

HINTS FOR IDENTIFYING WOOD IN THE FIELD.

When recording fungi, the inclusion of the host or substrate is a necessary piece of the data, and this applies particularly to fungi growing on wood. However, a record may be made with no more than "on wood" (unspecified) if the wood has not been identified. Identification of wood presents little difficulty while still attached to a tree: it is the detached pieces that are the problem. And much as one may be tempted, it may not be in the best interests of science to confidently assume that wood on the ground has fallen from a tree nearby. However, except perhaps for wood rotted to the point of disintegration, all is not lost. There are a few clues which can with practice be used to narrow the range of possible woods, either from the internal wood structure, or external features.

There are subtle differences between tree genera in their internal structure, which are expressed in the make-up of their wood. If wood from a BROAD-LEAVED (hardwood) tree is broken across, as one breaks a stick, and the cross-section (end-grain) examined, the annual growth rings will be seen as a series of more or less distinct concentric rings. (Note: cutting or sawing will not show the required detail; in the field breaking across the grain although rough and ready is usually effective).

Closer inspection will further reveal numerous pores in the end-grain, like minute pin holes in the tissue. These are the open ends of vertical water conducting tubes known as vessels. In some species the pores are large and conspicuous, in others they may be so small as to be scarcely distinct without a hand lens. For the smallest a X20 lens may be necessary. The arrangement of pores is a significant clue, and it will be one of two types: either "ring-porous" or "diffuse-porous".

In RING-POROUS wood, rings or bands of pores occur concentric with the annual rings, (like the pattern of a target) separated by tissue where they are less numerous and smaller in diameter. Ring-porous woods are usually easy to identify, the common British ones being Elm, Laburnum, Mulberry, Oak, Ash, and Sweet Chestnut for which there is the convenient mnemonic: ELM-OACs. Note: 'oak' here refers to deciduous oaks, e.g. English and Sessile Oak, (*Quercus robur* and *Q. petraea*). Evergreen oaks e.g. Holm Oak (*Q. ilex*) are not ring porous.

In DIFFUSE-POROUS wood, pores do not occur in distinct rings but are distributed more or less evenly over the whole surface and are approximately the same size throughout the ring. These woods are less readily determined, some requiring detailed examination (see key) and include such as Alder, Apple, Beech, Box, Birch, Cherry, Hawthorn, Hazel, Holly, Holm Oak, Hornbeam, Lime, Pear, Plane, Poplar, Rowan, Sycamore, Walnut and Willow. However, this group is at least distinguishable both from ring-porous and from coniferous wood, as conifers in general do not exhibit pores, though occasionally vessels known as resin ducts may occur. Absence of pores therefore (use X20 lens) is indicative of coniferous wood. Instead of pores the tissue often shows a reticulate pattern like a finely woven fabric, and may appear freckled and translucent, and although quite dry sometimes appearing as though water-soaked. In ring-porous wood, the rings of large pores signify the start of growth of spring-wood in successive annual rings, and after the initial spurt as it were, the pore size decreases either abruptly or progressively in the summer-wood. The size of the spring-wood pores may be used for identification. Oak, Ash and Sweet Chestnut have large pores: Elm and Mulberry moderately

sized, and Laburnum small. In Ash and Sweet Chestnut the pores tend to be oval. The arrangement of the summer-wood pores is also diagnostic: in deciduous Oak and Sweet Chestnut they are in irregular groups more or less parallel with the medullary rays. In Elm and Laburnum they tend to form festoon-like patterns running across the rays.

However, this character is not easy to see on a broken cross-section and is better seen on cut sections when planed or pared with a razor blade, which may not be possible on rotten wood, or in the field. The end-grain will also show lighter coloured medullary rays, arranged (in a complete cross-section) like spokes of a wheel. The width of rays in conjunction with size and arrangement of pores is used in identification, and some woods have rays of two widths. Those with fine rays only are Elm, Ash, & Chestnut (sweet). In Laburnum all rays are broad. Oak, Holm Oak, Hornbeam, and Beech have both fine and broad rays, (in Holm Oak the broad rays are very conspicuous).

