

Order form at
International Association of Wood
Anatomists Web Site

<http://bio.kuleuven.be/sys/iawa>

IAWA Hardwood Feature List Definitions and Illustrations Features 136-162.

Numbered photographs from:
IAWA Committee. 1989. IAWA List of
Microscopic Features for Hardwood
Identification. IAWA Bulletin n.s. 10(3):
219-332.

Photographs without numbers are associated
with the InsideWood website hosted by N.C.
State University Libraries.
<http://insidewood.lib.ncsu.edu/search>

Photographs copyright of the individual
photographers credited.

Slide Set Assembled by E.A.Wheeler

MINERAL INCLUSIONS

Prismatic crystals = solitary rhombohedral or octahedral crystals composed of calcium oxalate, which are birefringent under polarized light.
Synonym: rhomboidal crystal.

Chambered cell = an axial parenchyma strand cell or ray parenchyma cell subdivided by septa or by thin to thick end walls.

Feature 136. Prismatic crystals present

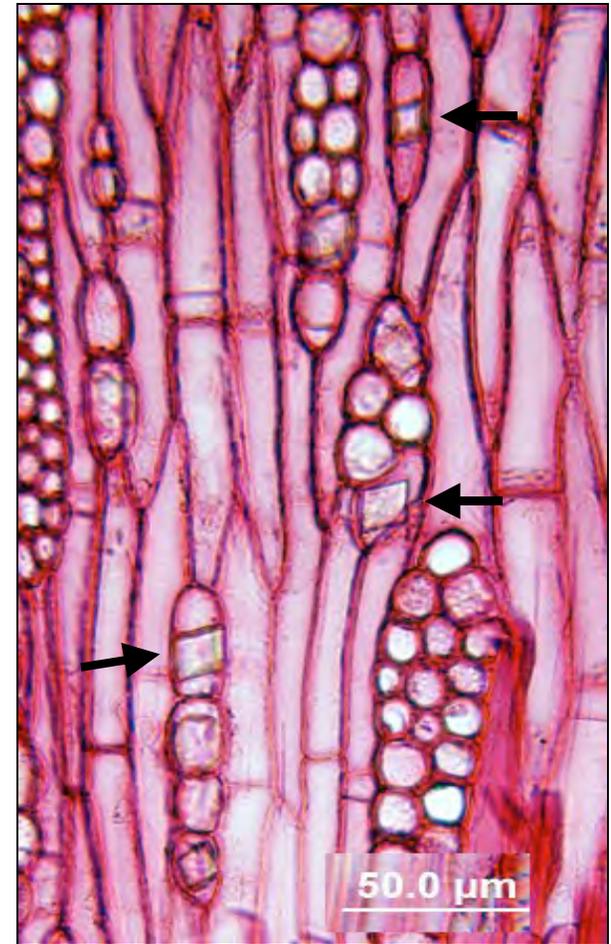
Feature 137. Prismatic crystals in upright and/or square ray cells.



Drypetes keyensis: E.A. Wheeler
(Putranjavaceae)

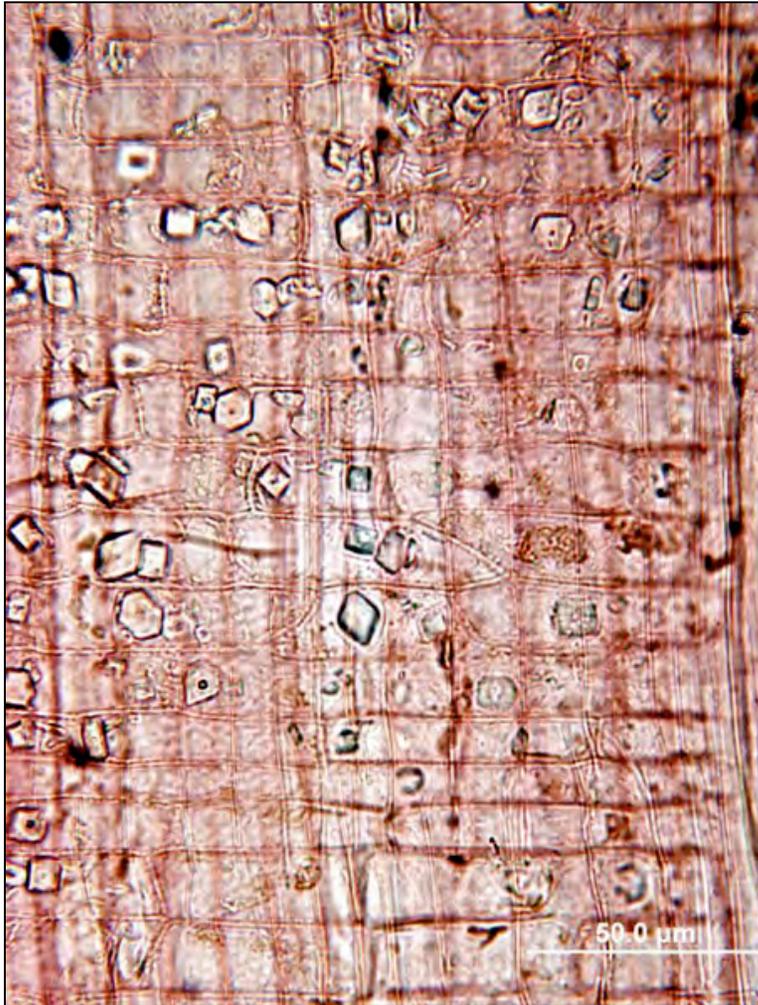


Astronium graveolens: E.A. Wheeler
(Anacardiaceae)



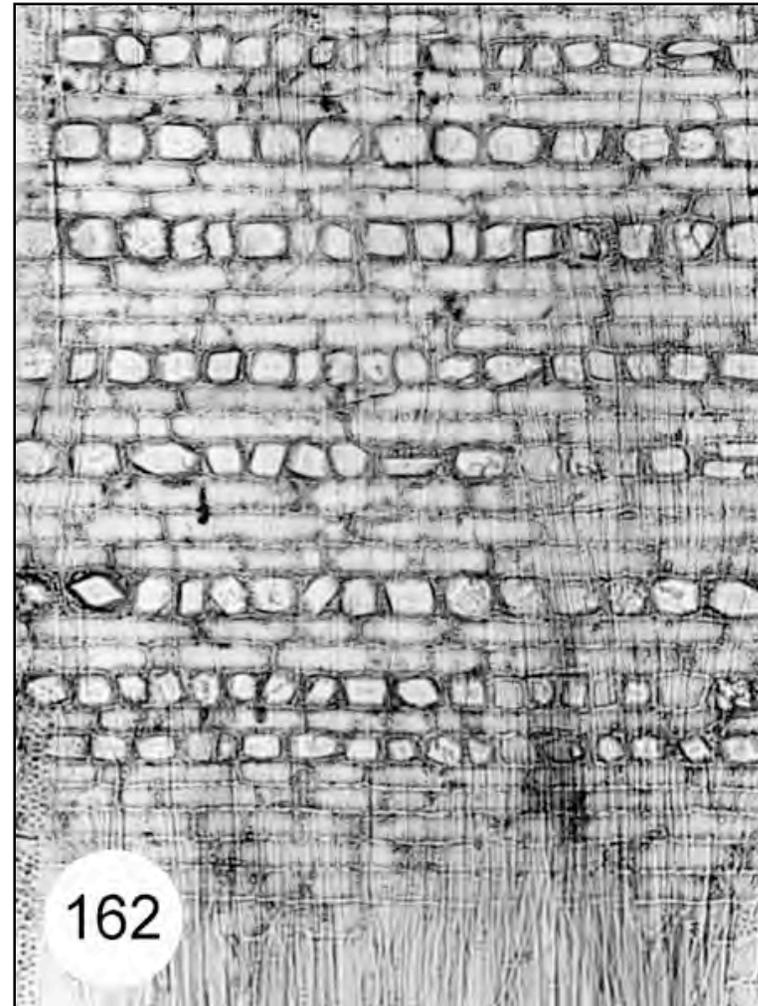
Celtis ehrenbergiana: E.A. Wheeler
(Cannabaceae)

Feature 138. Prismatic crystals in procumbent ray cells.



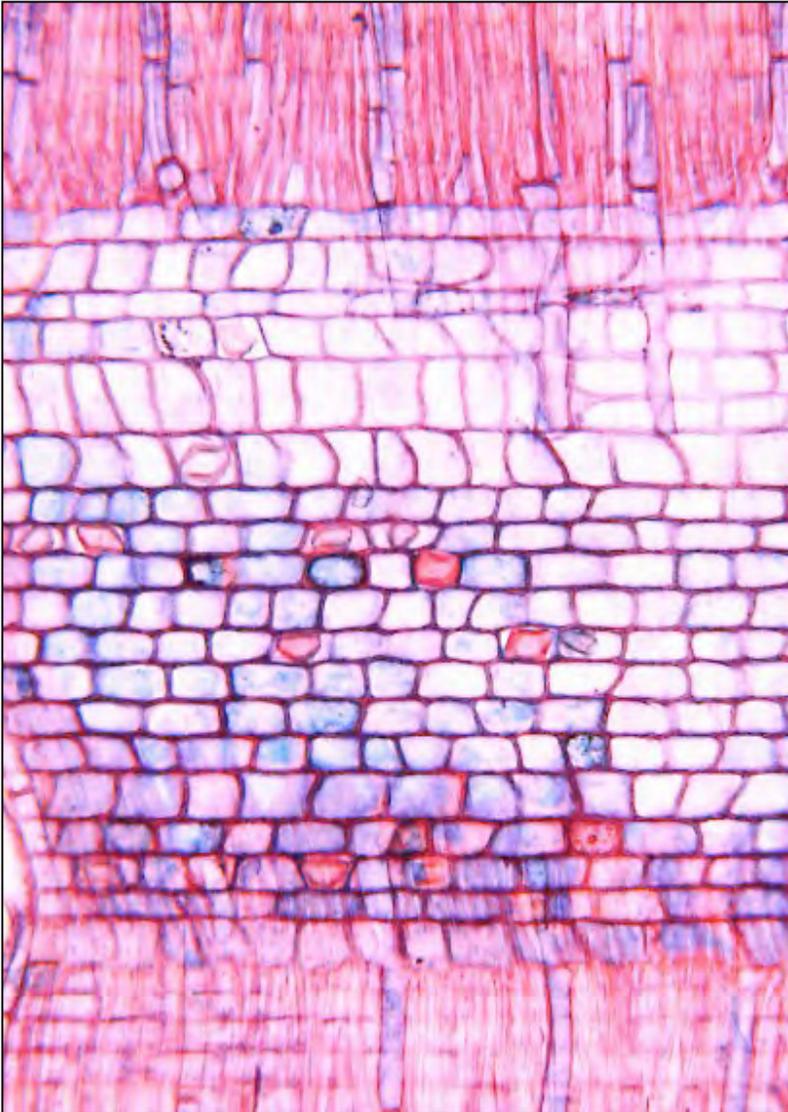
Capparis flexuosa: E.A. Wheeler
(Capparaceae)

Feature 139. Prismatic crystals in radial alignment in procumbent ray cells.



