

Physiological

Botany

SPRING TERM

1886

A E Bulson, Jr.

Cypripedium, Plate I.

Plant from greenhouse.

Examination of upper epidermis (Fig II) The cells are from four to seven sided and usually uniform in length and ~~wedges~~ are well defined. There are 120 cells to sq mill. scarcely no chlorophyll but mostly transparent. Upper walls thicker than lower. Small specks on cells. (nucleus) crystals in some places. some of the cells are broken and some seem to overlap others. ^{cells pierced by holes} Ex. of lower epidermis shows cells from 4 to 7 sided but not regular like those of upper surface. much smaller than those of upper epidermis (see Fig I) Stomata. Each wall of from 4 to 5 cells. occurs without much order. look like egg with beak turned inward. walls broken in several places. In longitudinal section we see fibrovascular bundles extending lengthwise looking like chicken's wind pipe. glassy looking fibers & stomata of lower side. Fig 31 shows stomata.

Elder Pith

Cross section. cells overlap. different sizes, definite order of arrangement - cells of different size walls are broken more or less, walls different in color. some walls spotted, broken & irregular. cells spherical & pierced by holes. all are green in color. holes are spherical round

White Ash.

Plate A shows cross section of Branch piece of White Ash. showing difference in wood cells & also difference in duct or vessels. growth of spring and fall. Plate B shows rude sketch of same except showing the least compact form of cells & vessels. Plate C shows cross section of tough White Ash. showing least compact form of cells & vessels while Plate D shows most compact form of the same.

Pumpkin vine.

Ex shows small hairs on side. & these hair from one or 3 cells & in these cells are protoplasm with occasional vacuoles. Three forms of hairs. RM & ~~Chlorophyll~~ many different lengths.

1 = vacuole
2 = protoplasm

Asparagus.

Ex shows a few outer cells filled with protoplasm & others with chlorophyll



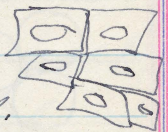
Cala Lilly.

Ex of intercellular spaces.



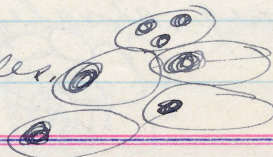
Persimmon.

thick walled cells.



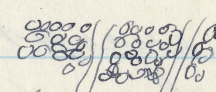
Selaginella.

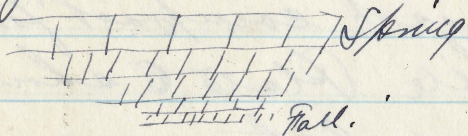
Chlorophyll granules.



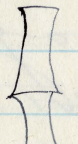
Ex of Oak cells. cells long, cylindrical & having
mark down middle. pointed.

Ex of Pine, radial section shows rapidly in
growth. Tangential section shows long cells but
no shade of growth

cross section  Shows medullary
rays & wood cells. large cells in Spring
of year & small cells in Fall.

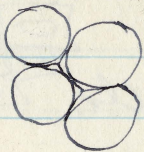


Lolium frondosum. hair pulled out
looks like fur under microscope
Sometimes blue number.

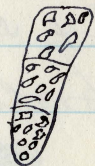
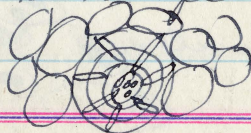
Radial vertical section of Symplocos vine
cut through lengthwise of fibro vascular bundle
shows yellow cells or longitudinal section
of sieve cells.  cells containing ~~lots~~
many holes.

