FAGUS

THE NORTHERN BEECHES

Fagus, Linnæus, *Syst.* ed. 1. *V. Monœcia* (1735); Bentham et Hooker, *Gen. Plant.* iii. 410 (1880).

THE genus, as understood by Bentham and Hooker, included all the beeches, those of the southern as well as of the northern hemisphere. Blume[1] separated the southern beeches as a distinct genus, Nothofagus; and his arrangement, on account of its convenience, will be followed by us. Fagus belongs to the family Quercineæ, which includes the oaks, chestnuts, castanopsis, and beeches. The genus, limited to include only the northern beeches, consists of large trees with smooth bark and spindle-shaped buds arranged alternately on the twigs in two rows. Leaves: deciduous, simple, pinnately-nerved, folded in the bud along the primary nerves. Flowers monœcious: the staminate flowers numerous in pendulous globose heads, the pistillate flowers in pairs in involucres. The male flower has a 4 to 8 lobed calyx with 8 to 16 stamens. The female flower has a 6 lobed calyx, adnate to a 3 celled ovary, with 2 ovules in each cell; styles 3, filiform. On ripening, the involucre is enlarged, woody, and covered with bristly deltoid or foliaceous processes; it dehisces by 4 valves, allowing the 2 fruits enclosed to escape. Each fruit is 3 angled and contains 1 seed, which has no albumen.

Seven distinct species of Fagus have been described, of which three, the European beech, the American beech, and the peculiar *Fagus japonica* are recognised by all botanists as good species. The Caucasian beech, the two Chinese beeches, and the common beech of Japan are considered by some authorities to be mere varieties of *Fagus sylvatica*; but these can all readily be distinguished, and in the following account will be treated as independent species.

KEY TO THE SPECIES OF FAGUS.

I. *Nuts projecting out of the top of the involucre.*

1. **Fagus japonica.** Japan.

Involucre very small, covered externally with small deltoid processes, and borne on a very long slender stalk. Leaves with 10-14 pairs of nerves, which bend round before quite reaching the slightly undulating margin.

[1] Blume, in *Mus. Lugd. Bat.* i. 306.

II. *Nuts enclosed in the involucre.*

A. *Involucres with linear, awl-shaped, bristly appendages. Species* 2, 3, *and* 4.

2. **Fagus sylvatica.** Europe.
Fruit-stalks short and pubescent throughout.
Leaves: under surface glabrous except on the nerves and midrib; lateral nerves 5-9 pairs; margin not regularly serrate.

3. **Fagus ferruginea.** North America.
Fruit-stalks short and pubescent throughout.
Leaves: under surface glabrous except on the nerves and midrib; lateral nerves 10-12 pairs, ending in the teeth; margin serrate.

4. **Fagus sinensis.** Central China.
Fruit-stalks short, pubescent only close to the involucre.
Leaves: minutely pubescent over their whole under surface; lateral nerves 9-10 pairs ending in the teeth; margin serrate.

B. *Involucres with their lower appendages dilated and foliaceous. Species* 5, 6, 7.

5. **Fagus orientalis.** Caucasus, Asia Minor, N. Persia.
Fruit-stalks long (twice the length of the involucre or more) and very pubescent throughout.
Leaves: broadest above the middle; lateral nerves about 10 pairs, bending round before quite reaching the undulate margin; under surface glabrous except on the midrib and nerves.

6. **Fagus Sieboldi.** Japan.
Fruit-stalks short (as long as the involucres) and pubescent throughout.
Leaves: broadest below the middle; lateral nerves 7-10 pairs, bending round before quite reaching the margin, which is crenate; under surface glabrous beneath except on the nerves and midrib.

7. **Fagus Engleriana.** Central China.
Fruit-stalks very long (five times the length of the involucre) and quite glabrous.
Leaves glabrous and glaucescent underneath; lateral nerves 13 pairs, bending round before quite reaching the undulate margin.

FAGUS FERRUGINEA. American Beech.

Fagus ferruginea, Dryander, in *Ait. Hort. Kew.* iii. 362 (1789); Loudon, *Arb. et Frut.* iii. 1980 (1838); Mayr. *Wald. von Nordamerika*, 176 (1890).
Fagus sylvatica atropunicea, Marsh. *Arb. Am.* 46 (1785).
Fagus silvestris, Mich. fil. *Hist. Arb. Am.* ii. 170, t. 8 (1812).
Fagus atropunicea, Sudworth, *Bull. Torrey Bot. Club*, xx. 42 (1893).
Fagus americana, Sweet, *Hort. Brit.* 370 (1826); Sargent, *Silva of N. Am.* ix. 27 (1896).