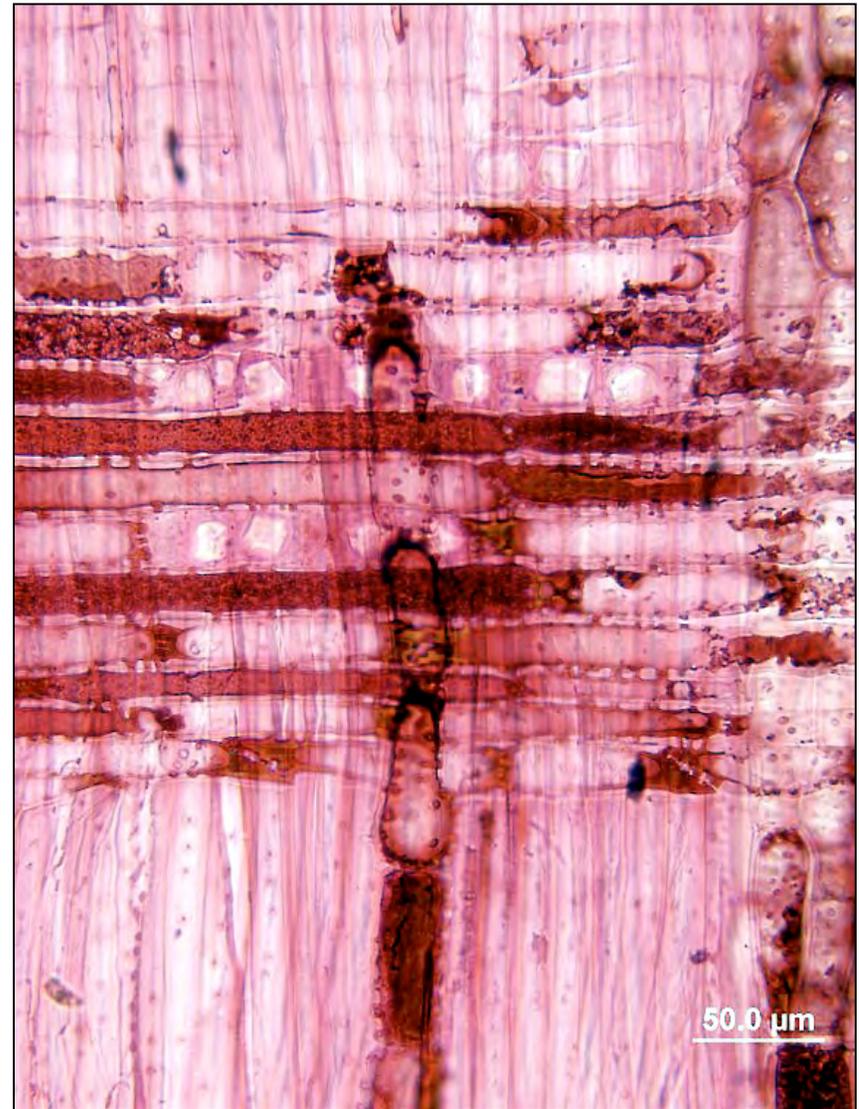
Anogeissus latifolia: K. Ogata
(Combretaceae)

Features 137 & 138. Prismatic crystals in upright/square and procumbent ray cells.



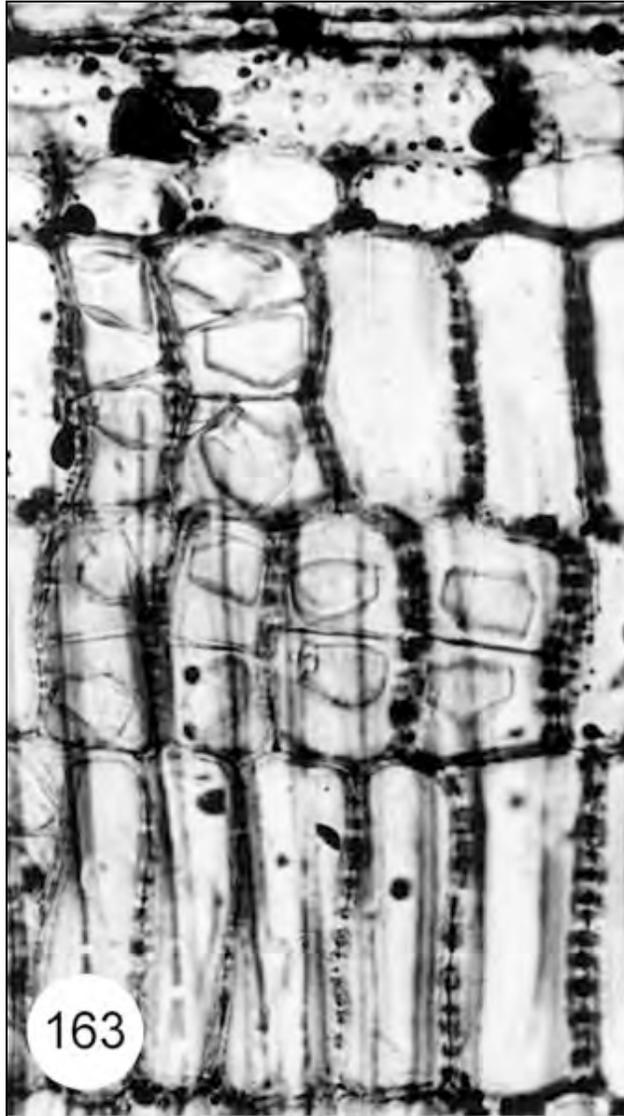
Diospyros montana: F. Lens
(Ebenaceae)

Feature 138. Prismatic crystals in procumbent ray cells.

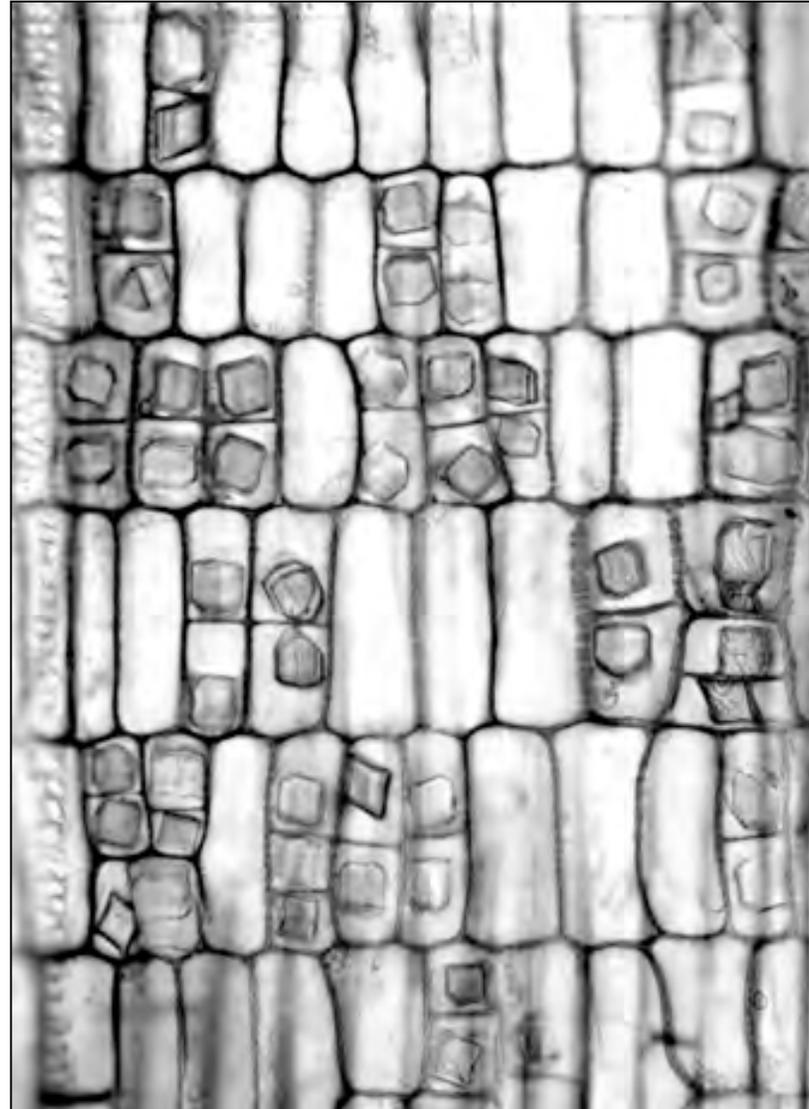


Gymnostoma papuana: E.A. Wheeler
(Casuarinaceae)

Feature 140. Prismatic crystals in chambered upright and/or square ray cells.

