

Since the present War, the beech tree has come into prominence for the manufacture of ply-wood, with such success that the demand is likely to increase beyond expectation. The Ministry of Supply has now given instructions that all beech being felled in the British Isles shall first be inspected and suitable butts reserved for this purpose.

The very beautiful and ornamental tree generally known as the copper beech is a variety of the purple beech (*Fagus sylvatica* var. *purpurea*). The origin of this tree is doubtful. Elwes says:

"Mention is made of a beech wood at Buch, on the Irchel mountain in Zurichgau (commonly called the Stammberg) which contains three beech trees with red leaves, which are nowhere else to be found . . . and the legend is stated that according to popular belief five brothers murdered one another on the spot where the trees sprang up. Offspring of these trees were carried into a garden, where they still retained their purple colour."

As to the romantic origin above-mentioned, there may possibly be a difference of opinion. This tree can be found widely distributed and is highly prized in innumerable places throughout Great Britain and on the Continent. Its highly decorative appearance in parks and gardens should ensure its future success and planting. Within the last twenty-five years, on two separate occasions I have heard of the successful transplantation of two splendid fully-grown trees—a significant illustration of its appreciation by the respective owners. Elwes mentions that the largest tree which he had found was in the park at Dunkeld, Perthshire, which measured 86 ft. high, with a girth of 15 ft. 3 in.

Nor must we overlook among numerous varieties of this beautiful tree the fern-leaved beech, sometimes called the 'cut-leaved' beech, for which a number of different botanical names have been used, but which Elwes names var. *heterophylla*: the origin of this variety is unknown. This tree is far too little known; but its ornamental character and the decorative beauty of its foliage should recommend it for more general cultivation.

CHEMICAL RESEARCH IN THE U.S.S.R.

RECENT Russian publications received contain many papers of considerable interest dealing with chemical and physico-chemical subjects. Only a small number of them can be mentioned here.

Although polonium belongs to Group VI in the Periodic System, no compounds in which it shows a valency of six were known, although compounds of lower valencies have been described. A. G. Samartzewa¹ examined the co-precipitation of polonium with salts of telluric acid, containing 6-valent tellurium, and found that polonium crystallizes isomorphously with salts of orthotelluric acid. This suggests that polonium forms an ion PoO_4^{6-} in which it is hexavalent.

The Debye formula for the dipole moment of a molecule in terms of the dielectric constant is restricted to gases and to very dilute solutions of polar substances in non-polar solvents. In the case of pure polar liquids the effective orientation polarization is less than the ideal orientation polarization,

$$P_i = \frac{4}{9} \pi N \frac{\mu^2}{kT}$$

which, if known, would give the dipole moment μ .

The difference is probably due to the internal local field in the liquid. J. K. Syrkin² has found two formulae which give the relation between effective and ideal polarizations, from which the dipole moment μ for a pure liquid can be determined if its refractive index n , density d , and dielectric constant ϵ are known (N is Avogadro's number, k is Boltzmann's constant, M is molecular weight, T is absolute temperature):

$$\frac{4}{3} \pi N \frac{\mu^2}{3kT} = \frac{(\epsilon - n^2)(\epsilon + 2)}{(n^2 + 2)(2\epsilon - 1)}$$

A formula for mixtures is also given, and can be used when the substance is soluble only in a polar solvent.

The relation between colour and structure of organic compounds has often been dealt with both theoretically and experimentally. A theory based on quantum-mechanical resonance was proposed by Sklar³. An increase in the number of conjugated bonds is accompanied by an increase in the number of resonance structures, which probably tells upon the absorption spectrum and colour. M. A. Kovner⁴ has considered quantitatively the energy-levels and spectrum of hexatriene, and gets good agreement with the known absorption band.

Among the many suggestions for the structure of boron hydrides, one by M. E. Dyatkina and J. K. Syrkin⁵ supposes that there are no single electron bonds but resonance between the states $> \text{B}^+$ and $> \bar{\text{B}} <$, and the structure of B_2H_6 is represented as follows. Two atoms of boron and four of hydrogen are in one plane and the remaining two hydrogens are on a line perpendicular to this plane and passing through the middle of the line $\text{B}-\text{B}$ at equal distances from the plane. This model represents two distorted tetrahedra having a mutual edge. The model is discussed in the light of the electron diffraction measurements of Bauer and, in the opinion of the authors, is consistent with them. Structures for metal borohydrides are also proposed.

The mechanism of discharge of hydrogen ions has, as is well known, attracted a considerable amount of attention in recent years, and different theories have been proposed. A paper by A. Frumkin⁶ gives a survey of his experiments. The lack of agreement of data on the over-voltage on mercury is traced to the deposition of impurities, especially near the electro-capillary maximum. The results with high current densities obtained by other workers are critically considered and shown to be really in agreement with Tafel's equation. Measurements with very low current densities are very difficult, on account of the possibility of depolarization by dissolved oxidants, and the danger of adsorption of surface-active substances. For very low current densities the time lag in charging the double layer also comes in. There is some disagreement with Bowden and Kenyon's results, but not much. The results with dropping electrodes are considered in detail. The shift of half-wave potential with concentration found by Tomeš was not confirmed. A very detailed discussion of the structure of the double layer is given, and, among other conclusions reached, it is shown that results cannot be explained on the assumption that the potential depends only on the distance from the mercury surface.

¹ *Compt. Rend., U.R.S.S.*, **33**, 498 (1941).

² *Compt. Rend., U.R.S.S.*, **35**, 43 (1942).

³ *J. Chem. Phys.*, **5**, 669 (1937).

⁴ *Compt. Rend., U.R.S.S.*, **35**, 51 (1942).

⁵ *Acta Phys. Chim., U.R.S.S.*, **14**, 547 (1941); *Compt. Rend., U.R.S.S.*,

35, 180 (1942).

⁶ *Acta Phys. Chim., U.R.S.S.*, **18**, 23 (1943).