Ex of Begonia (stem)

Fibro vascular bundles. three
cornered intercellular spaces showing
bores of cell walls



Ex of Wax plant Hoya
showing stratification and canals



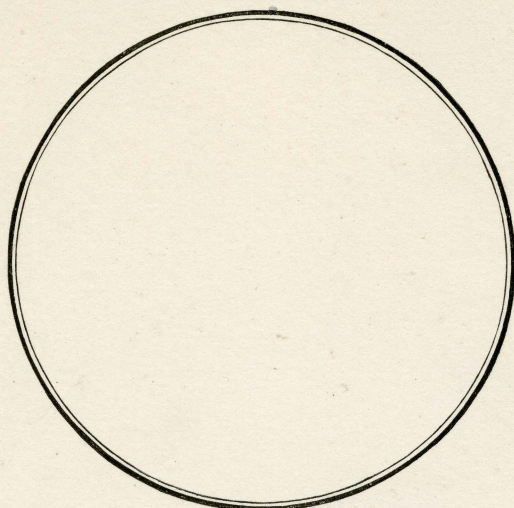


FIG. 1.

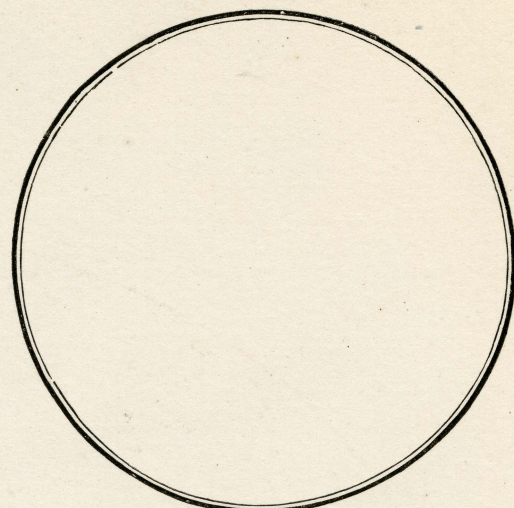


FIG. 2.

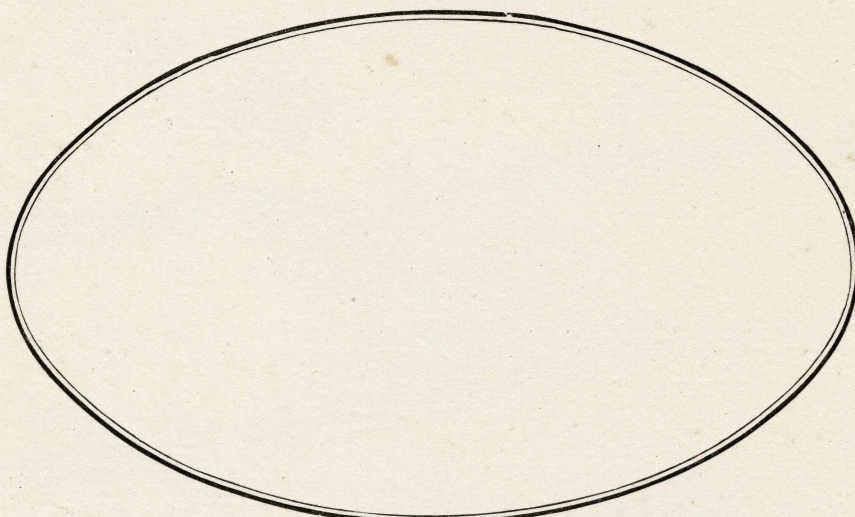


FIG. 3.

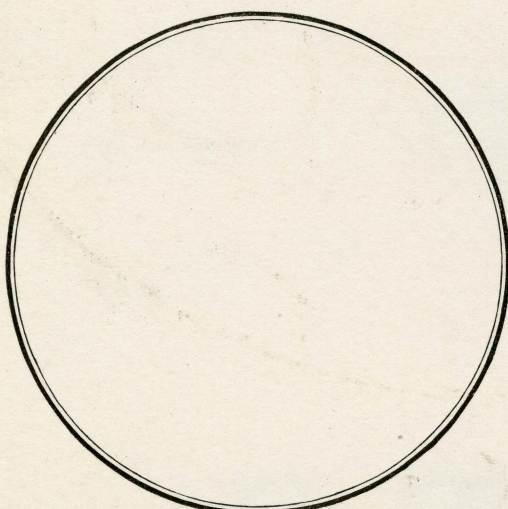


FIG. 4.