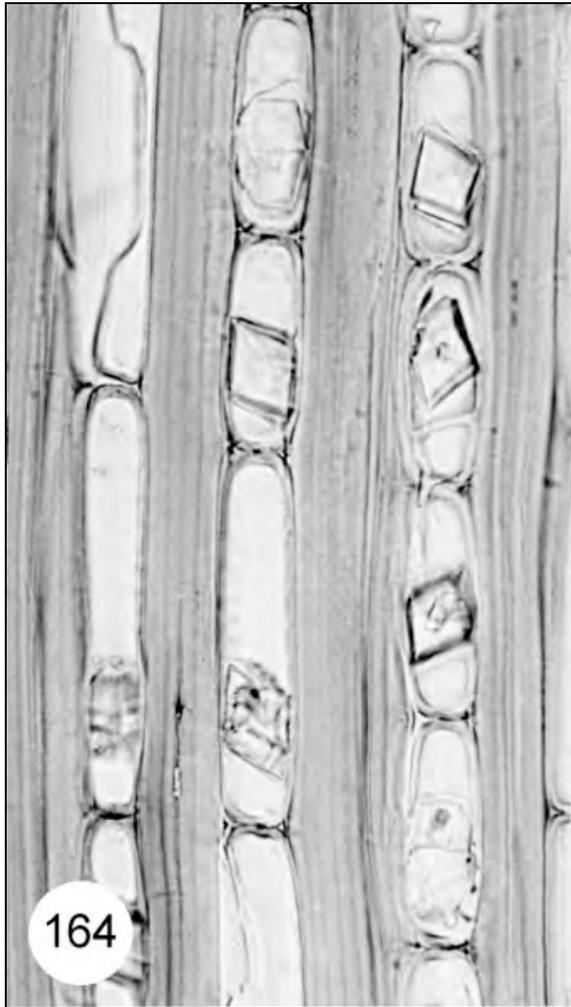


Elaeocarpus calomala P.E. Gasson
(Elaeocarpaceae)



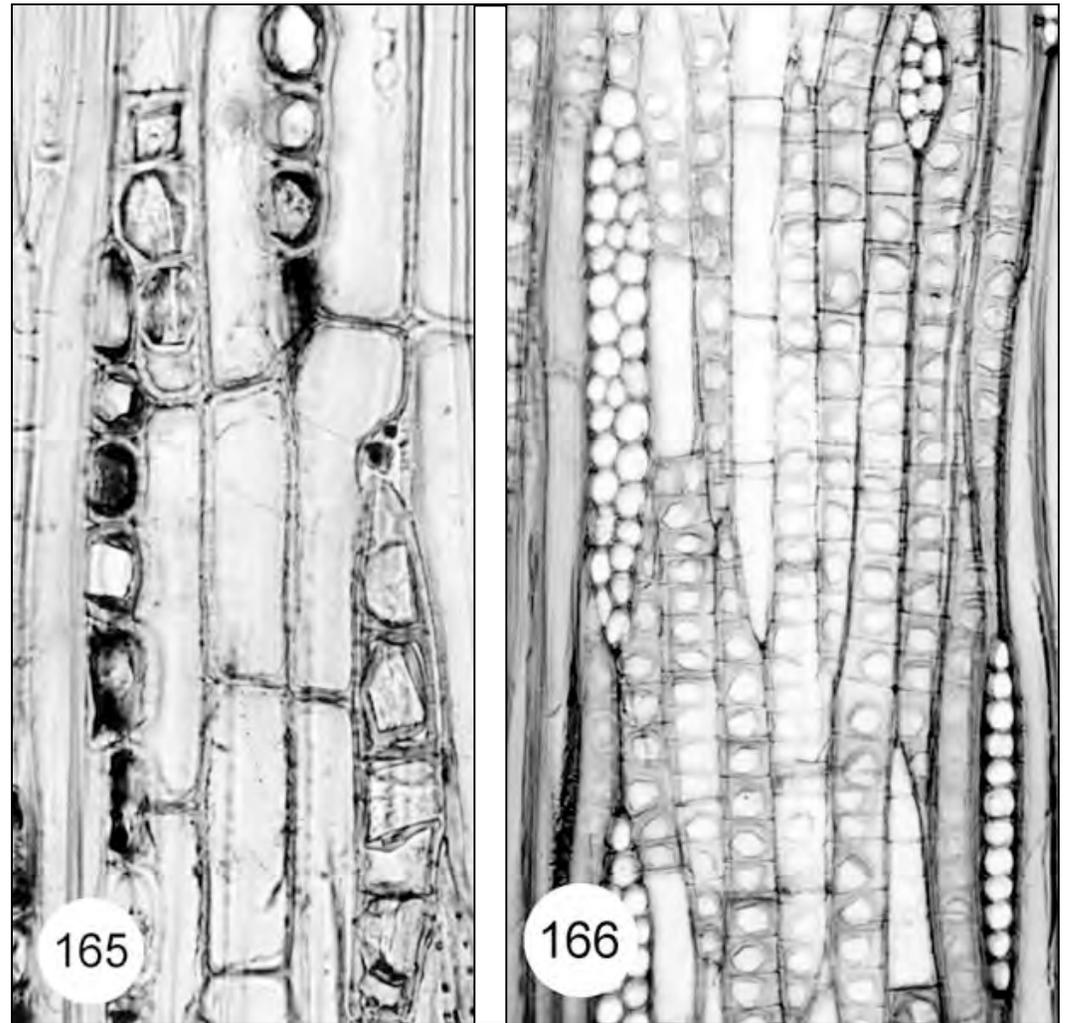
Ahernia glandulosa R.B. Miller
(Achariaceae)

Feature 141. Prismatic crystals in nonchambered axial parenchyma cells.



Drypetes gerrardii P.E. Gasson
(Putranjavaceae)

Feature 142. Prismatic crystals in chambered axial parenchyma cells.



165. *Lithocarpus edulis*. (Fagaceae).

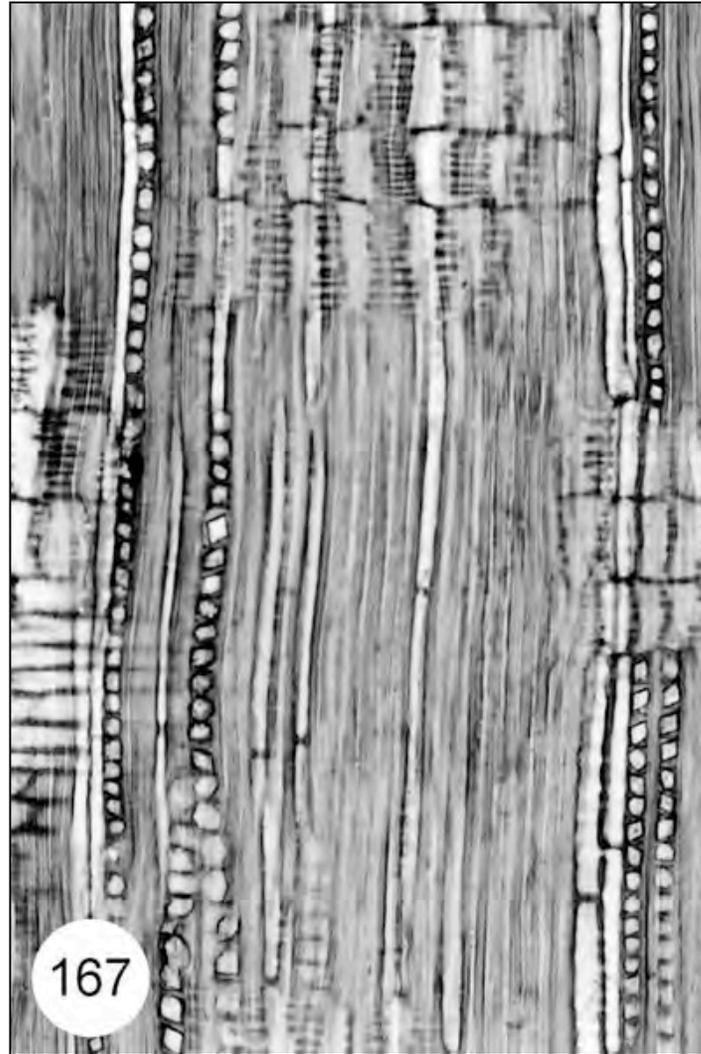
166. *Parkia pendula* (Leguminosae-Mimosoideae)

P.E. Gasson

**Feature 142. Prismatic crystals
in chambered axial parenchyma
cells.**

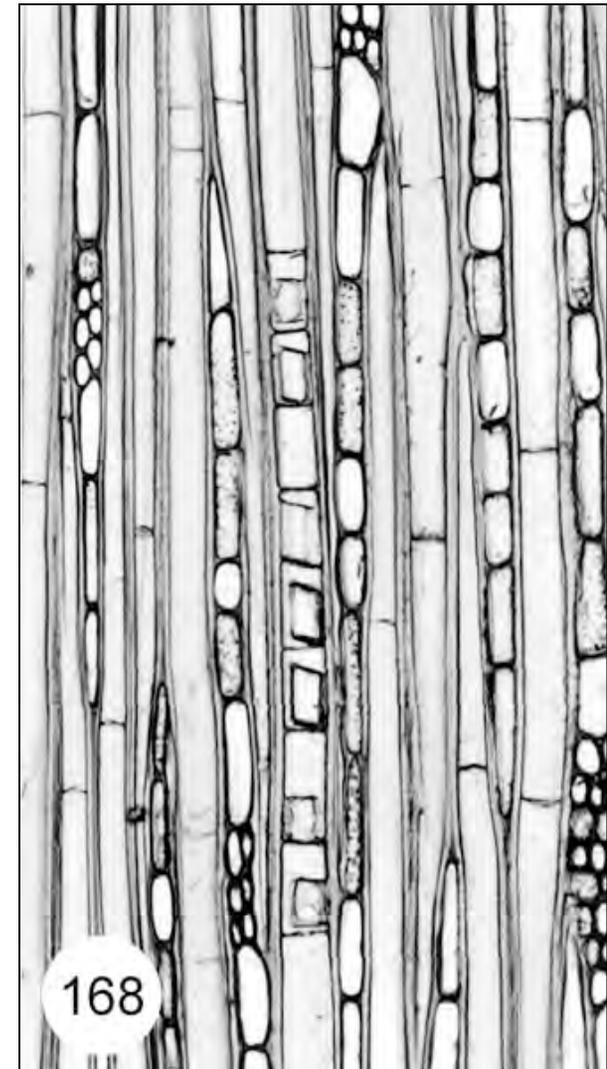


Savia bahamensis
(Phyllanthaceae)
E.A. Wheeler



Malpighia incana P.E. Gasson
(Malpighiaceae)

**Feature 143.
Prismatic crystals
in fibres.**

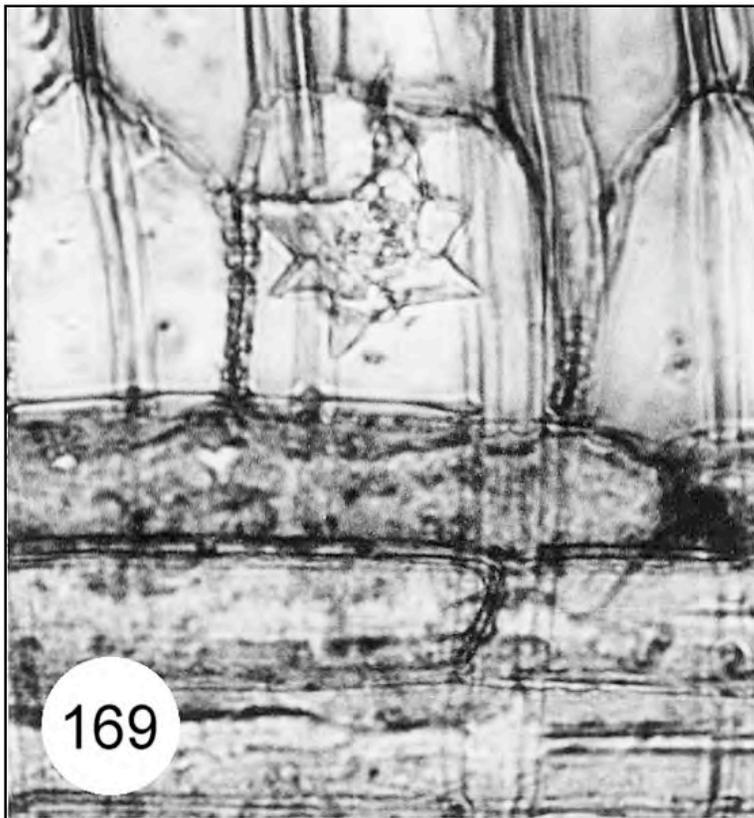


Banara regia P.E. Gasson
(Salicaceae)

