glow in a dark room after $1\frac{1}{3}$ minutes, and in a fairly dark room after $1\frac{1}{2}$ minutes.

Omitting the asbestos insulation between the ball and the neck delays the beginning of the glow by about a minute.

HARALD PERLITZ.

Fyysika Instituut, Tartu, Estonia,
February 3.

The Propagation of Radio Waves over the Earth.

THE modified form of the ionic deflexion theory of wave propagation, discussed by Messrs. Nichols and Schelling (NATURE, March 7, vol. 115, p. 334), appears to have been suggested in England and the United States almost simultaneously. That the effect of the earth's magnetic field had to be taken into account in calculating the phase-velocity was pointed out in a paper on "Geophysical Influences on the Transmission of Wireless Waves" read at a joint discussion of the Physical Society of London and the Royal Meteorological Society in November 1924 and already published. The formula for the phase-velocity for transmission along the earth's magnetic field and the calculation of the critical frequencies were there given, and some consequences of these effects have been discussed in a paper communicated to the Cambridge Philosophical Society. Since the earth's magnetic field is strong enough to affect the phase-velocity to a sufficient extent, all the rotatory and double refraction effects familiar in physical optics are appreciable. But probably the most interesting possibility is that the reciprocity relation between two wireless stations may not hold, for the extra forces on the moving electrons due to the earth's magnetic field are, to a certain extent, independent of the direction of propagation of the waves and thus produce relatively different effects for the two directions of transmission.

E. V. APPLETON.

Wheatstone Laboratory,
King's College,
London, March 7.