generally used in the mercantile navy for yards and top­masts, and also in the royal navy for the smaller description of spars and boats’ masts. They are tough, close grained, and elastic, but are very full of large knots ; and care is therefore required in selecting them. The timber also is soft and far from durable, it having very little appearance of resin. The Norwegian spruce grows frequently to a large size.

Cedar, *Pinus Cedrus,* would be among the most valuable of all timber trees, were it sufficiently common to be avail­able for building purposes. It is almost indestructible from time, and no insects will ever attack it. It thrives well in this climate, but hitherto has only been planted either as an object of curiosity or of ornament. It requires a more generous soil than any other of the tribe of pines, and is considered to be a timber of very slow growth. Pitch- pine is also a very valuable timber for building purposes, but it is too heavy for spars.

Fir sticks, the Riga hand-masts especially, are very liable to have serious defects in them, which it is often impossible to discover until the stick is worked. They are techni­cally called upsets. The grain appears to be partly se­parated, so that a shaving from the stick at that place would bend to a sharp angle at the upset, as if partly broken. There always appears to be a greater or less ac­cumulation of the turpentine about the injury, as if it had originally exuded at the wound, and become congealed around it. These defects are most frequently found in the smaller sticks, those especially that are more resinous and knotty than others ; and they sometimes are so numerous as to extend, at very short distances apart, for a great por­tion of the length of the stick. Mr Cradock, who has long superintended the mast-making at Portsmouth dock-yard, considers them to be the effect of violent winds on the more exposed trees of a forest. He founds this opinion on the facts that they are most common in the most flexible timber; that they are not perceived in sticks of large dia­meter; and that in the firs of little flexibility, as the yel­low pine, they are seldom or never found ; although the sticks of this fir, from being cut in every variety of direc­tion, to form the components of made-masts, are more searched than any other. The cowdee, a New Zealand timber, lately introduced both in the royal and mercantile navies, is, he says, much subject to this defect; and he has observed it once in a poon topmast. The defect seldom or never appears in the outer layers of the timber, but only after some of these have been removed by the axe, and the older timber laid bare of the sap-wood.

The sap-wood in all fir timber is useless, and very ge­nerally there is a large proportion of it in comparison to the quantity of heart-wood. It is rather a curious fact, that there appears to be a difference between the pines and the generality of the hard-wood timber in this, that a small proportion of sap-wood in fir is indicative of the in­feriority of the timber. Thus the red pine of Scotland has fewer layers of sap-wood than either the red pine of Ca­nada or of the Baltic. As a general remark, it may be stated, that the greater the quantity of sap-wood there is about a tree of any description of fir timber, the better will be the quality of the spine, which is the technical name given to the mature wood.

The cowdee, which is now largely imported into this country, is a close and even-grained timber, almost entire­ly free from knots. It grows to so large a size as to be available for the topmasts and other principal spars of the largest classes of vessels ; but from its want of elasticity, and its liability to warp and rend, it is not so suitable for small conversions. It varies greatly in its quality, even so much as often to be of different colours, grain, and texture, in the same stick. It is of about the same average weight as Virginia red pine

Larch timber, *Pinus Larix,* formerly unknown in Great Britain, has, within the last century, been very extensively planted. The first plantations of it were made on the vast estates of the duke of Atholl, in the Highlands of Scotland. The following account, which is extracted from Knowles on Preserving the Navy, was, as the author of that work states, furnished to him by the late duke, and it contains, consequently, the results of the longest experience as to the growth of larch timber in Britain which can be ob­tained. The account is interesting, because plantations of larch arc becoming very numerous, as they are found to be very profitable. The returns from a larch plantation dur­ing the time the trees are arriving at their full growth, are estimated to be at least double what they would have been from an equal plantation of any other timber. “ Seedlings of larch were probably first brought into Scotland in the year 1738, by Mr Menzies; but it has been asserted by some, that they were introduced into that part of this coun­try in 1734, by Lord Kames. Some were left at Dunkeld, and some at Blair Λthole, by the former gentleman; and being exotic plants, were placed by the gardeners in green-houses. Not thriving in those situations, they were plant­ed in the pleasure-grounds, where they grew luxuriantly. When the present duke succeeded to the titles and estates (in 1774), there was a considerable number of trees in a thriving state ; and on a general survey of his estates in 1783, there were found to be 900 Scotish acres of planta­tion, 600 of which were of larch ; since which time his grace has planted extensively every year, and in the spring of 1820, 10,820 Scotish, or about 12,984 English acres, were covered with trees. The different species were, of

Scotch Acres.

Oak 800

Scotish firs . 1,500

Spruce firs 500

Mixed plantations in the pleasure-grounds 200

Birch 200

Larch 7,620

10,820

“ The larch thrives in very exposed situations. The lower range of the Grampian Hills, which extends to Dun­keld, are at an altitude there of from 1000 to 1700 feet above the level of the sea. The larch trees are planted as high as 1200 feet up these hills, and grow exceedingly well ; a situation where the hardy Scotish firs cannot rear their heads. The spruce fir, however, thrives equally well as the larch on high and exposed hills. The growth of the larch trees is very rapid, and Scotish fir of the same age will measure only half the quantity ; and so much is the wood esteemed in Scotland, that while the former is worth 2s. 6d. per cubic foot, the latter brings only 1s. 3d. The following account of a larch tree, planted in the year 1738, and measured February 1819, will give some notion of its growth.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Above the ground, 1 ft. 2 ft. | | 3 ft. | 4 ft. | 5 ft. | 6 ft. | 10 ft. | 20 ft. 30 ft. | 40 ft. | 50 ft. | 60 ft. | 70 ft. 75 ft. |
|  | Ft. In. Ft. In. | Ft. In. | Ft. In. | Ft. In. | Ft. In. | Ft. In. | Ft. In. Ft. In. | Ft. In. | Ft. In. | Ft. In. | Ft. In. Ft. In. |
| Girth | 17 8 14 6 | 12 7 | 11 9 | 11 5 | 11 1 | 10 4 | 9 7 8 11 | 7 11 | 6 3 | 4 8 | 3 2 1 10 |

“ The top was fifteen feet in height, making the whole height ninety feet ; and the tree measured 300 feet, or six loads, in cubical contents. The white and red larch trees are those chiefly planted. The duke has made trial of the black or American, and also of the Russian larch, but has found that they do not thrive well. The timber in ques­tion has been used for many years in Scotland for almost all local purposes, such as posts, rails, mill-wheels, fishing