Another structural feature is the central pith, present in twigs, branches, and trunk, if not removed by decay. It is said to be distinctive in some genera, and is most reliably seen in Walnut which is septate and chambered, when viewed in a longitudinal section. In cross-section, ash pith tends to be elliptical and there is usually a conspicuous pith (or pith cavity) in Elder and Ivy.

Try looking at wood by collecting pieces from some broad-leaved trees while in leaf, selecting from dead but still attached branches as these will break easily and cleanly, and being attached, there should be no doubt (!) as to the tree. Immediately write the tree name on the sample! It is useless trying to use 'green' wood which is not only difficult to break but will produce a stringy unreadable fracture. Although one- and two-year old twigs will often show the diagnostic characters, they are more easily seen in larger diameter wood of several years growth. If wood is water-logged, dry it to remove visible water before attempting identification.

Additional clues can be provided by certain external features. The position of twig buds and successful lateral shoots along a branch occur either opposite one another or are arranged alternately (or spirally). There are three common large-tree genera which have twig buds opposite: Ash (buds are more or less opposite), Sycamore (together with the other Maples), and Horse Chestnut: (mnemonic: A S H). When dealing with fallen branches, this feature must be used positively by consistently finding the presence of opposite budding, as failure in early growth of one bud of a pair can give a false indication. Twigs give a more reliable indication than older wood.

Thorns of thorny trees and bushes often persist on dead wood, and may assist identification, although unlikely to be present on larger diameter wood. Of the trees, Crab Apple, Blackthorn and Hawthorn are commonplace. Less common, the False Acacia (*Robinia pseudoacacia*) much planted by the Victorians and now spread occasionally to hedges and woodland, has paired short thorns one on each side of a bud. Spiny or thorny bushes which form woody stems include such as Barberry, Bramble, Rose, Gorse, and the Purging and Sea Blackthorns. Blackthorn, Hawthorn and Buckthorn are similar and are difficult to distinguish. Rose stems are usually not sinuous, and are circular in cross-section (terete) which distinguishes them from Bramble which are usually ridged and often slightly sinuous, the larger thorns or prickles

of the latter often being confined to the ridges with minor bristles between. Rose thorns tend to be more stout and less numerous than those on Bramble. In Barberry the spines are tripartite 1-2 cms long. In Gorse, the spines are modified leaves and tend to be shed from dead stems. Twigs and smaller stems which have corky excrescences are English Elm and Field Maple.

KEY TO THE IDENTIFICATION OF COMMON BRITISH HARDWOODS

The following key is offered as 'better than nothing'. It has been adapted from Forest Products Research Bulletin No. 3 designed for timber-yard use where sound clean wood is assumed. Although decay inevitably reduces density, and staining will obscure wood colour limiting the use of these characters, much partially decayed wood nevertheless retains a recognisable structure. The key works perhaps more successfully with ring-porous woods and those diffuse-porous woods with broad rays, than with those of finer diffuse-porous structure.

1. Pores of spring-wood in a conspicuous ring or band, ring-porous woods: **2**
 1. Pores of spring-wood not in a conspicuous ring or band, diffuse-porous woods: **8**

 2. Pores of the summer-wood in radial lines or groups: **3**
 2. Pores of the summer-wood not in radial lines or groups, but scattered or in tangential lines, chains or bands: **4**

 3. Rays of two distinct sizes, the larger very broad and conspicuous: **Oak**
 3. Rays all very fine and conspicuous: **Sweet chestnut**

 4. Pores of summer-wood single or in scattered groups, sometimes joined by soft tissue in the outer part of the annual ring to form tangential lines or chains: **5**
 4. Pores of summer-wood in distinct wavy tangential bands or chains: **7**

 5. Wood white or pale coloured, not yellow. Rays barely visible to the naked eye: **Ash**
 5. Wood yellow to dark brown. Rays distinct to the naked eye: **6**

