large as are usually expected[6] on the basis of $\tau^* = 2$ (ref. 1, equation 108).

The theoretical results have been confirmed with ribonuclease (Armour) in experimental runs at 13,410 r.p.m. in the Spinco Model E ultracentrifuge equipped with a temperature-control system and phaseplate schlieren optics. A stationary distribution of the protein, which did not appear to be truly homogeneous ($\bar{M}_z$ = 14,800), was reached in the case of a uniform initial distribution in about 40 hr. compared with the calculated time of 36 hr., and in less than 20 hr. for an initial step distribution for which C_2/C_1 was 2·12 and β was 0·53. The speed, ω, chosen from (2) was such that the assumed value of M, 13,600, corresponded to an α value of 0·6 in a 0·61-cm. column of solution.

This investigation was supported in part by the National Institutes of Health, Bethesda, Maryland, and in part by a grant from the National Science Foundation. A more extensive account will be published later.

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Temperature Coefficient of Resistivity of Polythene and Oil-impregnated Paper

THE distribution of d.c. electric stress in insulation is controlled by the resistivities of the dielectrics involved. In turn, the resistivity at any point is a function of the temperature at that point. Thus in order to compute the electric stress under d.c. conditions, a knowledge of the variation of the resistivity of the dielectric with temperature after long periods of electrification is necessary. Some data on the properties of polythene have been given by Fowler and Farmer[1] and by Ramsey[2]; but the agreement is poor, and in general the published information is scant. Accordingly, it has been necessary to make some measurements on polythene and oil-impregnated paper in connexion with a high-voltage d.c. cable project.

Typical results for three cable materials are given in Fig. 1. It will be seen that the resistivity (ρ) varies with the absolute temperature (T) in accordance with the general relationship:

$$\rho = \rho_0 \exp (b/T)$$

where ρ_0 and b are constants. Electrification times of not less than 1 hr. were needed, in general, before the resistivity of polythene approached a constant value.

The values of b for the three curves shown in Fig. 1 are 12,500, 13,100 and 9,700 for polythene,

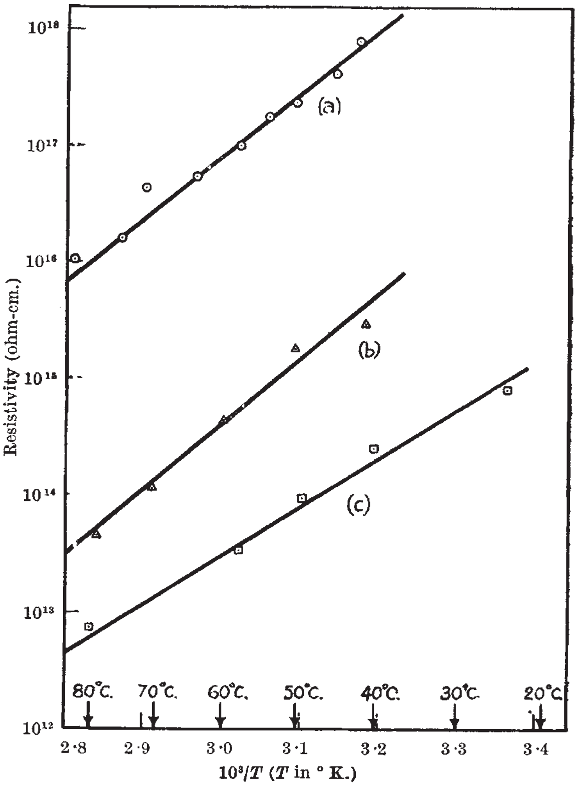

Fig. 1. Variation of resistivity with temperature: *a*, polythene cable; *b*, mass-impregnated non-draining cable; *c*, mass-impregnated oil–rosin cable from service

non-draining and oil–rosin cable respectively. The value for polythene lies between the two values obtained by the workers mentioned above.

This work is being continued; but in the meantime it is hoped that the values of temperature coefficient obtained will assist others engaged on similar problems.

Thanks are due to Messrs. Telegraph Construction and Maintenance Co., Ltd., who supplied the polythene sample.

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Structure of Bone in Relation to Growth

IN a recent communication[1], Jackson and Randall have shown, using electron microscopy and electron diffraction, that at a very early stage in the development of bone, apatite crystals are deposited in what appears to be a definite relationship to the collagen fibres. They did not, however, find any evidence of preferred orientation of the crystals. The samples examined by Jackson and Randall were of embryonic avian bone, and the absence of preferred orientation in such young bones is in accord with results we have obtained with X-ray diffraction.

We have examined the femora of rats from birth onwards, and find that there is no preferred orienta-