annual rings being of a darker shade. A characteristic feature is the large number of very hard black knots which the wood contains. It is easy to work, but rather inferior in all respects to the northern pine. Its weight per cubic foot averages about 33 lb.

The red pine *(Pinus resinosa* or *P. rubra)* is also known as "Canadian pine ” and "American deal.” It grows in the northern parts of North America, where the tree attains a height of 60 or 70 ft. with a diameter of from 12 to 30 in. It weighs about 36 lb to the cubic foot. In Canada it is called "Norway pine ” and “ red pine” from the colour of the bark. The wood is white, tinged with yellow or red, of fine grain, and works to a smooth lustrous surface remarkably free from knots.

The white pine *(Pinus str obus)* is exported from the northern parts of the United States of America and from Canada. Other names for this timber are "yellow pine” and "Weymouth pine,” the last name originating in the fact that the earl of. Weymouth first introduced it into England. The tree attains a height of from 150 to 200 ft. with a thickness of trunk at 5. ft. from the bottom of from 5 to 10 ft. The wood when cut is white or yellowish white, straight in grain and easily worked, but is not so tough, elastic or durable as the northern pine, and therefore is not so suitable for constructional work. For joiners’ work, however, it is well adapted, and glue adheres strongly to it, though nails do not hold well. It weighs about 30 lb per cub. ft.

The Kauri pine *(Dammar a australis)* is a native of New. Zealand. It grows to a height of from 80 to 140 ft., with a straight stem 4 to 8 ft. in diameter. The wood is a light yellowish brown in colour, fine in grain and of even texture, the annular rings being marked by a darker line. It is strong, elastic and resinous. A cubic foot weighs about 35 to 40 lb..

The pitch pine *(Pinus rigida)* is a native of Canada and is common throughout the United States of America. It is remarkable for the large quantity of resin it contains, the weight of the wood, which is about 48 lb per cub. ft., and the strong, red markings of the grain, usually straight but sometimes exhibiting a beautiful figure. Its weight and strength, and the large size of the balks, make it very valuable for heavy constructional works and piling, and its fine figure makes it equally valuable for joinery.

Of the larch the best known variety is the European larch *(Larix europaea),* which grows in Switzerland, Italy, Russia and Germany. The larch frequently attains, a height of 100 ft. but the average height is about 50 ft. and diameter 3 ft. The wood is extremely durable and lasts well where exposed alternately to wet and dry; indeed, the larch is useful for every purpose of building, internal and external. It is the hardest and toughest of the cone-bearing trees and weighs 30 to 40 lb per cub. ft.; it has a straight grain free from many knots; in colour it is of a rather deep yellow or brownish tint, with the hard portions of the annular rings marked in a darker red. The American black larch *(Larix pendula)* and the American red larch *(Larix microcarpa)* are native to North America. The latter tree is of comparatively little service. The black larch yields timber of good quality, nearly equal to that of the European tree.

The cedar used in building work is really a species of juniper. The Virginian red cedar *(Juniperus virginiana)* grows in the United States, Canada and the West Indies. The tree produces excellent timber, and is much used for furniture, its strong acrid taste driving away insects. It weighs about 40 lb per cub. ft. The Bermuda cedar *(Juniperus bermudianá)* is used for internal joinery and is extremely durable.

*Hard Woods.—*The timbers in the second class are obtained from non-coniferous trees, containing no turpentine or resin, and are given the general name of hard woods. Their initial expense and the high cost of working preclude their general use, and they are consequently reserved to a great extent for specially heavy constructional work and ornamental finishing joinery.

The oak *(Quercus),* of which some sixty distinct species are known, grows freely in Europe and America. Several kinds yield valuable timber: in England the two best-known varieties are *Quercus pedun- culata* and *Quercus sessiliflora.* There is little difference between the quality of the two woods, the variation being in the foliage and fruit. The wood is very hard, tough, with fine regular grain and close texture, the annular rings being distinct and the medullary rays well marked. When it is cut along these rays beautiful markings are revealed, called silver grain. The colour is a light brown, and its weight is about 50 to 56 lb per cub. ft. Oak is very durable either in a dry or a wet situation, or in a. position where it will be alternately dry and wet. It is very suitable for constructional and engineering works, and it supplies one of the finest woods for ornamental joinery work. The Durmast oak grows in France and the south of England; it is not so strong or durable as the English oak. Baltic oak is grown in Norway, Russia and Germany, and is exported from the Baltic ports. Though inferior to the English oak, it is very straight in the grain and free from knots. Austrian oak is light in colour, and is much used for joinery work. White oak comes principally from Canada, under the name of American oak. It is straight in grain but subject to warping, and is not so durable as British oak.