The American beech ranges, according to Sudworth, from Nova Scotia to north shore of Lake Huron and Northern Wisconsin; south, to western Florida; and west, to south-eastern Missouri and Texas (Trinity River). Mayr[1] says it is at

[1] Mayr, *l.c.*

its best in the northern deciduous forest, where it is a stately tree, *e.g.* at Lake Superior. The finest individual trees occur on the small hills of the Mississippi valley, but the timber is not so good as that of trees farther north. Pure woods of American beech rarely if ever occur.[1] Elwes saw the American beech principally near Boston and in Canada, and remarked one peculiarity which may not be found in all places. This was its tendency to throw up suckers from the roots, a feature which is very marked in Professor Sargent's park at Brookline, and in the beautiful grounds of the Arnold Arboretum. There is a group of beech here by the side of a drive, of which the largest was 65 feet by 7 feet 8 inches, surrounded by a dense thicket of suckers. Beech seedlings, however, seem to be much less common here than in Europe, and on moist ground are often suppressed by maple and other trees. The rate of growth of young trees in the Arboretum was about equal to that of the European beech at twenty years, and the bark of the latter was darker in colour. Near Ottawa Elwes gathered ripe fruit of the American beech[2]—which here is not a large or tall tree—in the end of September; the mast was smaller and less abundant than in the European beech, and the tree—as near Boston—did not seem to have the same tendency to outgrow and suppress other hardwoods which it shows in Europe. The roots, judging from seedlings sent from Meehan's nurseries at Philadelphia, are larger, deeper, and less fibrous than those of the European beech, though this may be caused by a deep soil. A good illustration of the American beech in the open is given in *Garden and Forest*, viii. 125, taken from a tree at South Hingham, Massachusetts.

The American beech is rare in collections in England. We have only seen specimens at Kew Gardens, Beauport, Tortworth, and Eastnor Castle. In no case do these attain more than 15 feet in height. As the tree, no doubt, was often planted even a century ago, and no large trees are known to exist in this country, it is very probable that, like many other species from the Eastern States, it will never reach timber size in this climate. The specimen from Eastnor Castle has very dull green leaves, somewhat cordate at the base, and probably belongs to the following variety.

Var. *caroliniana*, Loudon, *ex Lodd. Cat.* (1836).—In cultivation in Europe, distinguished from the common form by the leaves being more rounded at the base, said to be more dwarf in height, and to come out in leaf fifteen days before ordinary *Fagus ferruginea*.[3]

FAGUS ORIENTALIS. Caucasian Beech.

Fagus orientalis, Lipski, *Acta. Hort. Petrop.* xiv. 300 (1897).
Fagus sylvatica, Linnæus, β *macrophylla*, DC., and γ *asiatica*, DC. (*ex parte*), *Prod.* xvi. 2, 119 (1864).

Lipski says that the beech which occurs in the Caucasus, Asia Minor, and

[1] But Sargent says that it attains its largest size in the rich land of the Lower Ohio valley, and in the Southern Alleghanies, and that it often forms pure forests. He quotes an old author (Morton) as follows :—"Beech there is of two sortes, red and white, very excellent for trenchers or chaires, also for oares," and says that these different coloured woods, recognised by lumbermen, are produced by individual trees, which are otherwise apparently identical, and for which Michaux and Pursh tried to find botanical characters which he cannot allow to be specific.

[2] Sargent says that the sweet nuts are sold in Canada, and in some of the middle and western states.

[3] Jouin, "Les Hêtres" in *Le Jardin* (1899), p. 42.