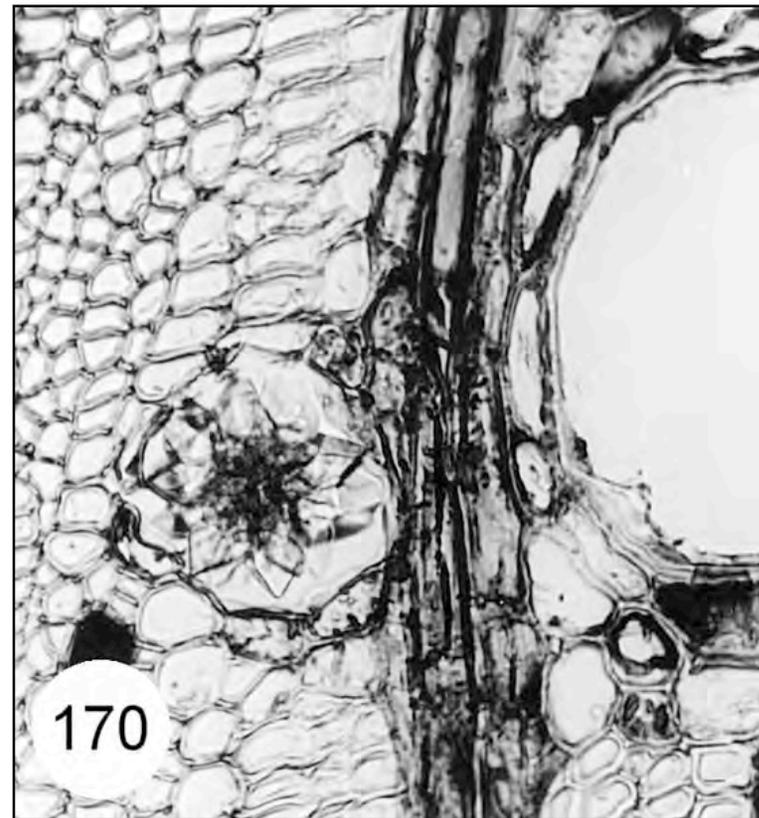
Feature 144. Druses present = a compound crystal, more or less spherical in shape, in which the many component crystals protrude from the surface giving the whole structure a star-shaped appearance.

Feature 145. Druses in ray parenchyma cells

Feature 146. Druses in axial parenchyma cells



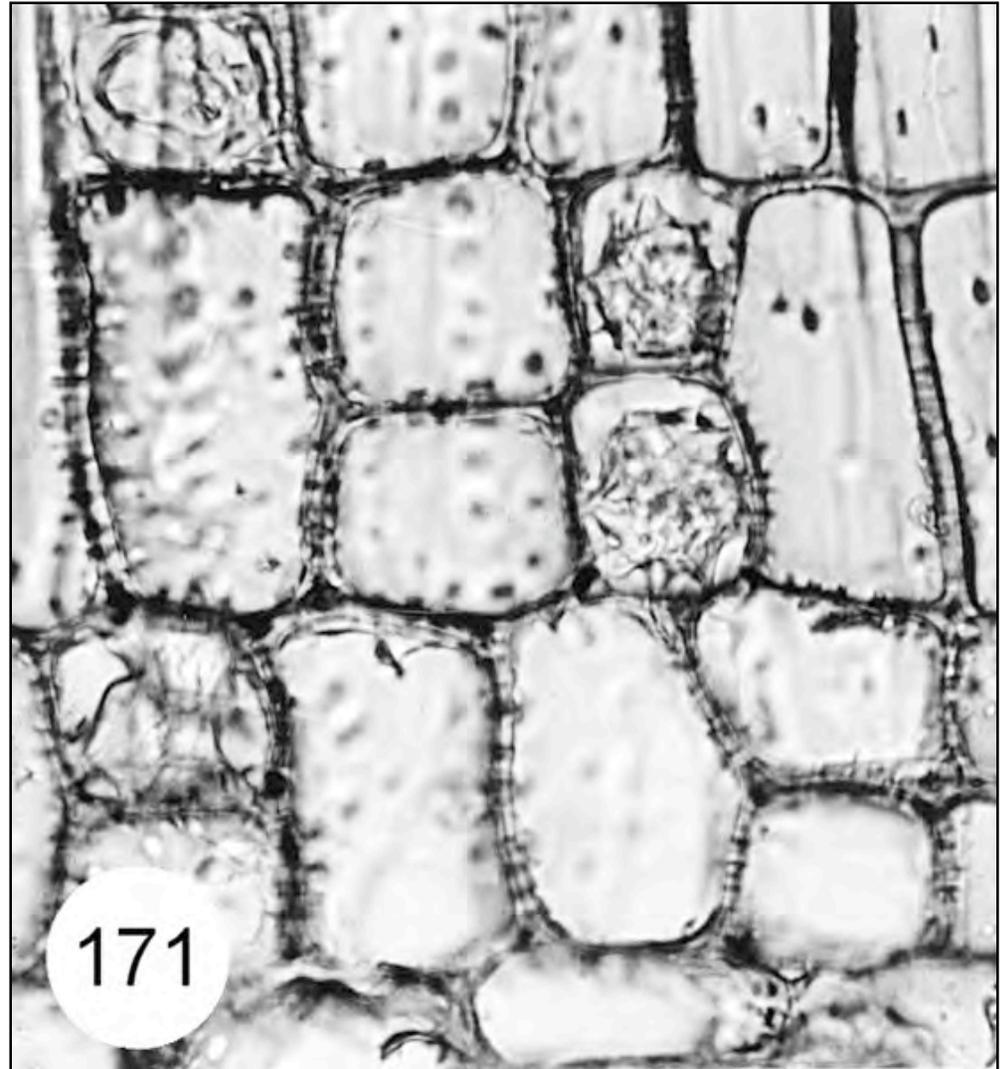
Hibiscus tiliaceus (Malvaceae)
Druse in ray parenchyma cell.
Features 144, 145. E.A. Wheeler



Terminalia catappa. (Combretaceae)
Druse in axial parenchyma cell.
Features 144, 146. D. Grosser

Feature 147.
Druses in fibres
(not shown)

Feature 148.
Druses in
chambered cells



Banara regia. (Salicaceae)
Druses in chambered ray parenchyma cells.
Features 144, 145, 148 present.
P.E. Gasson

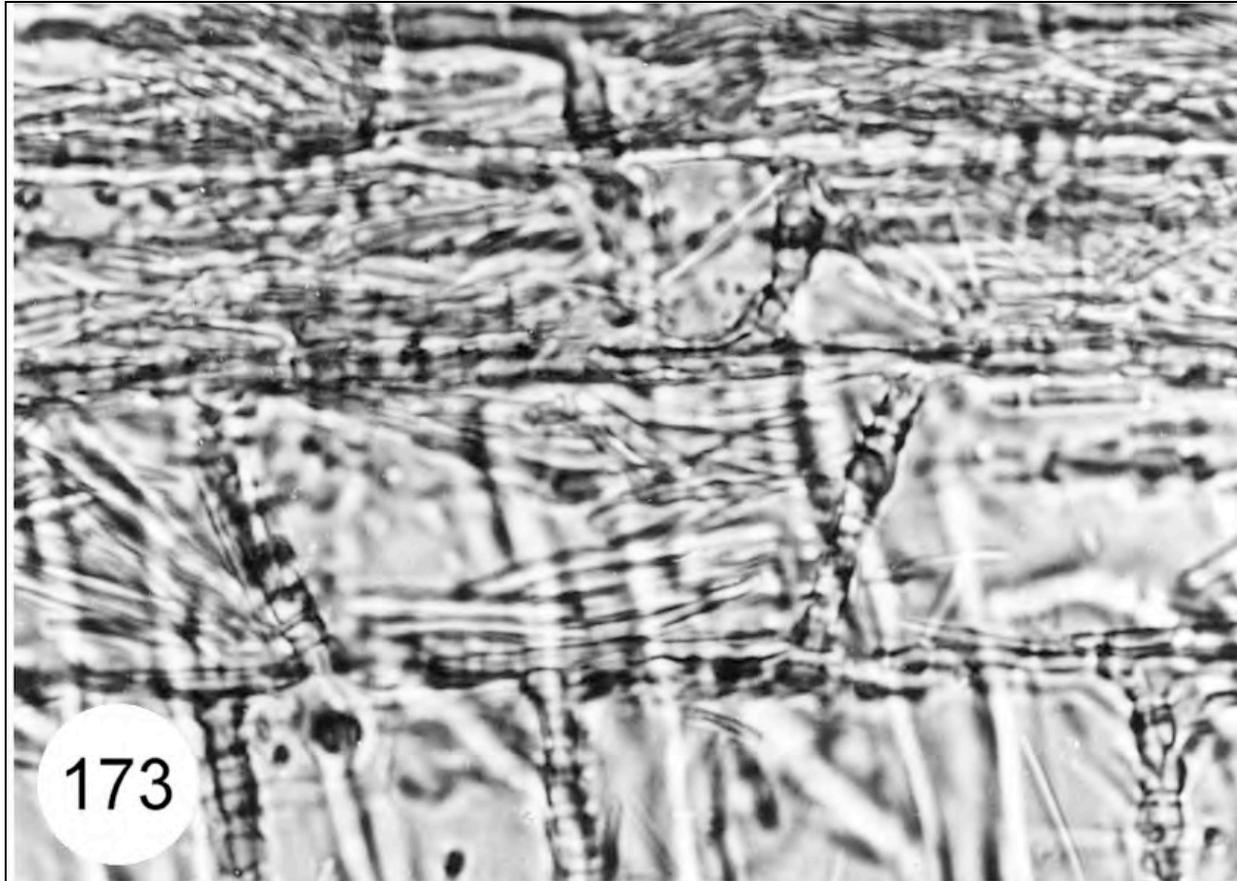
OTHER CRYSTAL TYPES

Feature 149. Raphides = a bundle of long needle-like crystals.



