yield stress can rise so high at low temperatures or at fast rates of straining (for example, impact deformation at room temperature) that it will exceed the twinning stress, and so the specimen will deform by twinning. On the other hand, in a crystal in which the yield phenomenon has been removed by purification or by plastic deformation, the elastic limit for slip will not depend so sensitively on temperature[8],[9] or strain velocity, and in consequence will not exceed the twinning stress. Finally, we may note that the comparative brittleness shown at low temperatures, or at high rates of strain, of specimens that possess yield points lends support to Orowan's theory of brittle fracture[10], which requires an unusually steep dependence of yield stress on temperature and rate of strain.

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Relaxation Spectrum of Glass

RELAXATION spectra for different kinds of glass, all containing sodium and potassium as common constituents, have been obtained from lateral vibrations over a frequency-range from 5 to 1,500 c./s. It has been found that, in addition to relaxation by thermo-elastic currents, the internal friction at room temperature (26° C.) shows two other common peaks independent of the diameter, one at 50 c./s. and the other at 500 c./s. Evidence for the peak at 50 c./s. has already been given by one of us[1].

Vibration was detected photo-electrically. On account of the finite, though extremely small, electrical conductivity of glass, it was found possible to induce transverse vibrations in glass fibres by electrostatic excitation. The fibre, when connected to a polarizing voltage of the order of 1,000 volts to ground, ultimately acquires the potential of the source in about one minute. If an exciter plate, connected to an alternating potential supplied by a beat-frequency oscillator with an earthed lead, is situated near the glass fibre, forced mechanical vibrations will be set up.

In the high-frequency region, the internal friction was calculated from the width of the resonance curve. In the low-frequency region it was estimated from the free decay of amplitude.
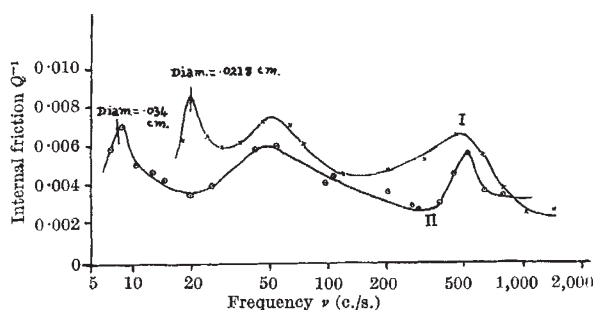
Glass I. SiO_2 68, Na_2O 18, CaO 6, Al_2O_3 4, K_2O 2, other constituents 2.
Glass II. SiO_2 70, Na_2O 11, Al_2O_3 10, K_2O 6, other constituents 3

Typical results are given in the accompanying graph. The first peak in each case is identified with that arising from diffusion of thermo-elastic currents. The theoretical value is indicated by a vertical line. The constitution of the specimens investigated indicates that ionic diffusion of sodium and potassium appears to be responsible for this type of relaxation.

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X-Ray Study of the Thermal Decomposition of Dolomite

THE thermal decomposition of dolomite has repeatedly been investigated; but the mechanism of this reaction still remains obscure. Some authors suppose that solid solutions of carbonates are formed during decomposition[1], others assume primary dissociation into separate carbonates[2] or into oxides[3] of magnesium and calcium. However, the fact that thermal decomposition takes place in the two stages (i) and (ii) has been generally established.

$$MgCa(CO_3)_2$$
$$\big\downarrow \quad MgO + CO_2 + CaCO_3 \qquad (i)$$
$$\big\downarrow \quad CaO + CO_2 \quad (ii)$$
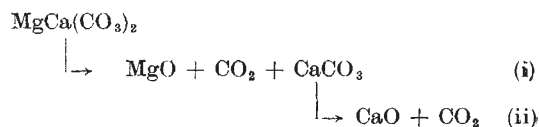
The second step involves the decomposition of calcium carbonate, which occurs in the same way as that of natural calcite. Therefore, in order to obtain further information on the reaction mechanism, a detailed X-ray study of the first stage of decomposition was carried out using single crystals of dolomite.

Depending on temperature and partial pressure of carbon dioxide, dolomite can be decomposed either to magnesium oxide and calcium carbonate, or completely to magnesium and calcium oxides. Three series of experiments were carried out, at 600°, 640° and 800° C., the partial pressure of carbon dioxide being 100, 100 and 650 mm. respectively in order to effect only stage (i) of the reaction. For studies of complete decomposition, the partial pressure of carbon dioxide was lowered to 0·02 mm.

Needles about 3 mm. long and 0·5 mm. in diameter were prepared by cleaving pure transparent dolomite