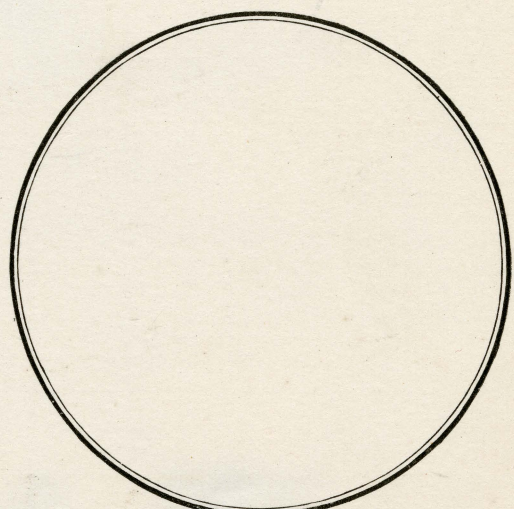


FIG. 5.

PLATE

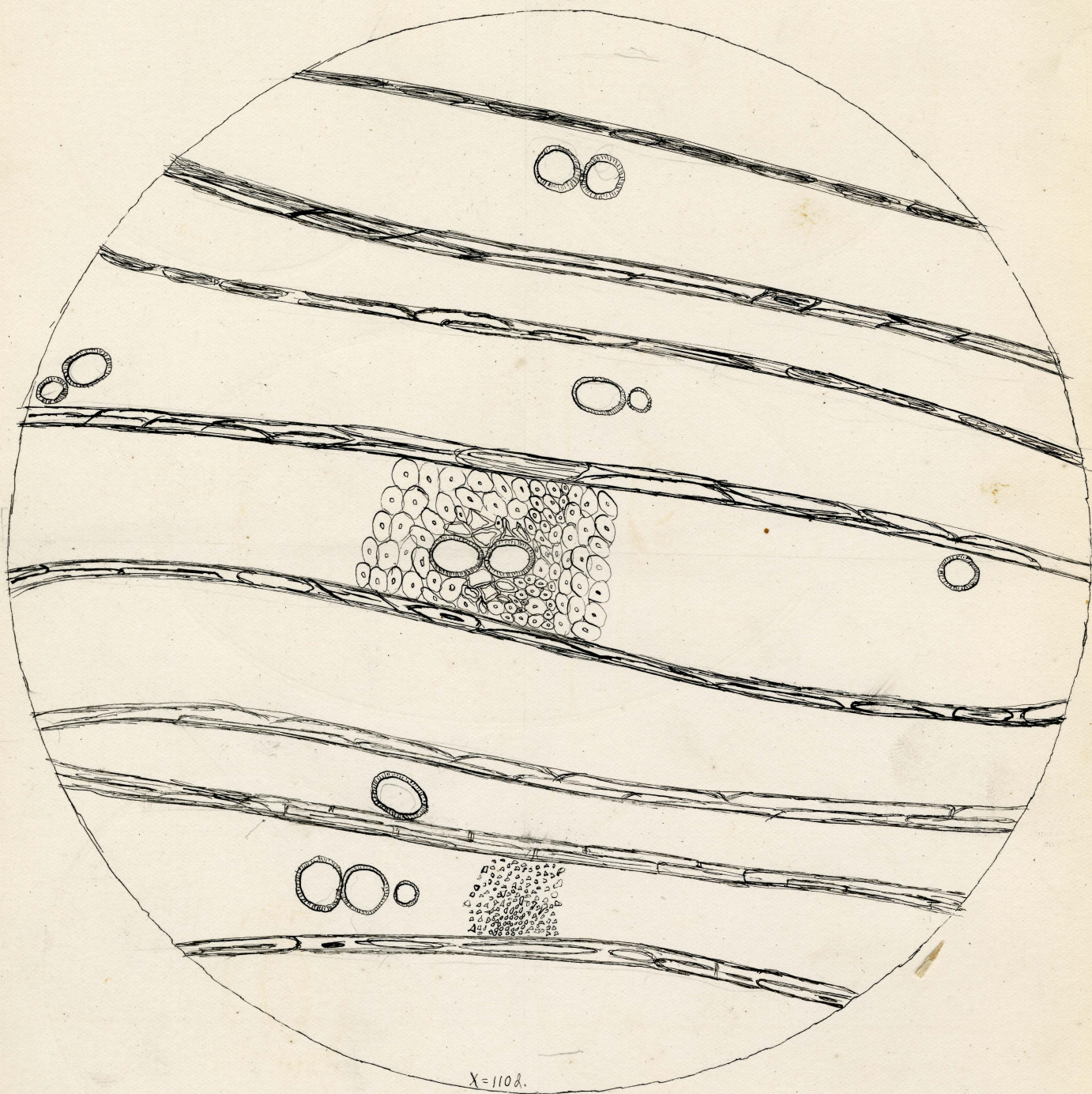


PLATE C.

