

Identification of the important Japanese woods  
by anatomical characters : supplement to the  
Anatomical characters and identification of  
Formosan woods etc.

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PART II.  
ANALYTICAL KEY TO THE IMPORTANT  
JAPANESE WOODS.

The figures after the name refers to the number placed before its name  
in the description of Part I.

- I) Non-porous woods (without vessels) . . . . . Coniferae.<sup>1)</sup>
- II) Porous-woods . . . . . Dicotyledons.
- 1) Without vessels . . . . . *Trochodendron aralioides*(7)
- 2) With vessels.
- A) Ring-porous; perforation of vessels always simple.
- a<sub>1</sub>) Pith rays homogeneous or nearly homogeneous.
- a<sub>2</sub>) Broad rays present, small vessels without spirals . . . .  
. . . . . *Quercus dentata*(139), *Q. glandulifera* (143), *Q. crispula* (138), *Q. variabilis* (137), *Q. aliena* (142), *Passania cuspidata* (134), *Q. serrata* (136)
- b<sub>2</sub>) Large pith rays absent; small vessels sometimes with spirals.
- a<sub>3</sub>) Pith rays uniseriate . . . . . *Castanea pubinervis* (130)
- b<sub>3</sub>) Pith rays polyseriate.
- a<sub>4</sub>) Maximum diameter of early wood pores less than 120  $\mu$ .
- a<sub>5</sub>) High rays present . . . . . *Elaeagnus multiflora*(101)
- b<sub>5</sub>) High rays absent.
- a<sub>3</sub>) Small vessels without spirals; metatracheal parenchyma absent. . . . . *Acanthopanax innovans*(63)
- b<sub>3</sub>) Small vessels with spirals; metatracheal parenchyma present . . . . . *Platycaarya strobilacea*(115)
- b<sub>4</sub>) Maximum diameter of early wood pores 160-280  $\mu$ .
- a<sub>5</sub>) Paratracheal parenchyma elongating tangentially.
- a<sub>3</sub>) Pith rays up to 15 cells wide . . . . .  
. . . . . *Gleditschia japonica* (44)
- b<sub>3</sub>) Pith rays 1-4 cells wide.

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1) see p. 74.

- a<sub>7</sub>)** Diameter of wood fibers 14–18  $\mu$  . . . . .  
 . . . . . *Albizia Julibrissin*(42), *Picrasma quassioides*(20)
- b<sub>7</sub>)** Diameter of wood fibers 25–30  $\mu$  . . . . .  
 . . . . . *Paulownia tomentosa*(92)
- b<sub>5</sub>)** Metatracheal parenchyma one cell wide in radial  
 direction . . . . . *Elrebia acuminata*(91)
- c<sub>6</sub>)** Terminal parenchyma present.
- a<sub>6</sub>)** Small vessels without spirals . . . . . *Fraxi-*  
*nus Bungeana. var. puvinervis*(85), *F. longicuspis*(87)
- b<sub>6</sub>)** Small vessels with spirals.
- a<sub>7</sub>)** Tracheids arranged in tangential lines at the  
 peripheries of growth rings . . . . .  
 . . . . . *Maackia amurensis var. Buergeri*(43)
- b<sub>7</sub>)** Not as above. . . . .  
 . . . . . *Ulmus laciniata*(112), *U. Sieboldii*(110),  
*U. japonica*(111)
- d<sub>6</sub>)** Neither terminal nor metatracheal parenchyma pre-  
 sent.
- a<sub>3</sub>)** Maximum diameter of pores up to 160  $\mu$  . . . . .  
 . . . . . *Acanthopanax sciadophylloides*(65)
- b<sub>6</sub>)** Maximum diameter of pores up to 250  $\mu$  . . . . .  
 . . . . . *Orixa japonica*(17)
- c<sub>4</sub>)** Maximum diameter of early wood pores more than 200  $\mu$ .
- a<sub>5</sub>)** Wall of late wood pores more than 7  $\mu$  in thickness  
 . . . . . *Fraxinus manshurica*(88) *F. Sieboldiana*(86)
- b<sub>5</sub>)** Wall of late wood pores less than 5  $\mu$  in thickness.
- a<sub>6</sub>)** Late wood pores connected in tangential bands.
- a<sub>7</sub>)** Small vessels without spirals . . . . .  
 . . . . . *Acanthopanax ricinifolium*(64)
- b<sub>7</sub>)** Small vessels with spirals . . . . . *Zelkova acuminata*(113)
- b<sub>6</sub>)** Late wood pores scattered or in circular groups.
- a<sub>7</sub>)** Tyloses very conspicuous . . . . . *Robinia Pseudacacia*(45)
- b<sub>7</sub>)** Tyloses not conspicuous.