Vitis vinifera (Vitaceae) P.E. Gasson

Feature 150. Acicular crystals = small needle-like crystals, not occurring in bundles.



Gmelina arborea (Verbenaceae) D. Grosser

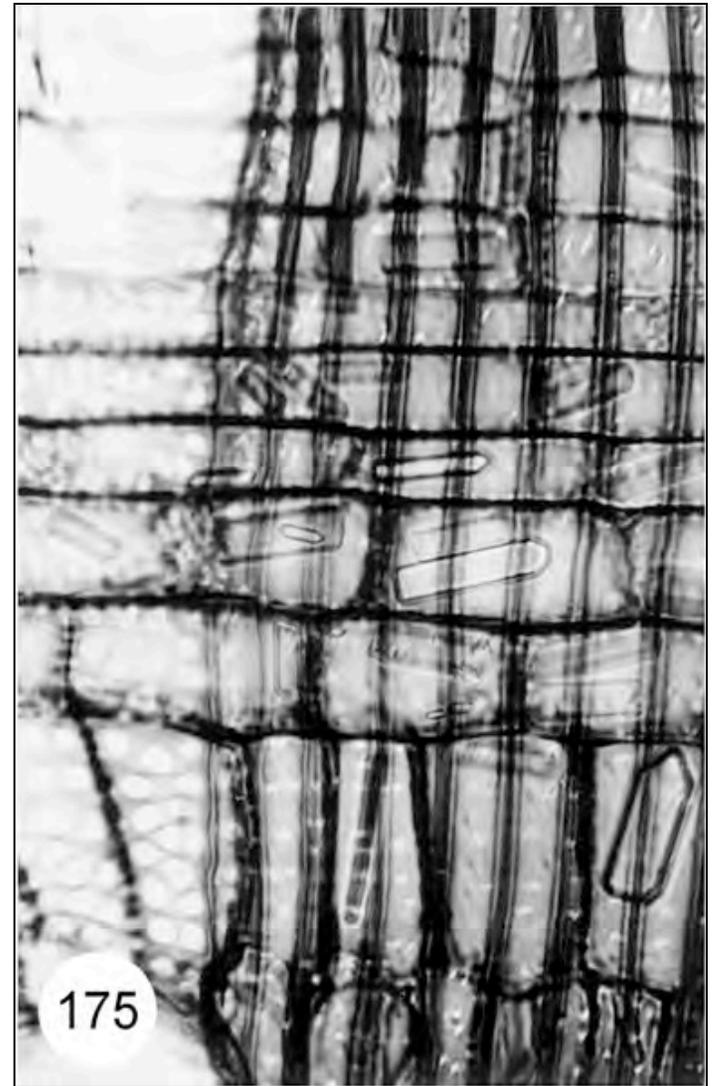
Feature 151. Styloids and/or elongate crystals.

Styloids = large crystals at least four times as long as broad with pointed or square ends.

Elongate crystals = crystals two to four times as long as broad with pointed or square ends.

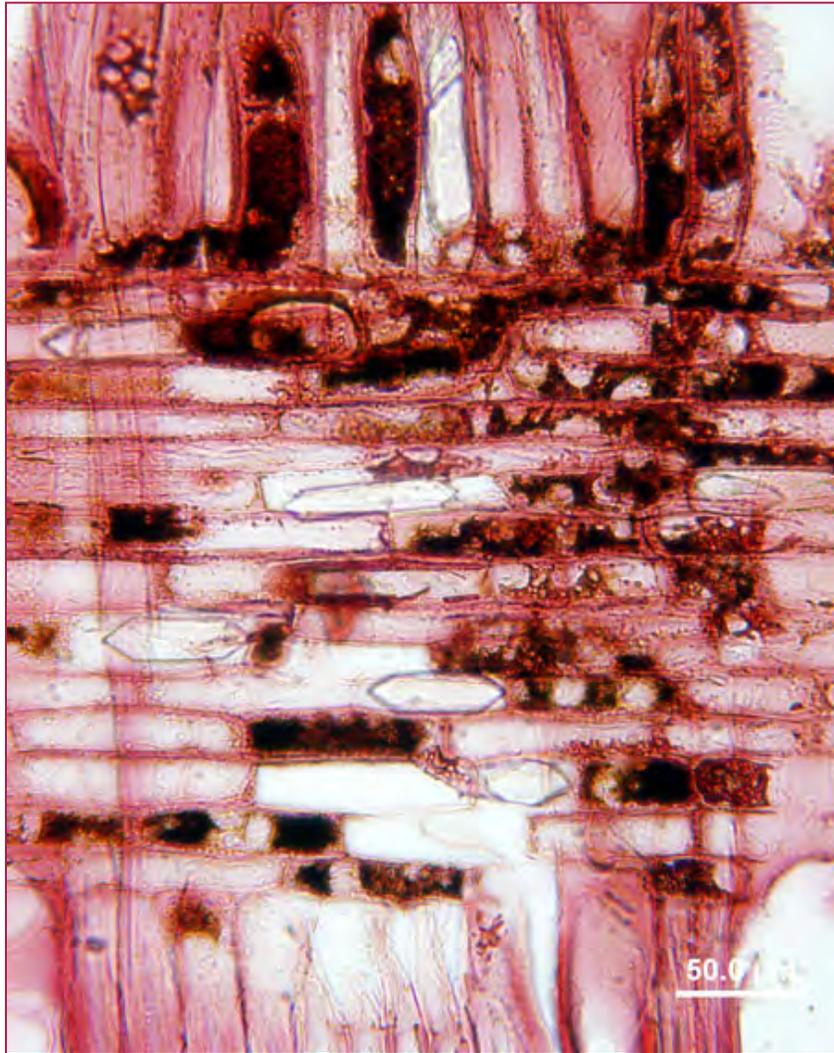


Memecylon membranifolium
(Melastomataceae)
Styloids in included phloem
Van Vliet 1981. Blumea.



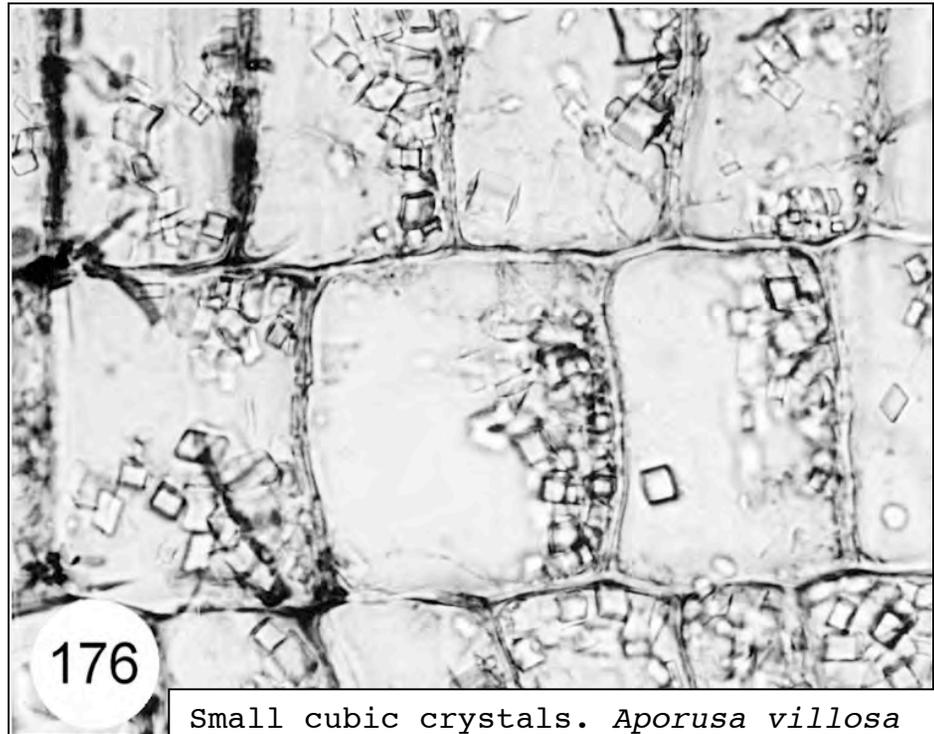
Ligustrum vulgare (Oleaceae)
Baas et al. 1988. IAWA Bull.

Feature 151. Styloids and/or elongate crystals.

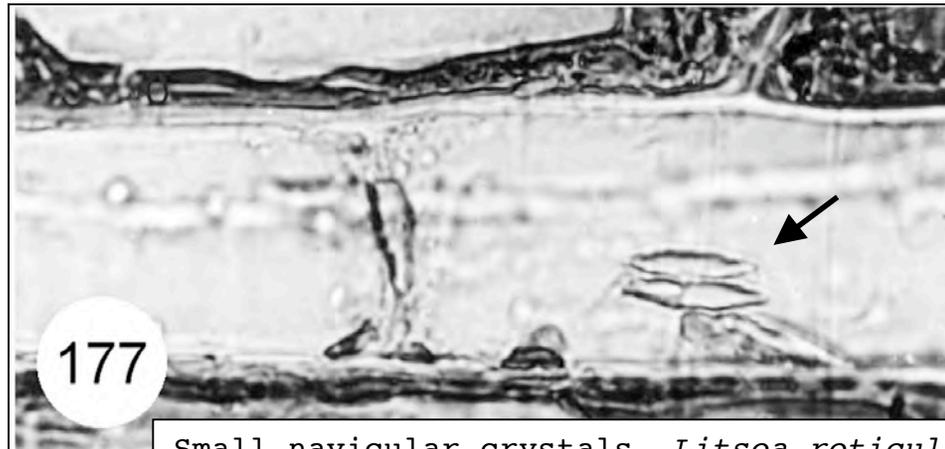


Lophopetalum obtusifolium

Feature 152.
Crystals of other shapes
(mostly small) =
includes all other shapes of crystals, e.g., cubic, navicular (boat-shaped), spindle-shaped, pyramidal, tabular, indented, twinned, etc.