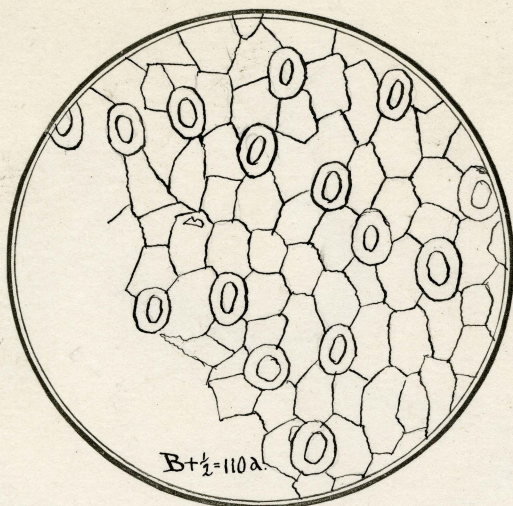


FIG. 1.

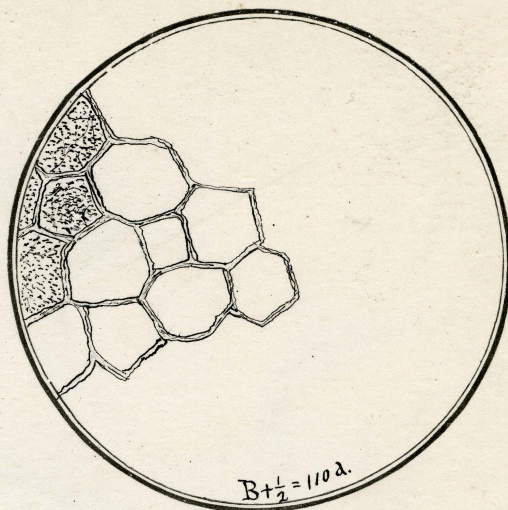


FIG. 2.