- a<sub>3</sub>) Small vessels without spirals; diameter of fibers  
14-18 $\mu$  .. .. . *Sophora japonica* (46)
- b<sub>3</sub>) Small vessels with spirals; diameter of fibers  
18-30 $\mu$ .
- a<sub>3</sub>) Terminal parenchyma present .. .. .  
.. .. . *Melia japonica* (22)
- b<sub>3</sub>) Terminal parenchyma absent .. .. .  
.. .. . *Phellodendron japonicum* (18)
- b<sub>1</sub>) Pith rays heterogeneous.
- a<sub>2</sub>) Pith rays 1 or 2 cells wide.
  - a<sub>3</sub>) Maximum diameter of pores up to 220 $\mu$ ; small vessels  
without spirals; metatracheal parenchyma one cell wide  
in radial direction.. .. . *Mallotus japonicus* (104)
  - b<sub>3</sub>) Maximum diameter of pores up to 80 $\mu$ ; small vessels  
with spirals; metatracheal parenchyma absent .. .. .  
.. .. . *Ligustrum Ibotu* (89)
- b<sub>2</sub>) Pith rays 3-6 cells in width.
  - a<sub>3</sub>) High rays present .. .. . *Berberis Thumbergii* (8)
  - b<sub>3</sub>) High rays absent
    - a<sub>4</sub>) Maximum diameter of fibers more than 25 $\mu$ ; terminal  
parenchyma usually present.
    - a<sub>5</sub>) Wall of late wood pores more than 8 $\mu$  in thickness.  
.. .. . *Hovenia dulcis* (30)
    - b<sub>5</sub>) Wall of late wood pores less than 4 $\mu$  in thickness.  
.. .. . *Rhus vernicifera* (39),  
*R. succedanea var. japonica* (40), *R. javanica* (41)
  - b<sub>4</sub>) Maximum diameter of fibers less than 20 $\mu$ ; terminal  
parenchyma usually absent.
    - a<sub>5</sub>) Wood fibers septate .. .. . *Aralia chinensis* (66)
    - b<sub>5</sub>) Wood fibers non-septate.
      - a<sub>5</sub>) Late wood pores distributed tangentially .. .. .  
.. .. . *Clerodendron trichotomum* (94)
      - b<sub>5</sub>) Late wood pores evenly distributed in general.

- a<sub>7</sub>) Maximum diameter of early wood pores up to 250 $\mu$ ; small vessels with spirals . . . . .  
 . . . . . *Morus bombycis*(109)
- b<sub>7</sub>) Maximum diameter of early wood pores up to 340 $\mu$ ; small vessels without spirals . . . . .  
 . . . . . *Cedrela chinensis*(21)
- c<sub>2</sub>) Pith rays up to 10 cells wide.
  - a<sub>3</sub>) High rays present. . . . . *Firmiana simplex*(15)
  - b<sub>3</sub>) Pith rays absent.
    - a<sub>4</sub>) Late wood pores in diagonal or tangential groups . . . . .  
 . . . . . *Celtis sinensis*(106)
    - b<sub>4</sub>) Late wood pores evenly distributed . . . . .  
 . . . . . *Catalpa Kämpferi*(93)
- B) Pores arranged radially or diagonally.**
  - a.) Broad rays present . . . . . *Quercus acuta*(144), *Q. gilva*  
 (135), *Q. glauca*(140), *Q. stenophylla*(141), . . *Q. myrsinæfolia*(145)
  - b.) Aggregate (or compound) rays present.
    - a<sub>2</sub>) Perforation of vessels scalariform sometimes simple . . . . .  
 . . . . . *Carpinus cordata*  
 (129), *C. japonica*(127), *C. laxiflora*(128), . . *C. yedænsis*(126)
    - b<sub>2</sub>) Perforation of vessels nearly always scalariform . . *Alnus japonica*(118),  
*A. Maximowiczii*(120), . . *A. tinctoria*(119)
  - c.) Neither broad rays nor aggregate rays present.
    - a.) Perforation of vessels simple.
      - a<sub>3</sub>) Pith rays homogeneous or nearly homogeneous.
        - a<sub>4</sub>) Vessels without spirals; pith rays uniseriate . . . . .  
 . . . . . *Populus Maximowiczii*(147), *P. Sieboldii*(146)
        - b<sub>4</sub>) Vessels with spirals; pith rays more than 3 cells in width.
          - a<sub>5</sub>) Maximum number of pores per square mm. up to 40 . . . . .  
 . . . . . *Ostrya japonica*(133)
          - b<sub>5</sub>) Maximum number of pores per square mm. more than 50 . . *Prunus cerasoides*(51), *P. Buergeriana*(49)
      - b<sub>3</sub>) Pith rays heterogeneous.