North Persia, is a peculiar species. Radde,[1] while not admitting it to be a distinct species, considers that it is a form which approaches the Japanese *Fagus Sieboldi*, Endl., rather than the typical European beech, which occurs in the Crimea. Specimens in the Kew herbarium from the Caucasus, Paphlagonia, Phrygia, and Ghilan (a province of North Persia), differ markedly in fruit from the common beech. This tree occurs throughout the whole of the Caucasus, both on the north and south sides, often ascending to the timber line, but descending in Talysch to the sea-level. On the north side of the Caucasus the beech reaches to 5900 feet altitude; while in the Schin valley, on the south side of the range, it attains 7920 feet. It occurs mixed with other trees, or forms pure woods of considerable extent. It sometimes occurs in the forests in the form of gigantic bushes (springing from one root), of which the individual stems measure 6 feet in girth, and are free from branches to 30 or 40 feet. The largest trees recorded by Radde were:—one 380 years old, 7 feet in girth, and 123 feet high; and another 250 years old, 8 feet 4 inches in girth, and 120 feet high, which contained 370 cubic feet of timber.

This species has been introduced into cultivation on the Continent, and is said[2] to have a crown of foliage more slender and more pyramidal than the common beech.

FAGUS JAPONICA. Small Beech of Japan. (Native name, *Inubuna*.)

Fagus japonica, Maximowicz, *Mél. Biol.* xii. 542 (1886).
Shirasawa, *Iconographie des Essences Forestières du Japon*, vol. i. t. 35, figs. 1-13 (1900).

This species is much rarer in Japan than *Fagus Sieboldi*, and was not seen by Elwes or Sargent, who says that it had not been collected since a collector in Maximowicz's employ found it on the Hakone mountains, and in the province of Nambu. Very little is known about it, and it has not been introduced into Europe. Shirasawa, however, says it has the same distribution as *Fagus Sieboldi*, and grows almost always in mixture with it, but beginning at a lower level; and that it often occurs in a bushy form, and does not attain the dimensions of the other species.

FAGUS SIEBOLDI. Common Beech of Japan. (Native name, *Buna*.)

Fagus Sieboldi, Endlicher, *Gen. Suppl.* iv. 2, 29 (1847).
Fagus sylvatica, L., γ *asiatica*, DC. *Prod.* xvi. 2, 119 (1864).
Fagus sylvatica, L., δ *Sieboldi*, Maximowicz, *Mél. Biol.* xii. 543 (1886).
Shirasawa, *l.c.* t. 35, figs. 14-26.

This is the common beech which occurs in Japan, and it is considered by Japanese botanists[3] to be only a variety of the European beech. Shirasawa[4] has given some details concerning its distribution, in connection with a figure which illustrates well the botanical characters of the species. Sargent[5] was doubtful if the common beech in Japan was not quite identical in all respects with the European beech.

Elwes saw it in many places in Central Japan, but not in Hokkaido. Near Nikko it grows to a large size at 2000-4000 feet, but not in pure woods, being, so

[1] Radde, *Pflanzenverbreitung in den Kaukasusländern*, 182 (1899).
[2] Schneider, *Laubholzkunde*, 152.
[3] Matsumura, *Shokubutsu-mei-i*, 123.
[4] Shirasawa, *l.c.* 86.
[5] Sargent, *Forest Flora of Japan*, 70.

far as he saw, always mixed with other trees, though Goto says[1] that it occurs in Honshu and in the southern half of Hokkaido in almost unmixed woods, and that in Aomori, Iwate, Echigo, and Yamagata, pure woods of vast dimensions are seen in the mountains above 1000 feet elevation. It is one of the most important trees for firewood and charcoal, but little valued for building. It grows well in shade, and continues to grow to a great age, sometimes attaining enormous size. The Ainos in old Japan are said to have used the tree for dug-out canoes. The largest trees measured by Elwes were in the Government forest of Atera, in the district of Kisogawa, where there were tall straight trees in mixed deciduous forests of beech, magnolia, oak, birch, and maple, about 100 feet high and 9-10 feet in girth. Here the wood was not of sufficient value to pay the expense of carriage.

Fagus sinensis.

Fagus sinensis, Oliver, in Hook. *Icon. Plant.* t. 1936 (1891); Diels, *Flora von Central China*, 284 (1901).
Fagus sylvatica, L., var. *longipes*, Oliver, in scheda ad Hook. *Icon. Plant.* t. 1936 (1891); Franchet, *Jour. de Bot.* 1899, p. 90.
Fagus longipetiolata, v. Seemen, in Engler, *Bot. Jahrb.* xxiii. *Beibl.* 57, p. 56 (1897).