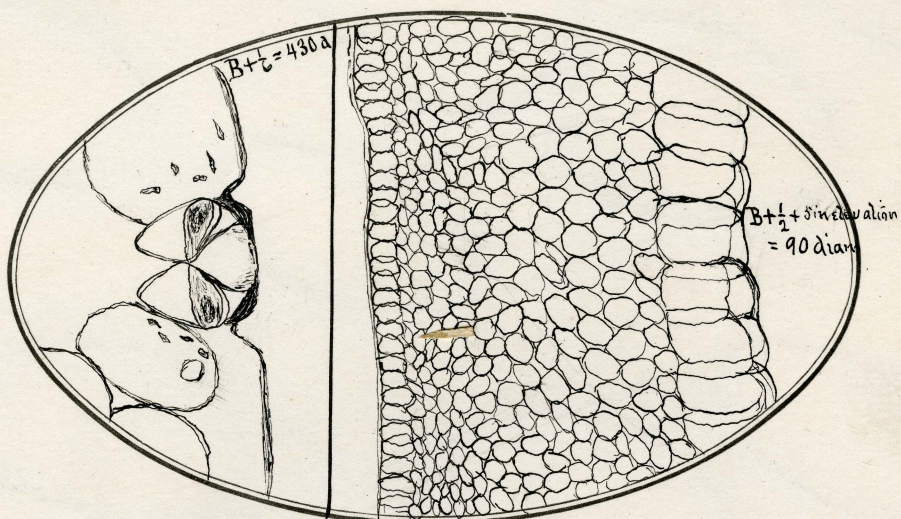


FIG. 3.

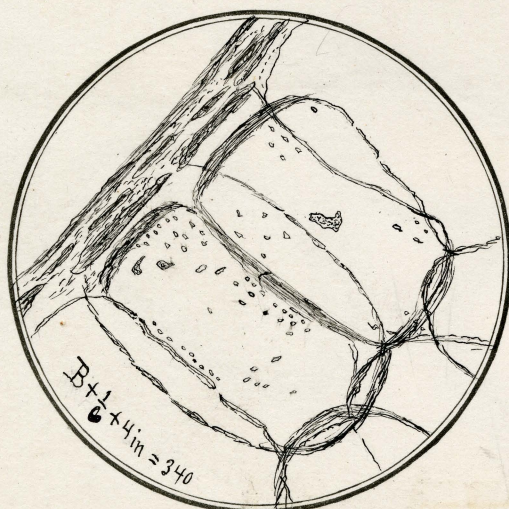


FIG. 4.

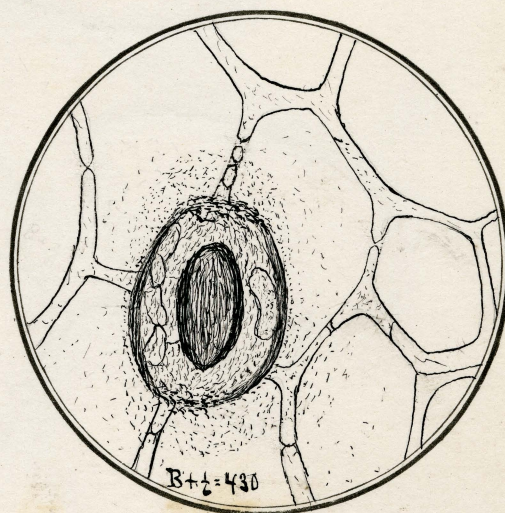


FIG. 5.