- a<sub>4</sub>) Pith rays uniseriate . . . . .  
*Salix babylonica* (150), *S. Caprea*(148), *S. Urbaniana*(149)
- b<sub>4</sub>) Pith rays polyseriate . . . . .  
. . . . . *Prunus serrulata*(48), *P. Maximowiczii*  
(54), *P. macrophylla*(52), *P. Grayana*(53), *P. Ssiori*(50)
- b<sub>2</sub>) Perforation of vessels scalariform.
  - a<sub>3</sub>) Fibers with spirals . . . . .*Ilex crenata*(25), *I. integra*  
(23), *I. latifolia*(27), *I. macropoda*(24), *I. pedunculosa*(26)
  - b<sub>3</sub>) Fibers without spirals.
    - a<sub>4</sub>) Pith rays 1 or 2 cells wide, up to 25 cells high. . .  
. . . . . *Pterostyrax corymbosum*(81)
    - b<sub>4</sub>) Pith rays 1-4 cells wide, high rays present . . . . .  
. . . . . *Meliosma myriantha*(38)
- C) Pores evenly distributed.
  - a<sub>1</sub>) Perforation of vessels always simple.
    - a<sub>2</sub>) Vessels with scalariform bordered pits where they are in  
contact with each other . . *Magnolia obovata*(2), *M. Kobus*(3)
    - b<sub>2</sub>) Vessels with bordered pits where they are in contact with  
each other.
      - a<sub>3</sub>) Pith rays heterogeneous.
        - a<sub>4</sub>) Pith rays uniseriate, sometimes up to 3 cells wide.
          - a<sub>5</sub>) Vessels with spirals; pith rays not arranged in hori-  
zontal series.
            - a<sub>6</sub>) Wood reddish brown . . . . . *Amelanchier asiatica*  
(57), *Eriobotrya japonica*(47), *Photinia glabra*(56)
            - b<sub>3</sub>) Wood yellowish or grayish . . . . .  
. . . . . *Euonymus alata*(28), *E. Sieboldiana*(29)
          - b<sub>5</sub>) Vessels without spirals; pith rays often arranged in  
horizontal series . . *Diospyros Kaki*(78), *D. Lotus*(77)
        - b<sub>4</sub>) Pith rays more than 4 cells in width.
          - a<sub>5</sub>) Vessels with spirals . . . . . *Photinia variabilis*(55)
          - b<sub>5</sub>) Vessels without spirals.
            - a<sub>6</sub>) Metatracheal parenchyma in broad tangential

