Nature (*London*) **123** 605 (1929)

Magnetic behaviour of organic crystals

The interesting observations of Sir William Bragg on the deportment of crystals of naphthalene in a magnetic field (*Nature*, Supplement, 7 May 1927) have been followed up quantitatively in this laboratory, and some very significant results have been obtained. It is found that the diamagnetic anisotropy of naphthalene is extremely pronounced, the susceptibilities along the three magnetic axes of the crystal being approximately in the ratios 16:7:4. That such a high degree of anisotropy is to be expected in aromatic compounds is indicated by the data for magnetic birefringence in liquids, as had indeed been shown earlier (C V Raman and K S Krishnan, *Proc. R. Soc.* (*London*) A, p. 511, 1927, **113**). Mr S Bhagavantam, who made the measurements, finds that the axes of maximum diamagnetic susceptibility and of minimum optical dielectric constant in naphthalene crystals are approximately coincident. This observation explains why organic liquids derived from naphthalene, and indeed also aromatic liquids generally, exhibit a strong *positive* magnetic birefringence. We may further expect to find that in aromatic compounds generally, the magnetic and optical characters are linked together more or less in the same way as in naphthalene crystals.

The magnetic behaviour of organic crystals of the aliphatic group of compounds is different. Not only is the anisotropy, in general, less pronounced, but also the relation between the magnetic and optical characters is more varied. In some crystals, for example, iodoform, Mr Bhagavantam finds the axes of maximum magnetic susceptibility and optical dielectric constant are parallel; while in others, for example, urea, they are crossed. These facts have a bearing on the explanation of the fact that liquids of the aliphatic class exhibit a magnetic birefringence which is usually much feebler than in aromatic liquids, and further that in some of them the magnetic birefringence is positive and in others negative. An extended series of measurements of magnetic birefringence in liquids of the aliphatic class is now being made by Mr Ramanadham here, and is serving to elucidate relationships between the optical and magnetic characters of organic compounds and their dependence on chemical constitution.

Since the position of the magnetic axes of a crystal depends on the orientation of the molecules in the unit cell of the lattice, it is clear that the studies of magnetic behaviour of organic compounds will form a powerful auxiliary to X-rays in the analysis of their crystal structure.

C V RAMAN

210 Bowbazaar Street, Calcutta, India
7 March