Small cubic crystals. *Aporosa villosa*
(Phyllanthaceae) P.E. Gasson



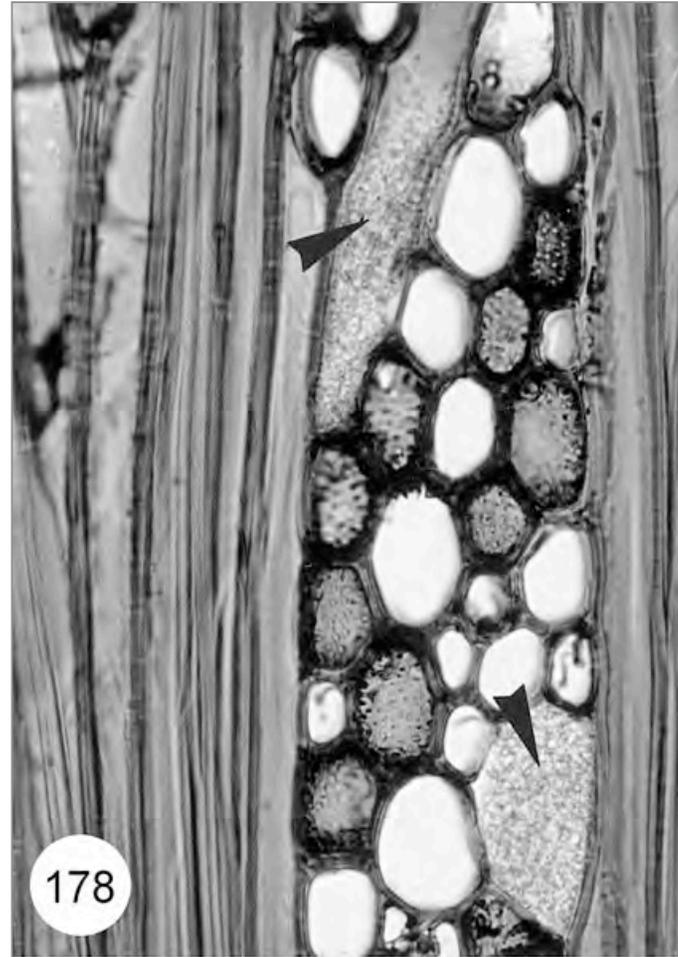
Small navicular crystals. *Litsea reticulata*
(Lauraceae) D. Grosser

Feature 153. Crystal sand = a granular mass composed of very small crystals.

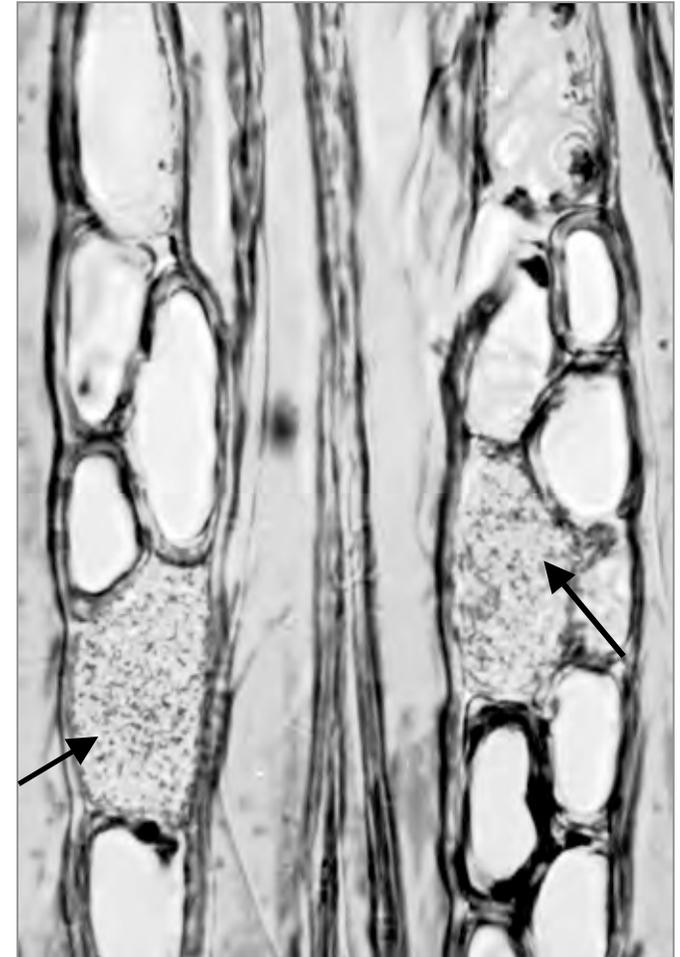
Synonym: microcrystals.