PLATE I

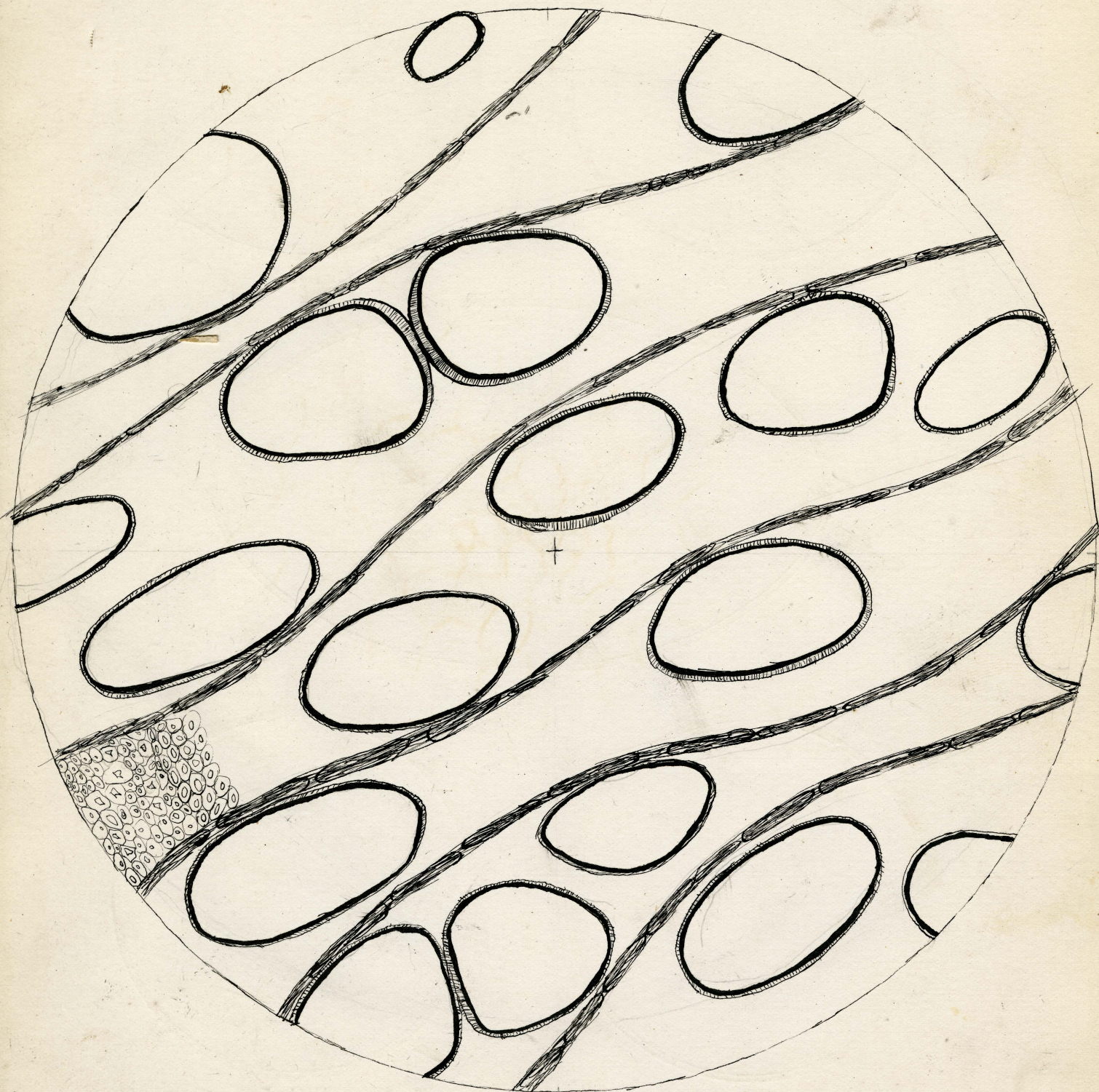


PLATE "B"

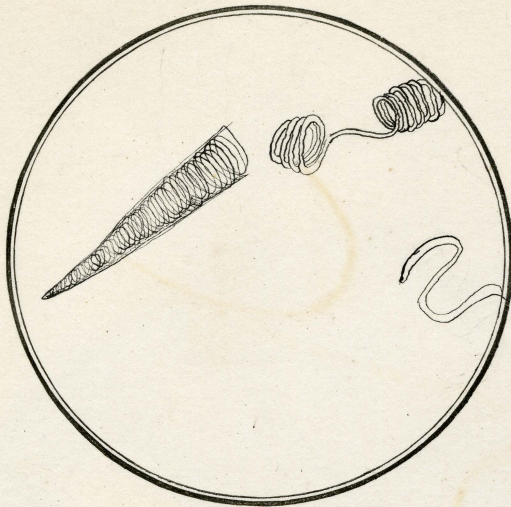


FIG. 1.