 6. Pores of spring-wood large, in a ring one or more rows wide, the lighter coloured spring-wood contrasting with the darker summer-wood. Pores may be difficult to see initially due to tyloses* completely filling them. Heartwood dark: **False Acacia**
 6. Tyloses not completely filling pores. Soft tissue comparatively inconspicuous: **Mulberry**
- (*Tyloses are bubble- or bladder-like structures within the vessels and tending to plug them, often glistening, sometimes more apparent in a broken longitudinal section.)
7. Rays as wide as, or wider than, the spring-wood pores: **Laburnum**
 7. Rays not as wide as the spring-wood pores: **Elm**

 8. Pores individually distinct to the naked eye. Pith septate, chambered, in longitudinal section: **Walnut**
 8. Pores not individually distinct to the naked eye: **9**

 9. Rays of two distinct sizes, the larger broader and conspicuous: **10**
 9. Rays not of two distinct sizes: **14**

 10. Pores in radial rows. broad rays faintly visible on tangential surface as long lines, slightly darker than background: **11**

10. Pores not in radial rows. Broad rays clearly visible on tangential surface as short dark lines:

Beech

(*i.e. a surface cut parallel with the axis, as a forester does when making a 'blaze' mark in removing a slice of bark to expose underlying wood.)

11. Wood hard and heavy:

12

11. Wood pale coloured to light reddish brown, soft and light, or only moderately hard and heavy:

13

12. Annual rings indistinct. Pores in radial lines often continuing across several annual rings. Broader rays very broad and conspicuous, 7-10 times the diameter of pores. Wood light brown:

Holm oak

12. Annual rings distinct and sinuous, wavy. Wood white:

Hornbeam

13. Broad rays fairly numerous. Annual rings between broad rays often bulging outwards (towards bark). Wood moderately hard and firm to cut:

Hazel

13. Broad rays comparatively sparse and irregularly grouped, often absent over wide areas. Annual rings between broad rays often dipping inwards (away from bark). Wood soft and woolly to cut:

Alder

14. Woods very fine textured, pores barely visible, even with a lens:

15

14. Woods fine to medium textured, pores distinctly visible:

16

15. Rays moderately broad, distinct to the naked eye:

Holly, Ivy

15. Rays very fine. not distinct to the naked eye:

Box, Elder

(pith or pith cavity usually conspicuous. Ivy often riddled with holes of wood-boring beetles).

16. Rays individually distinct to the naked eye:

17

16. Rays not individually distinct to the naked eye:

19

17. Rays more than twice as wide as pores:

Plane

17. Rays less than twice as wide as pores:

18

18. Wood white or yellowish. Annual rings marked by white line. Pores mostly open:

Sycamore

18. Wood light brown or reddish. Annual rings marked by zone of spring-wood with abundant pores. Pores often plugged with dark coloured gum:

Cherry

19. Woods hard and heavy:

20

19. Woods soft and moderately light:

21

20. Wood pale coloured. not red; lustrous:

Birch, Rowan

20. Wood distinctly reddish; not lustrous:

Pear, Apple, Hawthorn

21. Rays fairly distinct under the lens. Ripple marks sometimes present:

23

21. Rays indistinct under the lens. Ripple marks absent:

22

22. Heartwood distinct, light reddish brown contrasting with white sapwood: Willow
22. Heartwood not distinct (except for Poplar alba and P. canescens which have reddish heartwood): **Poplar**

23. Rays irregularly spaced, mostly separated by the width of two or more pores: **Lime**

23. Rays closely spaced. mostly separated by the width of one pore only: **Horse chestnut**

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CONIFER WOOD

Whereas conifer wood can often be distinguished from broad-leaved by use of a hand lens as described above, the identification of conifer wood to genus or species more usually involves microscopic examination which is beyond the scope of these notes.