Cordia sebestena
(Boraginaceae)
E.A. Wheeler

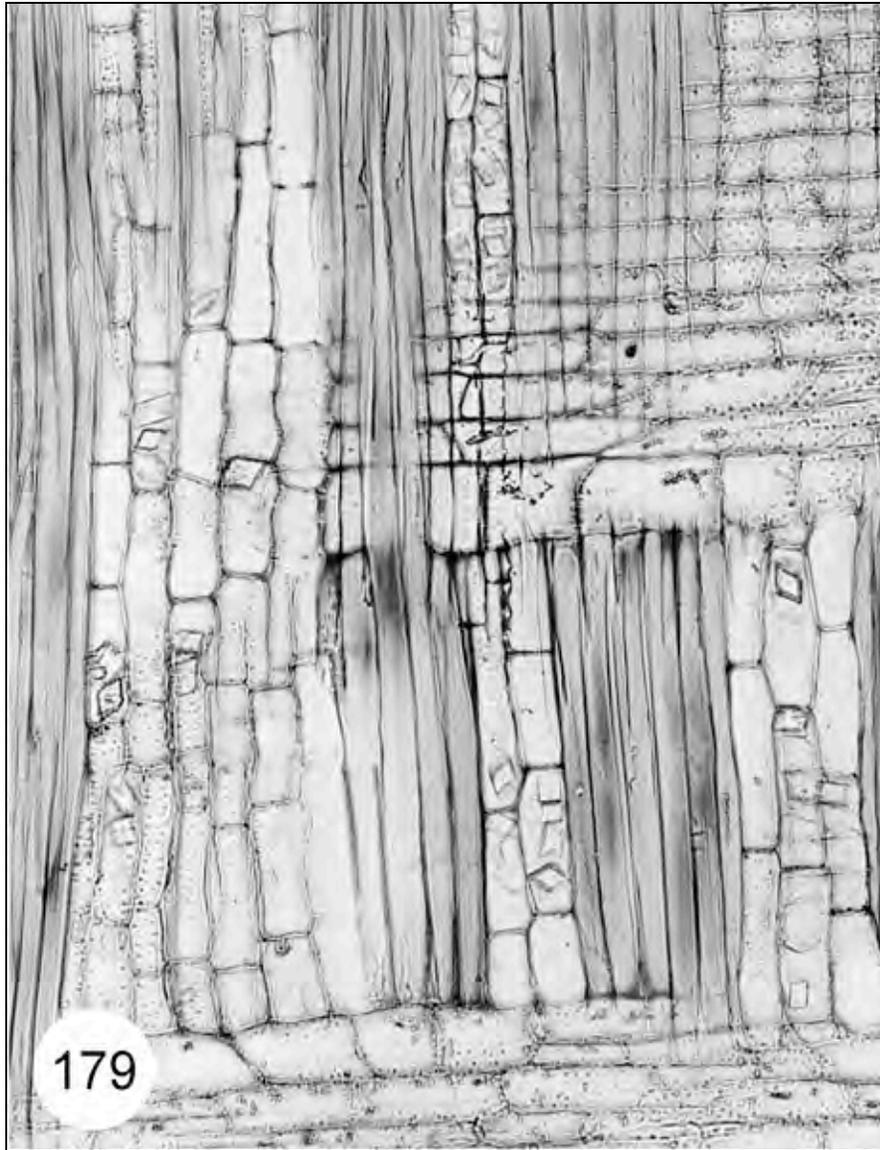


Cordia subcaudata (Boraginaceae)
P.E. Gasson



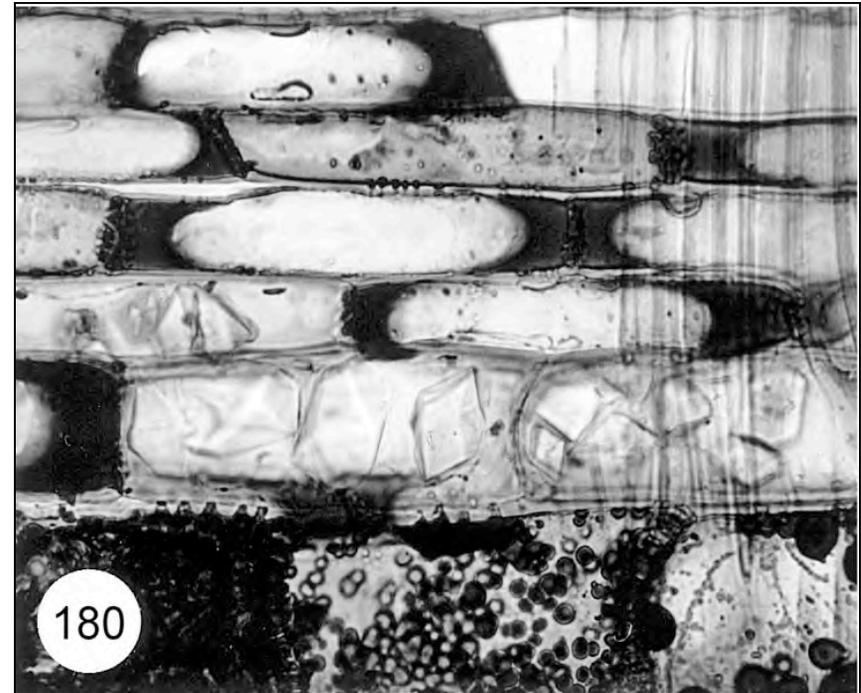
Nothocestrum (Solanaceae)
S. Carlquist

OTHER DIAGNOSTIC CRYSTAL FEATURES



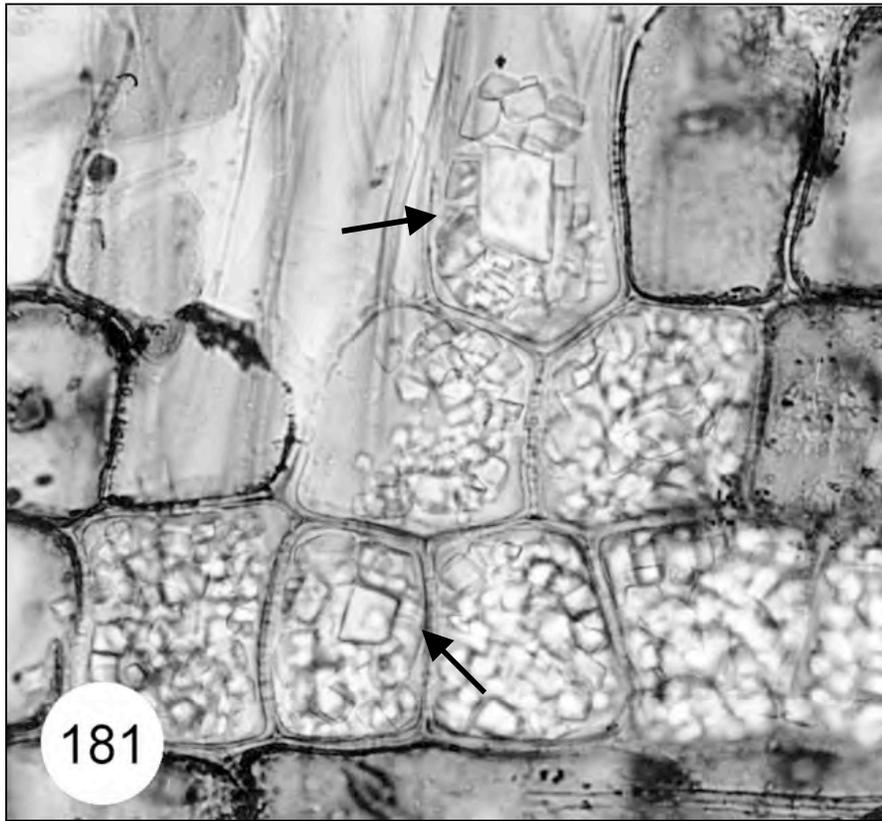
Garcinia latissima (Clusiaceae)
K. Ogata

Feature 154. More than one crystal of about the same size per cell or chamber.



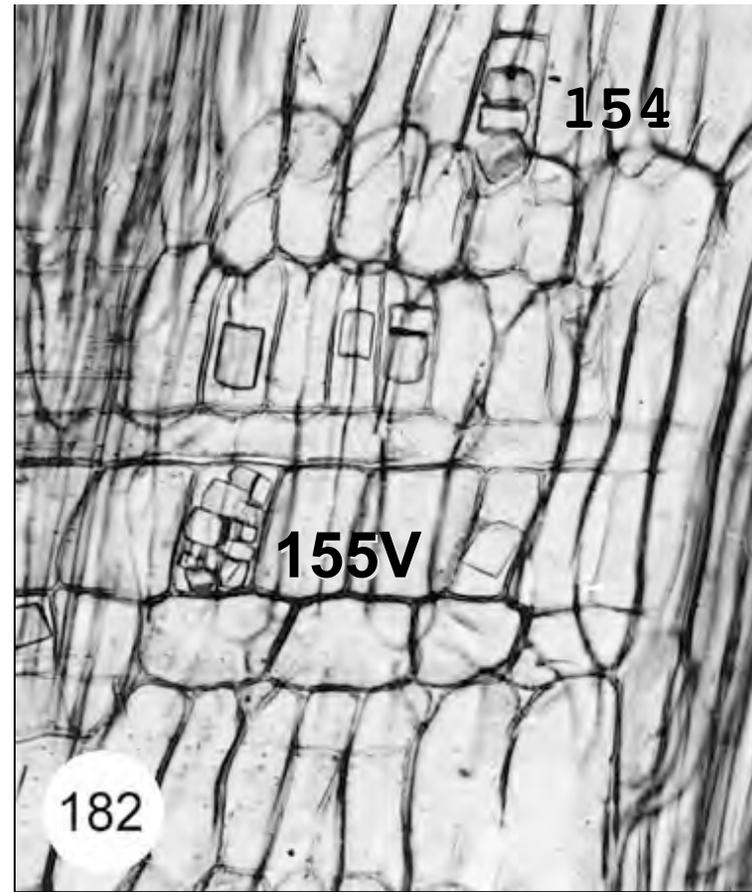
Bouea oppositifolia (Anacardiaceae)
P.E. Gasson

Feature 155. Two distinct sizes of crystals per cell or chamber (below)



Cordia bantamensis (Boraginaceae)
P.E. Gasson

Fig.182. Different size classes of crystals intergrading in some ray cells (feature 155 variable), but more than one crystal of about the same size per cell in others (feature 154 present).

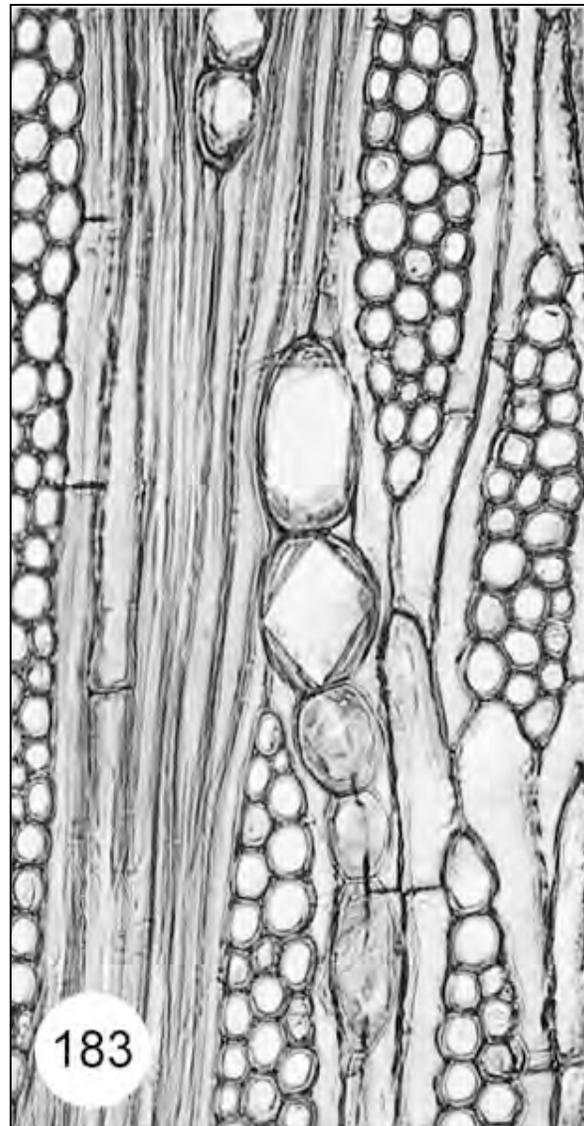


Cordia abyssinica (Boraginaceae)
P.E. Gasson

Feature 156. Crystals in enlarged cells (idioblasts)

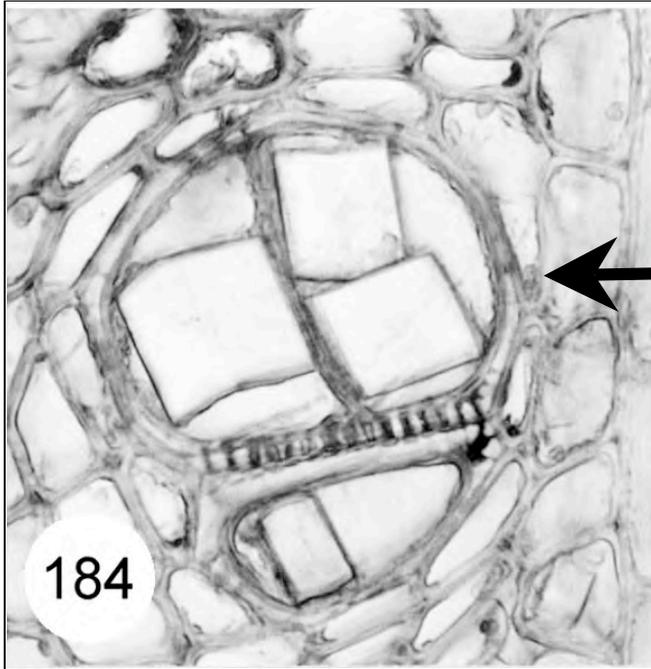


Ulmus crassifolia: E.A. Wheeler
(Ulmaceae)



Citrus aurantium (Rutaceae)
Tangential: E.A. Wheeler
Radial: P. Baas





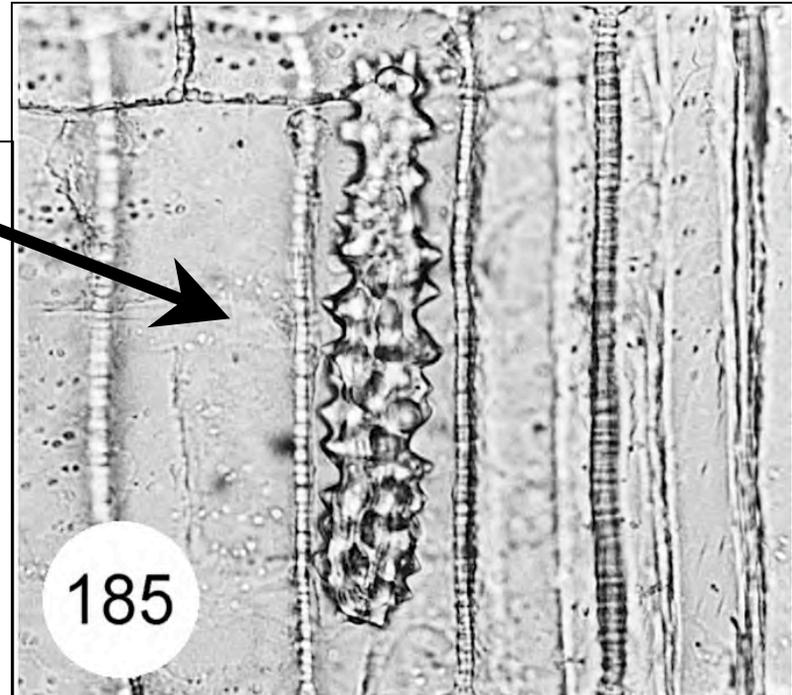
184

**Feature 157. Crystals
in tyloses**

Cordia gharaf (Boraginaceae)
Gottwald 1983. IAWA Bulletin

Feature 158. Cystoliths

= internal stalked
outgrowths of the cell wall
that project in the cell
lumen and are composed of
cellulose impregnated with
calcium carbonate. They are
irregular in shape and
sometimes completely fill a
cell.