This tree was discovered by Henry in the mountains south of the Yangtse, near Ichang, in Central China. It occurs scattered in deciduous forests at 3000-4000 feet altitude, and sometimes attains a considerable size, one tree being noted as 15 feet in girth. Von Rosthorn subsequently found the same species in the mountains south of Chungking, in Szechuan.

Fagus Engleriana.

Fagus Engleriana, v. Seemen, in Diels, *Flora von Central China*, 285, cum figurâ (1901).
Fagus sylvatica, L., var. *longipes*, Oliver, "var. *bracteolis involucri exterioribus spatulatim dilatatis*," Oliver, in scheda ad Hook, *Icon. Plant.* t. 1936 (1891).
Fagus sylvatica, L., var. *chinensis*, Franchet, *Jour. de Bot.* 1899, p. 201.

This species was also discovered by Henry, but in the mountains north of the Yangtse from Ichang in Central China. Subsequently specimens were sent to Europe by Père Farges from North-East Szechuan, and by von Rosthorn from Southern Szechuan. It is a smaller tree than *F. sinensis*, and was seen by Henry on wooded cliffs.

Neither of the Chinese beeches form pure woods. A beech of considerable size was seen by Henry in Yunnan, in a mountain wood near Mengtse, at about 5000 feet elevation, and is possibly a distinct species. This rare tree is remarkable in that it extends the southern limit of the northern beeches to as low as 23° N.

[1] *Forestry of Japan* (1904), p. 22.

6 The Trees of Great Britain and Ireland

FAGUS SYLVATICA, Common Beech

Fagus sylvatica, Linnæus, *Sp. Pl.* 998 (1753). Loudon, *Arb. et Frut. Brit.* iii. 1950 (1838).

A large tree, commonly 100 feet high (attaining 130 to 140 feet under very favourable conditions), with a girth of 20 feet or more. Bark[1] usually grey and smooth, but often in old trees becoming fissured and scaly, especially near the base. Branchlets of two kinds; the short shoots ringed and bearing only a terminal bud in winter and one, two, or three leaves in summer; the long shoots slender, glabrous, with many leaves in two lateral rows (in winter the buds are seen arising from the upper side of the twig, the leaf-scars being on the lower side).

Leaves: deciduous, alternate, two-ranked, varying in size with altitude and vigour, those of trees at high elevations being much smaller; generally oval, somewhat acuminate at the apex, slightly unequal at the base, undulate or toothed in margin, with 6-10 pairs of lateral nerves, which with the midrib are raised on the under surface of the leaf, and are more or less pubescent.

Flowers: arising in the axils of the leaves of the young shoots; the male heads by long pendulous stalks, the female involucres by short erect stalks above the male flowers on the same branchlet or on separate branchlets. The true fruits are usually two together enclosed in a woody involucre, which is beset by prickles. Each fruit contains a seed, triangular in shape like the fruit containing it. The seed hangs from the top of the cell and has no albumen.

Seedling: the seedling of the beech[2] has a long primary root and a stout radicle, 1-2 inches long, bearing 2 large sessile oval cotyledons, which are dark green above and whitish beneath. The first true leaves of the beech are opposite, ovate, obtuse, and crenate, borne on the stem an inch or so above the cotyledons. Above this pair other leaves are borne alternately, and the first season's growth terminates in a long pointed bud with brown imbricated scales.

The common beech is distinguishable at all seasons by its bark, which is only simulated by the hornbeam; but in the latter tree the stem is usually more or less fluted. In winter the pointed buds, arranged distichously on the long shoots and composed of many imbricated scales, are characteristic; while in length they exceed

[1] There is much difference in the colour and roughness of the bark, which varies with age, soil, situation, and exposure. On the dry, sandy soil of Kew Gardens this bark of the beech is so different from that seen on calcareous soils that it might almost be mistaken for a hornbeam, and Elwes has observed the same in the Botanic Gardens at Edinburgh, where the trees are exposed to the salt east wind. These variations are not, however, entirely caused by local conditions, but are sometimes found in trees standing close together. Professor Balfour pointed out to Elwes two beeches in the Edinburgh garden of which one has the bark rough and scaly, and regularly comes into leaf fifteen to twenty days before another tree similar in size which grows next to it, whose bark is smooth and silvery. Whether these variations are correlated with any differences in the wood does not seem to have been proved in England; but it is evident that for cold and exposed situations it would be advantageous to sow only the seed of the late leafing and flowering trees.