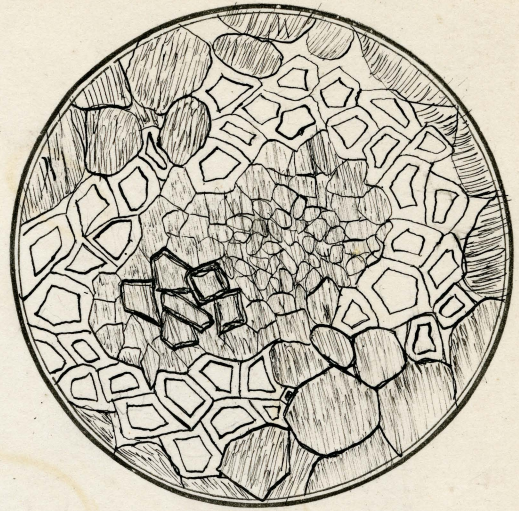


FIG. 2.

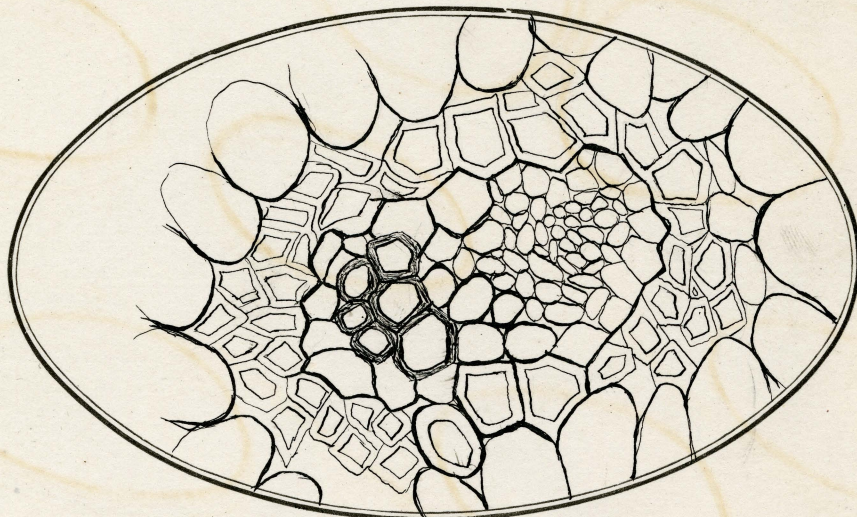


FIG. 3.

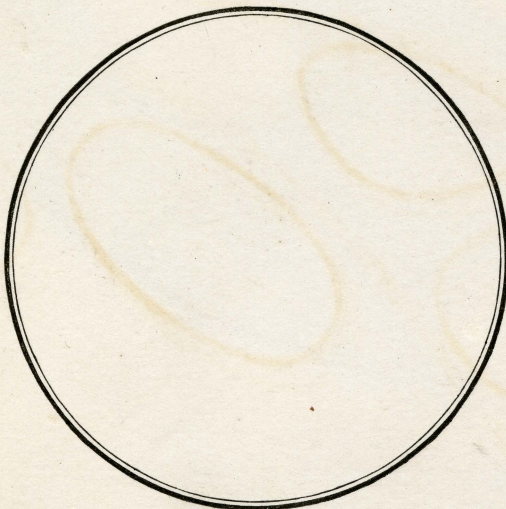


FIG. 4.

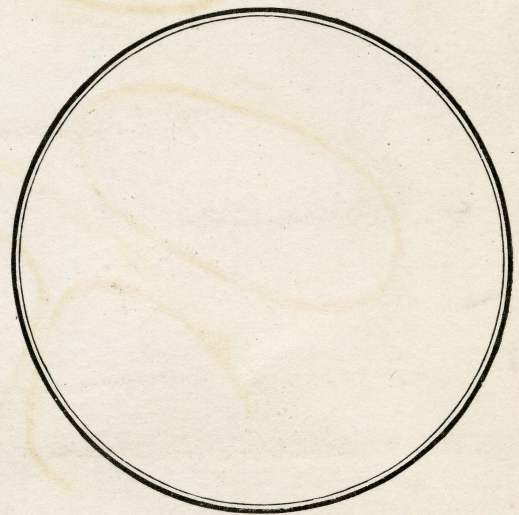


FIG. 5.