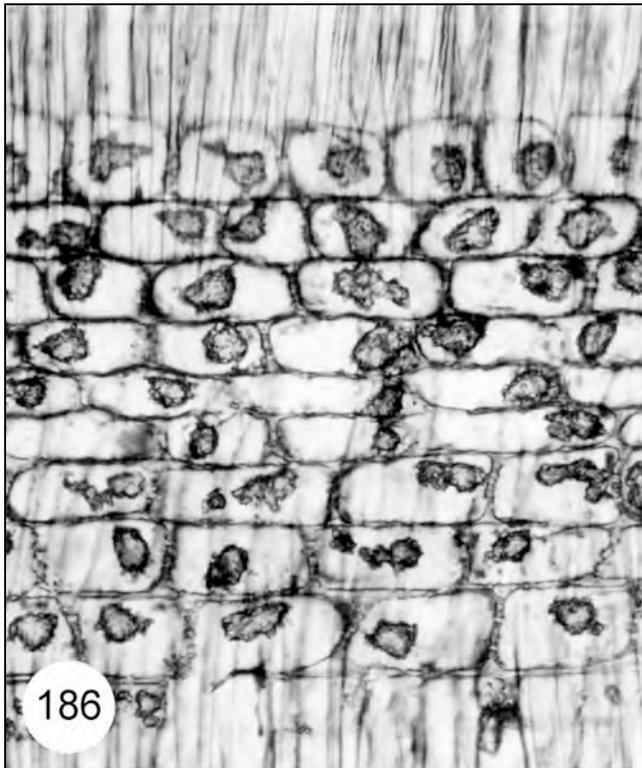
185

Trichanthera gigantea
(Acanthaceae) Ter Welle 1980. IAWA
Bulletin

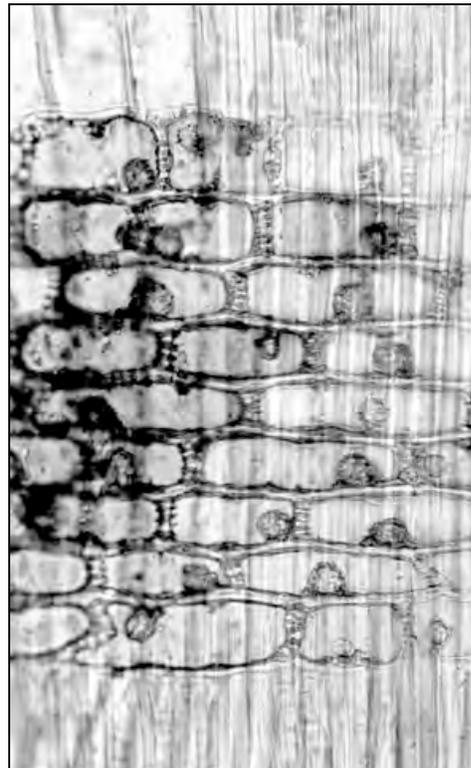
Silica bodies = spheroidal or irregularly shaped particles composed of silicon dioxide.
Synonyms: silica grains, silica inclusions.

Feature 159. Silica bodies present

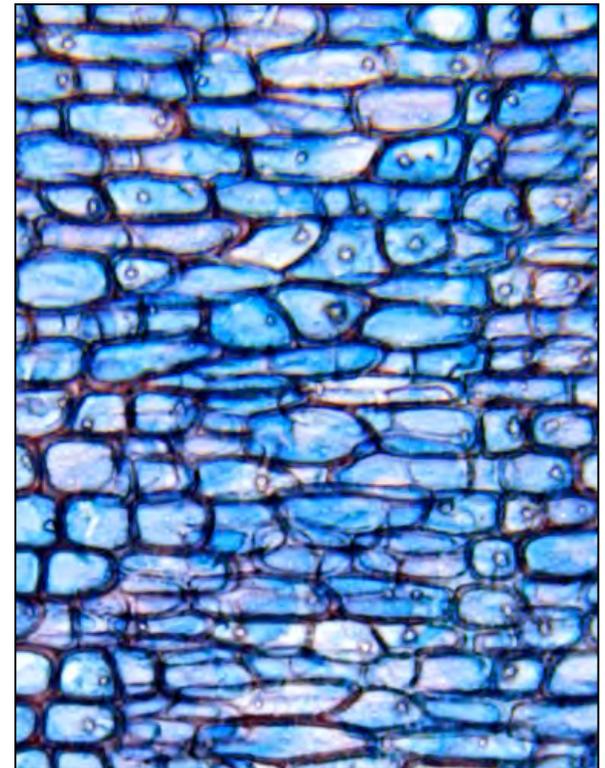
Feature 160. Silica bodies in ray cells



Shorea lamellata (Dipterocarpaceae)
R.B. Miller

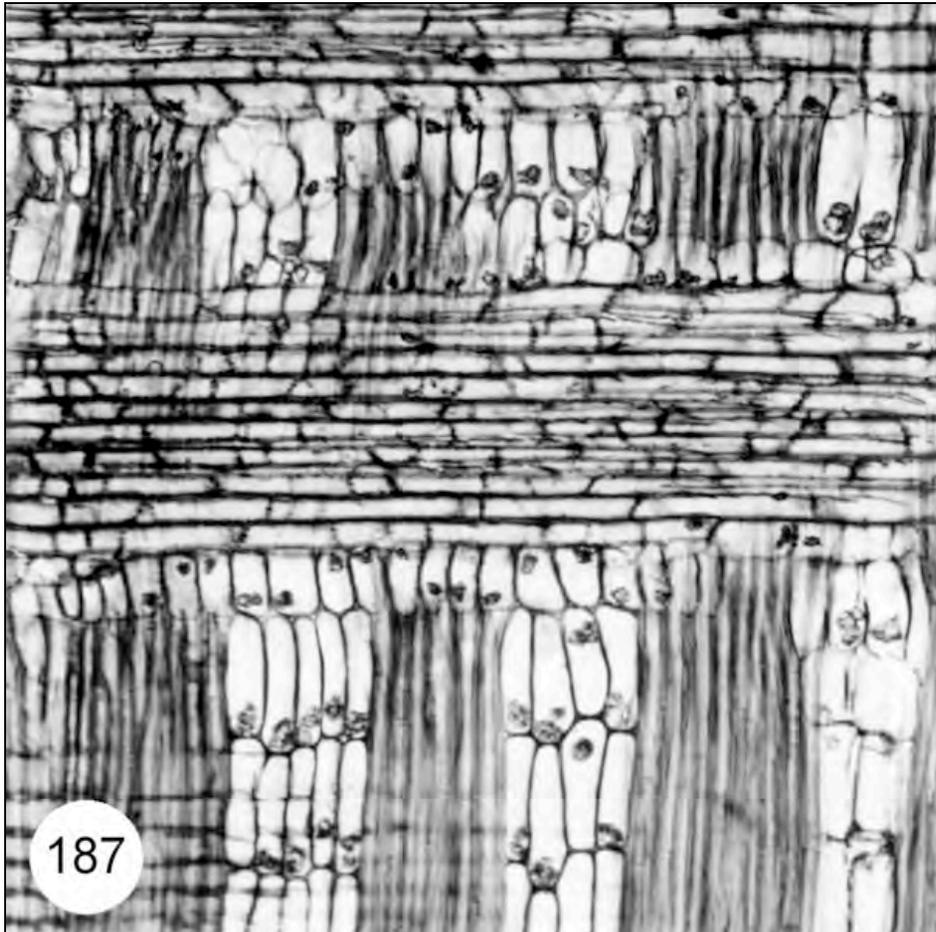


Sclerolobium guianense
(Leguminosae-Caesalpinioideae)
P.E. Gasson



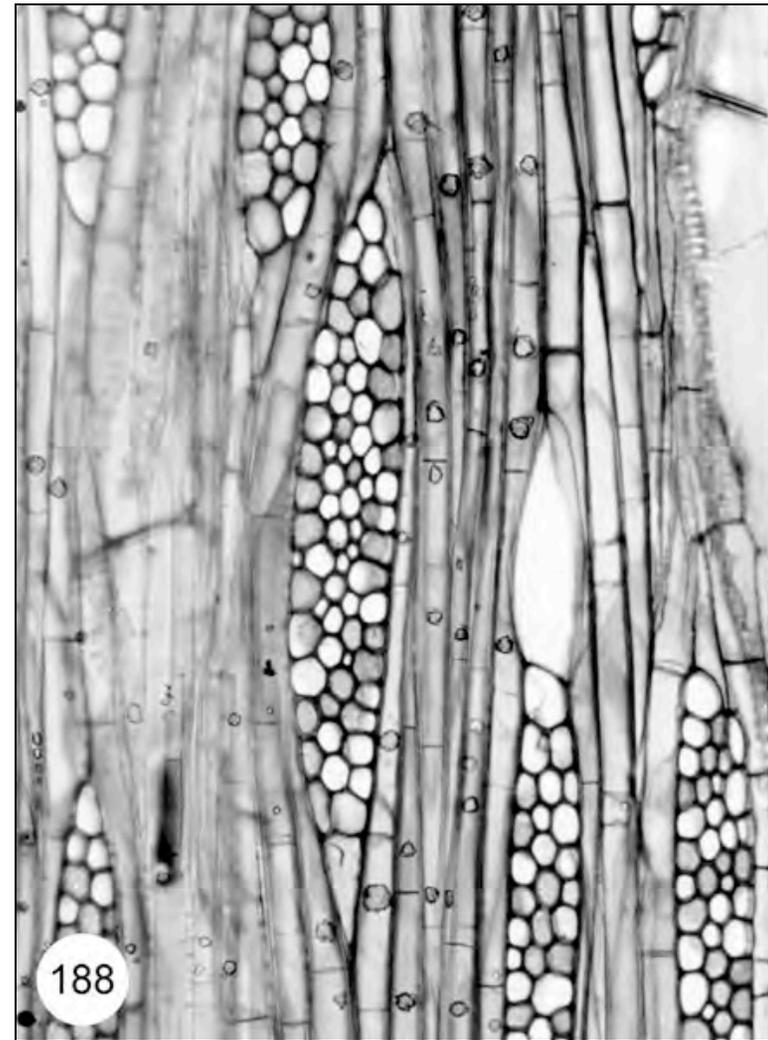
Clavija lancifolia
(Theophrastaceae)
F. Lens

**Feature 161. Silica
bodies in axial
parenchyma cells**



Apuleia leiocarpa (Leguminosae-
Caesalpinioideae) R.B. Miller
Silica bodies also in ray cells

**Feature 162. Silica
bodies in fibres**



Ocotea cf. *puberula* (Lauraceae)
P.E. Gasson