The common walnut *(Juglans regia)* grows in Great Britain. On account of its scarcity it is little used for building purposes, except for ornamental joinery, being more used by the cabinet and furniture maker. A cubic foot weighs about 45 lb. The white walnut *(Juglans alba)* or hickory is common in North America, and is very tough, hard and elastic. The black walnut *(Juglans nigra)* is also native to America. It has a fine grain with beautiful figure, and takes a fine polish. It weighs 56 lb per cub. ft.

Of the elm *(Ulmus)* there are five common varieties, the two most cultivated being the rough-leaved elm *(Ulmus campestris),* which is grown in large quantities in England and North America, and the smooth-leaved wych elm *(Ulmus glabra).* The colour of the wood is brown; it is hard, heavy, strong and very tough, and when kept either always wet or always dry is durable. Elm is very liable to warp and shake, is porous and usually cross-grained. The piles of old London Bridge were of elm, and after six centuries of immersion were but little decayed. The wood is not much used in building operations. It weighs about 40 ìb per cub. ft.

The common ash *(Fraxinus excelsior)* is a native of Europe and Northern Asia, and is grown extensively in Great Britain. Its colour is light brown, sometimes with a. greenish tint, with the annular rings of darker colour. The wood is very tough and strong, and superior to most wood in elasticity; and it weighs 40 to 55 lb per cub. ft.

Beech *(Fagus sylvatica)* grows in the temperate districts of Europe. The wood is heavy, strong and hard; white to light reddish-brown in colour; and durable if kept either dry or wet; is porous and works easily; it weighs about 40 to 48 lb per cub. ft. The red beech *(Fagus ferrugina)* is common in North America.

Sycamore *(Acer pseudo-plalanus)*, sometimes mistakenly called the plane tree, is common in Germany and Britain and in the eastern states of North America. It is a large tree of rapid growth. The wood is light brown or yellowish white, with annular rings not very distinct, often cross-grained and of uniformly coarse texture. It warps and cracks rather badly, and weighs from 35 to 42 lb per cub. ft.

Teak *(Tectona grandis)* is a native of southern India and Burma. It grows rapidly to a great height, often exceeding 150 ft., with a straight trunk and spreading branches. Teak wood is straight in the grain and. exceptionally strong and durable, its oily nature enabling it to resist the attacks of insects and to preserve iron nails and fastenings. It weighs from 45 to 56 lb per cub. ft.

Mahogany *(Swietenia mahogani)* is a native of the West Indies and Central America, the best-known varieties being Cuban or Spanish and Honduras. The Spanish wood has a darker colour and richer figure than the Honduras, and is therefore preferred for ornamental joinery work. The colour of mahogany is reddish brown, and in the Cuban wood the pores are often filled with a white chalky substance which is usually absent in the Honduras variety; the latter, however, may be obtained in larger sizes, and is straighter in the grain and easier to work. Spanish mahogany weighs about 56 lb to the cubic ft., and the Honduras variety about 36 lb.

Greenheart *(Nectandra rodiaei)* is a very heavy, hard and durable wood from the East Indies.. It ranges in colour from pale yellow to a deep brown, and the grain is very compact and of close texture. The wood contains an oil which enables it to resist the attack of sea worms, and this quality makes it suitable for use in marine construction. The average weight of a cubic foot is about 61 lb.

Basswood *(Tilia americana)* is common in Canada and in the northern United States. . It is soft and easy to work, and of even texture and straight grain. It may be obtained in wide boards, and thus is fitted for use in large panels. It weighs about 30 lb per cub. ft.

There are several varieties of maple growing in Canada and the United States, but the one in most common use is the sugar maple, also called rock maple, which grows freely in the districts around the Great Lakes. The wood is fine-grained, frequently with a beautiful wavy figure, yellowish white to light brown in colour; it is very hard, tough and durable. Birds’-eye maple has a peculiar curly grain, and is much in request for ornamental joinery.

The numerous tests of the strength of timber which have been made by various authorities from time to time vary so much, both as regards the conditions under which they were carried out and the results obtained, that great discretion is required in using them for any practical purpose. An important series of tests was made in 1883 and 1887 at Munich by Professor Johann Bauschinger. He reduced all the specimens submitted for test to a stan­dard of moisture, the percentage selected being 15%. This was necessary on account of the great difference in strength found to exist between specimens cut from the same piece of timber but differing in the amount of moisture they contained.