In view of this experience, it is suggested that sugar chromatograms of biological material which it might be impractical to de-salt should be run in a neutral medium. We have found the *n*-propanol/ethyl acetate/water mixture described above highly suitable for separation of reducing sugars occurring in biological fluids.

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Slow-Neutron Scattering Cross-Sections of Magnesium

The bound-atom and the coherent scattering cross-sections of magnesium have been given[1] as 4·2 and 2·4 barns respectively, and it has been pointed out[2,3] that these values are inconsistent with later measurements. In order to decrease the margin of uncertainty, we have re-determined the free-atom scattering cross-section.

The total cross-section of magnesium has been measured using the arrangement shown in Fig. 1, which selects neutrons in the energy-range 0·5–1,000 eV. The number of neutrons scattered by the 2 gm./cm.² of B_2O_3 or 0·070 in. of polythene is the same. Thus, if we denote the counting-rates with and without the sample when the polythene (boron) is in position by P_s (B_s) and P (B) respectively, the ratio $(P_s - B_s)/(P - B)$ will be the transmission of the sample for those neutrons which are absorbed by the 2 gm./cm.² of B_2O_3. The calculated spectrum of these neutrons is shown in Fig. 2, and their calculated mean wave-length is 0·145 A. (3·9 eV.). Over the neutron energy-range covered by this spectrum, the absorption cross-section of magnesium is negligible[4] and the total cross-section is constant[4], so that our measurement is of the free-atom scattering cross-section.

Measurements were carried out with samples of magnesium metal and its oxide. The oxygen total cross-section[4] was subtracted from the magnesium oxide cross-section. The results obtained were 3·53 ± 0·14 and 3·49 ± 0·12 barns from the magnesium and magnesium oxide measurements respectively. The mean value is 3·51 ± 0·09 barns. This yields a calculated bound-atom scattering cross-section of 3·82 ± 0·10 barns compared to 3·8 ± 0·2 quoted in ref. 4.

The coherent scattering cross-section has been determined recently by the neutron diffraction[2] and the mirror[5] techniques, values of 3·4 ± 0·14 and 3·7 ± 0·15, respectively, being obtained. If the mean of these values is subtracted from our value for the bound-atom cross-section, a value of 0·27 ± 0·14 barn is obtained for the incoherent cross-section. This result is consistent with the direct measurements of Squires[3] (0·11 barn) and Egelstaff[6] (0·09 ± 0·02 barn) of the incoherent cross-section. Thus the values of the scattering cross-sections of magnesium are now in better agreement.

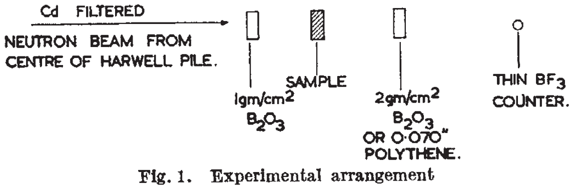

Fig. 1. Experimental arrangement

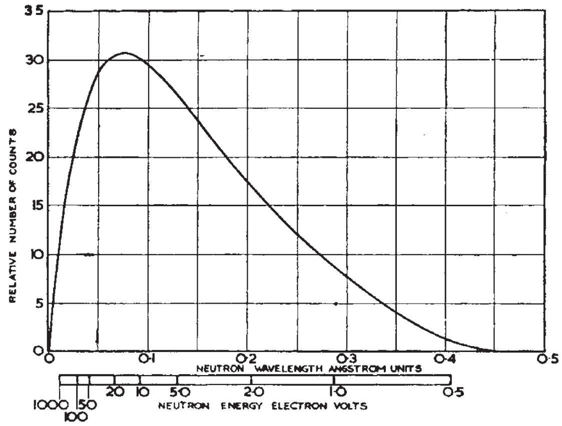

Fig. 2. Neutron wave-length spectrum

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Photo-elastic Effect in Lead Nitrate

In an earlier communication[1], it was reported that barium nitrate behaves in an exceptional manner in respect of its photo-elasticity. Since then, crystals of lead nitrate have also been studied, and differences between the stress-optical constants, as determined by a Babinet compensator for the sodium D lines, are found to be:

$$(q_{11} - q_{12}) = -19{\cdot}13 \times 10^{-13},\ (q_{11} - q_{13}) = -11{\cdot}84 \times 10^{-13} \text{ and } q_{44} = -1{\cdot}393 \times 10^{-13} \text{ c.g.s. units.}$$

These values are similar to those obtained in barium nitrate in being quite large. $(q_{11}-q_{12})$ is different from $(q_{11}-q_{13})$, as we should expect for the T_h class of crystals to which lead nitrate belongs. The difference is 60 per cent of the lower value and is very large indeed. As in barium nitrate, in this substance also, the birefringence produced by pressure along a cube axis is nearly fourteen times that produced by an equal pressure along a cube diagonal. The photo-elastic behaviour of lead nitrate is therefore to be regarded as highly anisotropic and very exceptional.

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