COMMON LARGE TREES WITH TWIG BUDS OPPOSITE: Mnemonic: ASH

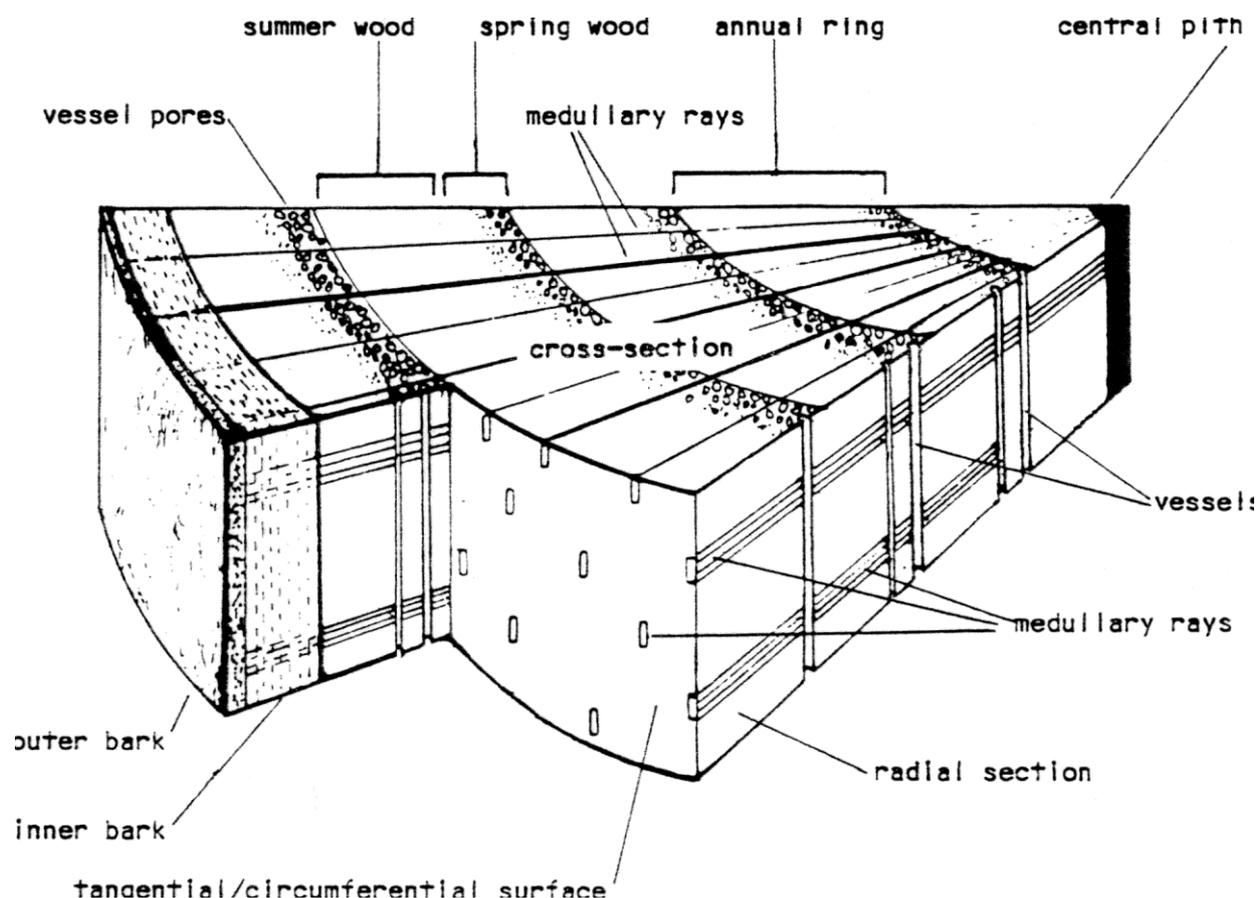
ASH (buds are more or less opposite). (Note: only Ash is ring-porous).

SYCAMORE and the other MAPLES. (Rays broad, abundant, but indistinct).

HORSE CHESTNUT (Rays v, fine and numerous, spaced by one pore-width).

Common shrubs and small hedgerow trees having twig buds opposite: Box, Buddleia, Clematis, Dogwood, Elder, Guelder Rose, Lilac, Privet, Purging Buckthorn, Purple Osier, Spindle, Wayfaring Tree. Most other hard-woods have buds arranged spirally or alternately.

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Diagrammatic wedge-shaped cross-section of a broad-leaved (hardwood) stem showing pores, vessels and medullary rays, with four annual rings.

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