

society was thought of as a harmony also. What kept concord in man, in society and in the universe as a whole was order or degree, the virtues of which are celebrated by Ulysses in the long speech in "Troilus and Cressida" (1.3.84-124), which gives us Shakespeare's most elaborate and explicit statement of Elizabethan political philosophy. This correspondence between humanity and the starry universe was no mere poetical metaphor. In that day, the stars and the human race were thought of as intimately linked. Comets and eclipses were portents. Astrology, the study of the influence of the stars, was a most learned and elaborate science in which everyone believed. We have no right to condemn such notions as mere superstition. Men toiled at them, gave up their lives to them, as modern men of science do to science. The Elizabethans were as intellectual as ourselves, probably more intellectual. Three hundred years hence, will not our roads to truth seem as strange, as ill-directed as theirs seem to us?

### The Flow of Metals

PROF. E. N. DA C. ANDRADE delivered the twenty-seventh annual May Lecture before the Institute of Metals on May 5. Flow is most easily observed in the liquid state, but whereas there is a satisfactory theory of gases, and the structure of crystalline solids has been elucidated by the methods of X-ray analysis, very little is known of the actual behaviour of the molecules in the liquid state. Prof. Andrade has put forward a theory of liquid viscosity on the basis that the momentum is transmitted from layer to layer not, as in a gas, by the passage of molecules from one layer into the other, but by instantaneous association of the molecules when they touch, so that at any nearest approach two molecules share their momentum. On this basis, a formula can be derived which gives the viscosity of a simple liquid at its melting point, and another which gives the temperature variation of the viscosity. Molten metals are particularly suitable for experiments designed to throw light on this problem of viscosity, because they constitute liquids which consist of one kind of atom only, and they are not, in general, associated. The viscosity is conveniently measured by sealing up the molten metal in a sphere, suspended *in vacuo*, and observing the damping of the torsional oscillations of the sphere about a vertical axis due to the enclosed liquid. The method has already been used for the alkali metals, and is being extended to other metals. The flow of solids is, perhaps, at first sight, even more troublesome theoretically than the flow of liquids, for single crystals of metals exhibit plastic flow under very small stresses, whereas a perfect crystal should be strong, and also brittle. It cannot be said that there is any fully satisfactory theory of the flow of single crystals of metals, but a good beginning has been made. It is, of course, a far step from the single metal crystal to the polycrystalline metal of industry, but we know that any crystal boundary is likely to stop the propagation of a dislocation, or glide in general, and so will make the

metal less weak and less liable to flow. Industry cannot, of course, wait for theory, but the only really satisfactory way to approach the problem of the strength of metals is by way of the single crystal.

### Exhibition of Opals at the Geological Museum

A SPECIAL loan exhibition of Australian opals and other gemstones, from the collections of Mr. Kelsey I. Newman, has been arranged for this Coronation month at the Geological Museum in South Kensington. The exhibition comprises many of the most beautiful opals hitherto obtained from New South Wales, including the famous 'Flame Queen', a magnificent and unique stone reputed to be the finest specimen yet won from Australian opal fields. Most of the stones are 'black' opals from the Lightning Ridge field, New South Wales, where the gem occurs in fissures or joints in sandy sediments of Cretaceous age. Since the 'black' opals from this area first came into the market about 1908, more than a million pounds worth of these stones has been produced from Australian sources. A collection of Australian sapphires, principally golden stones, is also exhibited. These are from the alluvial deposits of Anakie in Queensland, from which locality stones to the value of £113,000 have been produced since 1921. Other temporary exhibitions at the Museum include a display of recent presentations of semi-precious and ornamental stones presented by H.M. Queen Mary; and a small exhibit on the geology and history of the Coronation Stone, which is compared to Old Red Sandstones of similar petrography from the neighbourhood of Scone in Perthshire.

### Coronation Planting Schemes

IN order to encourage planting and the beautifying of the countryside as one aspect of Coronation celebrations, the Coronation Planting Committee has been formed under the presidency of the Marquess of Lothian, with an office at 68 Victoria Street, Westminster. The Committee is fully representative of practically all associations which aim at preserving the beauty and natural scenery of Great Britain. Its objects are explained in a pamphlet entitled "For King and Countryside: Towards a more Beautiful Britain", and it may be recalled that the scheme was launched at a meeting in Guildhall on November 26, 1936. Other booklets have now been published dealing with the village and how to make it beautiful, commemorative tree planting, design of allotment areas, play-parks, window-box gardening, etc. The Committee has also issued a leaflet with suggested forms of competitions for village communities, in order to foster pride in the village, floral displays and a care for trees. It is proposed to prepare a volume recording all the amenity schemes undertaken throughout the country in commemoration of the Coronation. The Committee's aims should make a wide appeal especially to those bodies which feel that transitory decorations need to be supplemented by permanent records of the occasion.