Wood Anatomy and Resistance to Shipworm Attack

A FASCINATING discussion of this important subject appears as a paper included in the *Proceedings of the Fifth Pacific Science Congress*, 1933 (University of Toronto Press, 1934) by Prof. G. van Iterson, jun., of Delft. A statement by Klitarchus in 325 B.C. to the effect that the Romans conducted a successful expedition to the Island of Tylos in the Red Sea in search of some species of wood that could resist the attacks of the teredo is made the keynote of the address.

In these days we are still suffering from the attacks of this shipworm; the damage to piling in the Bay of San Francisco alone in the years 1920 and 1921 being estimated at 15 million dollars. Science has so far been able to help but little, though the best remedy, creosote impregnation, was the result of scientific research. Even this is not, however, completely effective, as cases are reported where molluscs have pierced the creosoted timber, even the holes smelling of creosote.

What, then, remains of the knowledge of the Romans of a timber that resists the teredo? Nothing apparently, as a committee appointed by the Royal Academy of Amsterdam in 1869 came to the conclusion that such a timber could not be found.

Later, however, the great resisting powers of certain woods were recognised, notably of Demerara greenheart (originating from *Nectandra rodioei*, Schomb.), the wood of which both the polar ships, the *Fram* and the *Discovery*, were built, and the wood which Colonel Goethals preferred during the early years of the construction of the Panama Canal. A second wood, 'manbarklak', from *Eschweilera longipes*, Miers, from Dutch Guiana later became famous as still more resistant, though sometimes rapidly destroyed by fungi when stored on land.

The reasons for the resistance of these timbers to the teredo was not known. Demerara greenheart contains certain poisonous alkaloids, but manbarklak does not, and Prof. van Iterson suggested that its resistance might be due in part to inclusions of silica in the ray cells, which makes the wood very difficult to work and may impede the boring activities of the teredo. In the museum at Balboa are piles of Demerara greenheart (from the Panama Canal) riddled by teredo, a disappointment due to the appearance in these busy waters of a new species of teredo. A Dutch forester, Mr. J. W. Gonggrijp, followed up this observation of Prof. van Iterson, when he found manbarklak resisting much better than Demerara greenheart in canal sluice-gates of Dutch Guiana. The result of his extensive studies has been to indicate five or six species of woods from the Netherlands East Indies as promising for marine construction because of their silica inclusions, notably two related species of *Metrosideros*, whilst two or three species containing poisonous substances are also recommended.

The investigation of woods from other wood-producing regions from the same point of view is obviously a next step, and in this connexion Prof. van Iterson describes in this paper a new and rapid method for the microscopic recognition of the silica inclusions.

A Grid System for Ordnance Survey Maps

A PAPER by Brigadier M. N. MacLeod, Director General of the Ordnance Survey, on "A Grid System for the Maps of Great Britain" was read at a recent meeting of the Royal Geographical Society. Brigadier MacLeod explained that the 1/2,500 survey is not published as a continuous series for the whole country but consists of more than forty separate series, each comprising a single county or a small group of counties. This lack of continuity has proved a source of much inconvenience, and no little extra expense in revision. Since the War, the revision has fallen seriously into arrears, but if, as a result of the recommendations of the Departmental Committee now considering the matter, drastic action for overtaking these arrears is approved, the Director General thinks it would be a good opportunity for recasting the 1/2,500 sheets on national instead of county lines and on a single projection.

Such a step would enable all the maps of Great Britain to be brought on to the same projection, to which a grid could be applied. A map grid is formed by lines parallel to the co-ordinate axes of the projection at fixed distances therefrom. These lines appear on the maps as a network of squares. They form a framework upon which the map is compiled, and which enables one scale of map to be easily compared with another, besides being a complete index to maps of all scales. Above all, they form a simple, convenient and precise system of reference enabling the position of any point to be identified or defined, by the same co-ordinates on all scales.

For most uses of the grid, it is essential that the lines should be at intervals of 10 *units*; though the actual unit is immaterial. This 'decimal' arrangement of the grid lines at once suggests the use of metric units for the grid. There are, however, other considerations—the most important of which is that the grid square should be of a suitable size. It was suggested that a square of about 5 cm., or 1½–2 inches, is a suitable size. If much larger than this, measurements within the square would be affected by expansion or contraction of paper, and if much smaller, the squares would tend to obscure the map.

The size of the grid square is a function of the scale of the map as well as of the grid unit, and whatever unit is selected it is not possible to have a grid square of the ideal size on every scale of map. The two most important British maps are the 1/2,500 and