[2] The beech seedling has its cotyledons green and above ground; those of the oak and chestnut remain in the soil. In the hornbeam, hazel, and alder, the cotyledons are aerial, but the first pair of true leaves above them are alternate.

those of any tree ordinarily cultivated in England, being about ¾ inch long. The buds of the European beech are wider at the middle than at either end; while in the American beech they are as narrow in the middle as they are at the base.

Varieties

A great number of varieties of the common beech occur, some of which have originated wild in the forests, whilst others have been obtained in cultivation.

Var. *purpurea*, Aiton, Purple Beech. A complete account of the origin of this variety appeared in *Garden and Forest*,[1] 1894, p. 2. From this it would appear that a purple beech[2] discovered in the eighteenth century in the Hanleiter forest near Sondershausen in Thuringia, is the mother tree of those which now adorn the pleasure grounds of Europe and America. This is the only authenticated source from which horticulturists have derived their stock. The purple beech was, however, long known before the Thuringian tree was discovered. In Wagner's *Historia naturalis Helvetiæ curiosa* (Zurich, 1680) 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. These three beeches are again referred to in Scheuzer's *Natural History of Switzerland*, published in 1706; 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. The purple beech has also been observed in a wild state in the forest of Darney in the Vosges.

The purple beech has delicate light red-coloured foliage, which is of a pale claret tint in the spring, becoming a deep purple in summer. In early autumn the leaves almost entirely lose their purple colour, and change to a dark dusky green. The buds, young shoots, and fruits are also purple in colour. The involucres are deep purple brown in autumn, becoming browner with the advance of the season. The purple beech often fails to fruit regularly; still many individuals of this variety do produce fruit, and this has been sown, and in some cases produced plants almost all with purple leaves, not 5 per cent reverting to green.[3] The colour in the leaves, etc., is due to a colouring matter in the cells of the epidermis. The variety submits well to pruning or even to clipping with the shears; and may therefore, if necessary, be confined within narrow limits or grown as a pyramid in the centre of a group of trees.

A fine purple beech[4] grows in Miss Sulivan's garden, Broom House, Fulham, which is 82 feet high and 12 feet 2 inches in girth.

[1] See also *Gartenflora*, 1893, p. 150.

[2] This tree is still living. See Lutze, *Mitth. des Thuringer Bot. Vereines*, 1892, ii. 28.

[3] Elwes saw at the Flottbeck Nurseries near Hamburg, formerly occupied by the celebrated nurseryman John Booth, a fine hedge of purple beech, which Herr Ansorge told him was raised from a cross between the purple and the fern-leaved beeches. Of the produce of this cross 20 to 30 per cent came purple, but none were fern-leaved. This coincides exactly with his own experience in raising from seed. But in *Mittheilungen Deutschen Dendrologischen Gesellschaft*, 1904, p. 198, Graf von Schwerin describes as *F. sylvatica ansorgei* a hybrid from these two varieties which seems to combine the characters of both.

[4] Figured in *Gard. Chron.* 1898, xxiv. 305. See also *ibid.* 1903, xxxiii. 397, for notes on sub-varieties of the purple beech.

Another occurs at Hardwick, Bury St. Edmunds, the seat of G. M. Gibson Cullum, Esq., which in 1904 was 11 feet 9 inches in girth, and about 80 to 90 feet in height. Bunbury[1] considered this to be the finest purple beech in England, and says it produces abundance of fruit, from which young trees have been raised.

Var. *cuprea*, Loddiges, Copper Beech.—This is only a sub-variety of the purple beech, distinguished by its young shoots and leaves being of a paler colour. The largest purple or copper beech which Elwes has seen is in the park at Dunkeld, Perthshire, not far from the Cathedral. This measures 86 feet high, with a girth of 15 feet 3 inches, and does not show any evidence of having been grafted. There is a very fine one at Corsham Court, the seat of General Lord Methuen, 85 to 90 feet high, by 14 in girth, forking at about 10 feet. At Scampston Hall, Yorkshire, Mr. Meade-Waldo tells us of two large spreading trees on their own roots, 11 feet 6 inches and 10 feet 6 inches in girth respectively. At Beauport, Sussex, the seat of Sir Archibald Lamb, Bart., a copper beech measured 12½ feet in girth in 1904. At Syston Park, Lincolnshire, the seat of Sir John Thorold, Bart., there is one nearly as large (12 feet 2 inches girth). A copper beech at Bell Hall, York, which was planted in 1800, measured in 1894, 9 feet in girth, the diameter of the spread of the branches being 74 feet. At Castle MacGarrett, Claremorris, Ireland, the seat of Lord Oranmore, there is a beautiful copper beech, which in 1904 was 70 feet high and 9 feet 10 inches in girth. In Over Wallop Rectory grounds, in Hampshire, a copper beech measured 9 feet 4 inches in 1880.