- bands . . . . . *Ficus retusa*  
*var. nitida*(108), *F. Wightiana var. japonica*(107)
- .. **b<sub>6</sub>)** Terminal parenchyma present.. *Aphananthe aspera*(105)
- b<sub>3</sub>)** Pith rays homogeneous.
- a<sub>4</sub>)** Maximum number of pores per square mm. less than 9.
- a<sub>5</sub>)** Pith lamellated; metatracheal parenchyma present.  
. . . . . *Juglans Sieboldiana*(114)
- b<sub>5</sub>)** Pith solid; terminal parenchyma present.. . . .  
. . . . . *Zanthoxylum ailanthoides*(19)
- b<sub>4</sub>)** Maximum number of pores per square mm. more than  
20.
- a<sub>5</sub>)** Number of pores per square mm. 95–220.. . . .  
. . . . . *Micromeles*  
*alnifolia* (59), *M. japonica* (60) *Sorbus commixta*(58)
- b<sub>6</sub>)** Number of pores per square mm. 20–85.
- a<sub>3</sub>)** Ripple marks present . . . . *Aesculus turbinata*(37)
- b<sub>6</sub>)** Ripple marks absent.
- a<sub>7</sub>)** Pith rays uniseriate; vessels without spirals . .  
. . . . . *Pterocarya rhoifolia*(116)
- b<sub>7</sub>)** Pith rays 1–8 cells wide; vessels with spirals.
- a<sub>8</sub>)** Wood parenchyma terminal and metatracheal  
. . . . . *Tilia japonica*(16)
- b<sub>8</sub>)** Wood parenchyma terminal . . . . .  
. . . . . *Acer carpinifolium*(36),  
*A. cissifolium*(31), *A. crataegifolium*(35) *A.*  
*nikoense*(32), *A. palmatum*(33), *A. rufinerve*(34)
- b<sub>1</sub>)** Perforation of vessels either scalariform or “simple-scalariform.”
- a<sub>2</sub>)** Perforation of vessels simple sometimes scalariform (“simple-scalariform”); secretory cells often present; paratracheal parenchyma conspicuous on cross section (*Laurineae*)  
. . . . . *Actinodaphne acuminata*  
(95), *A. lancifolia*(96), *Cinnamomum Camphora*(97), *C.*  
*pedunculatum*(98), *Litsea glauca*(99), *Machilus Thunbergii*(100)

- b**<sub>2</sub>) Perforation of vessels nearly always scalariform.
- a**<sub>3</sub>) Terminal parenchyma present.
- a**<sub>4</sub>) Number of pores per square mm. 140–180; pith rays heterogeneous . . . . . *Michelia Compressa*(1)
- b**<sub>4</sub>) Number of pores per square mm. 10–28; pith rays nearly homogeneous . . . . .  
 . . . . . *Betula japonica*(122), *B. Schmidtii*(125), *B. grossa*(123), *B. Maximowicziana*(121), *B. ulmifolia*(124)
- b**<sub>3</sub>) Terminal parenchyma absent.
- a**<sub>4</sub>) Wood fibers often with spirals . . . . .  
 . . . . . *Symplocos cratogeoides*(84) *S. myrtaea*(82), *S. prunifolia*(83), *Viburnum Awabucki*(73)
- b**<sub>4</sub>) Wood fibers without spirals.
- a**<sub>5</sub>) Pith rays lamellated . . . . . *Daphniphyllum glaucescens*(103)
- b**<sub>5</sub>) Pith rays solid.
- a**<sub>6</sub>) Metatracheal parenchyma present.
- a**<sub>7</sub>) High rays present.
- a**<sub>8</sub>) Pith rays 1–5 cells wide . . . . .  
 . . . . . *Ternstroemia japonica*(13)
- b**<sub>8</sub>) Pith rays 12–20 cells wide . . . . .  
 . . . . . *Fagus japonica*(132), *F. Sieboldii*(131)
- b**<sub>7</sub>) High rays absent.
- a**<sub>9</sub>) Number of pores per square mm. 120–200 . .  
 . . . . . *Cleyera ochracea*(11), *Camellia japonica*(14)
- b**<sub>9</sub>) Number of pores per square mm. 45–80.
- a**<sub>10</sub>) Wood contains flavone . . . . . *Myrica rubra*(117)
- b**<sub>10</sub>) Wood does not contain flavone.
- a**<sub>10</sub>) Vessels with scalariform bordered pits where they are in contact with each other.
- a**<sub>11</sub>) Metatracheal parenchyma conspicuous . . . . .  
 . . . . . *Distylium racemosum*(62)





.. .. *Cornus controversa* (68), *C. Kousa*  
(70), *C. brachypoda* (69), *C. officinalis* (71)

**b<sub>0</sub>)** Pith rays less than 4 cells in width.

**a<sub>10</sub>)** Maximum diameter of pores up to 120 $\mu$

.. .. .. .. .. *Clethra*  
*barvinervis* (75), *Stewartia monadelphica* (12)

**b<sub>10</sub>)** Maximum diameter of pores up to 60 $\mu$

.. .. .. .. .. *Stachyurus præcox* (9)

**D)** Pores arranged in flame-like groups.. .. *Osmantlus Aquifolium* (90)

**E)** Pores arranged in tangential lines .. *Rhododendron quinquefolium* (76)