Two fine trees occur at Clonbrock, in Co. Galway, the seat of Lord Clonbrock. One measured in 1904 a length of 76 feet and a girth of 12 feet 9 inches. The other was 7 feet 6 inches girth in 1871, and in 1880 it had increased to 8 feet 5 inches.

The copper beech[2] is rarely used as a hedge, but there is one in the gardens of Ashwellthorpe Hall, Norwich, which is 138 yards long, 8 feet high, and about 5 feet through. It was planted about seventy years ago from seedlings by the Hon. and Rev. R. Wilson. The colouring in spring is very beautiful.

There is a sub-variety[3] of the copper beech in which the leaf is edged with pink whilst young, but later in summer it becomes nearly like the type. This variety has been called *Fagus purpurea roseo-marginata*, and it has been recommended as a hedge-plant, to be clipped two or three times during summer so as to obtain several crops of young shoots.

Var. *atropurpurea*.—The leaves in this are of a darker colour than in the ordinary purple beech.

Var. *atropurpurea Rohani* is quite different from the last, as the form of the leaves is similar to that of the fern-leaved beech, but their colour is like that of the copper beech.

Var. *purpurea pendula*.—This is a weeping form of the purple beech. It is of slow growth.

[1] *Arboretum Notes*, p. 117.

[2] *Garden*, July 30, 1904, Answers to Correspondents.

[3] *Gard. Chron.* June 23, 1888, p. 779.

Var. *Zlatia*, Späth,[1] Golden Beech.—This was found wild in the mountains of Servia by Professor Dragaschevitch. It is known in Servia as *Zladna bukwa* (golden beech).

Var. *striata*, Bose.[1]—This was discovered many years ago in a forest in Hesse. Soon after opening, the leaves show a regular golden striation parallel with the nerves, and this appearance lasts till the leaves fall off in autumn. It was introduced in 1892 by Dippel.

Various other coloured varieties have been obtained by horticulturists. In var. *variegata* the leaves are particoloured with white and yellow, interspersed with some streaks of red and purple. In var. *tricolor* the leaves are dark purplish green, spotted with bright pink and shaded with white. There are also gold-striped (var. *aureo-variegata*) and silver-striped (var. *argenteo-variegata*) varieties.

Var. *heterophylla*, Loudon, Fern-leaved Beech.—The leaves are variously cut, either in narrow shreds like some ferns, or in broader divisions like the leaves of a willow. This variety has received a great number of names, as *laciniata*, *comptoniæfolia*, *incisa*, *salicifolia*, *asplenifolia*, etc. The tree occasionally bears normal and cut leaves on the same twig, or normal and cut leaves on different twigs. It bears fruit occasionally, which, according to Bunbury,[2] is smaller than that of the common beech, the cupule being shorter in proportion to the nuts. The leaf-buds are considerably smaller than those of the common form; and the twigs are often very pubescent. The origin of this variety is unknown.

There is a good specimen of this tree at Devonshurst House, Chiswick, which measured in 1903 55 feet in height, and 8 feet 2 inches in girth at 3 feet, just under a great horizontal branch.

At Barton, Bury St. Edmunds, a fern-leaved beech in 1904 was 53 feet high, with a girth of 5 feet 1 inch. This tree[2] was planted in 1831, but grew slowly, in 1869 being only 15 feet high, with a trunk 3 feet round. In 1868 the tree bore some twigs with ordinary leaves; and it first fruited in 1869, the crop being a very small one.

There are large and well-shaped trees of this form at Strathfieldsaye measuring 50 feet by 7 feet 5 inches; at Fawley Court of the same size exactly, and weeping to the ground; and at Stowe near Buckingham.

Var. *quercoides*, Pers., Oak-leaved Beech.—The leaves in this variety are long-stalked, with an acute base and acuminate apex; margins pinnately and deeply cut, the individual segments being acute.

Var. *cristata*, Lodd. (also known as var. *crispa*).—Small and nearly sessile leaves, crowded into dense tufts, which occur at intervals on the branches. This form rarely attains a large size.

Var. *macrophylla* (also known as *latifolia*).—The leaves in this form are very large. In a specimen at Kew, from the garden of the Horticultural School at Vilvorde, they attain 7 inches in length and 5 inches in width. A large specimen of this tree, some fifty years old, occurs at Enys in Cornwall. The buds, as might

[1] *Gard. Chron.* 1892, xii. 669. This is an account of Späth's novelties by Dr. Edmund Göze of the Greifswald Botanic Gardens.

[2] *Arboretum Notes*, p. 118.

be expected, in this variety are considerably larger than those of the ordinary form.

Var. *rotundifolia*, Round-leaved Beech.[1]—The leaves are very small, round, and bright green, and are set close on the twigs. This variety has an upright habit of growth, and was introduced in 1894 by Jackman of Woking.

Var. *grandidentata*.—A form with conspicuously toothed leaves.

Var. *pendula*, Loddiges, Weeping Beech.—Several forms of this variety occur, but in all the smaller branches hang down. The main branches are irregularly disposed, so that the tree often has a very rugged outline. This variety should be grafted at a good height, as otherwise many of the pendulous branches will lie upon the ground; and the main branches, if they show a tendency to droop too much, should be supported. Weeping beeches may be tall and slender, or low and broad, or quite irregular, depending upon the direction of the larger branches, which may grow outwards or upwards, or in almost any direction; the smaller branches only are uniformly pendulous.

The weeping beech has been observed wild in the forest of Brotonne, in Seine-Inférieure, France.

A good example of a tall, slender, weeping beech may be seen near Wimbledon Common, on the estate lately owned by Sir W. Peek. A fine specimen occurs at Barton, which in 1904 was 77 feet high and 5 feet 2 inches in girth. Elwes has noted a very picturesque and well-shaped one at Endsleigh, near Tavistock, the Devonshire seat of the Duke of Bedford. Several have been figured in the *Gardeners' Chronicle*, *e.g.* a group of three trees[2] at Ashwick Hall, Gloucestershire, which were planted about 1860. In the Knap Hill Nursery[3] at Woking, and in the nursery[4] of R. Smith and Co. at Worcester, there are fine specimens. Another good specimen,[5] occurring in Dickson's nursery at Chester, is figured in the *Garden*.

Many forms of weeping beech have been described as sub-varieties, as *purpurea pendula*, mentioned above; var. *miltonensis*, with branches less pendulous, found wild in Milton Park, Northamptonshire; var. *borneyensis*, found wild in the forest of Borney, near Metz, and described as having an erect stem and distinctly pendulous branches; var. *pagnyensis*, discovered in the forest of Pagny in the department of Meurthe-et-Moselle in France; var. *remillyensis*, found in the forest of Remilly, near Metz.

Var. *tortuosa*, Parasol Beech.[6]—In this curious form, the branches, both large and small, and the branchlets are all directed towards the ground. It is not to be confounded with the preceding variety, in which only the slender branches are pendulous; and is analogous rather to the weeping ash. Beeches of this form have, even in old age, a very short and twisted stem, with a hemispherical crown, which sometimes touches the ground; and it scarcely ever grows higher than 10 feet. This variety has been found wild in France, in the forest of Verzy, near Rheims, and also

[1] *Gard. Mag.* 1894, p. 339, with figure.
[2] *Gard. Chron.* June 20, 1903, fig. 155.
[3] *Ibid.* Dec. 24, 1870, p. 70.
[4] *Ibid.* Dec. 29, 1900, suppl.
[5] *Garden*, Dec. 5, 1903, p. 167.
[6] For a complete account of the occurrence of this curious form in the forests of the east of France, see Godron, *Les Hetres tortillards des environs de Nancy*, Mém. de l'Acad. de Stanislas, Nancy, 1869. Godron says that their growth is infinitely slower than that of normal beech. See also *Rev. Hort.*, 1861, p. 84, and 1864, p. 127.