PLATE II

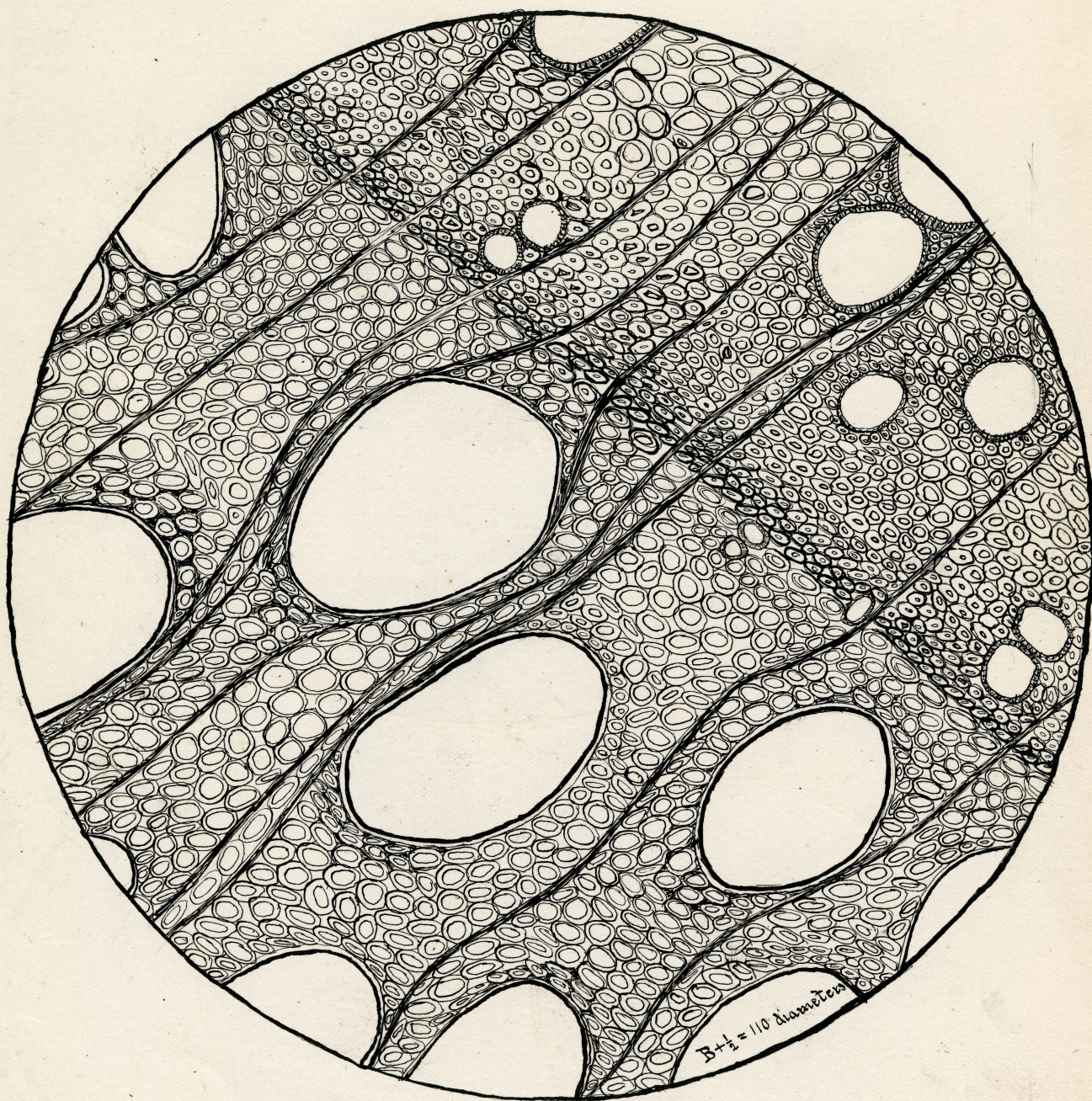


PLATE "A".

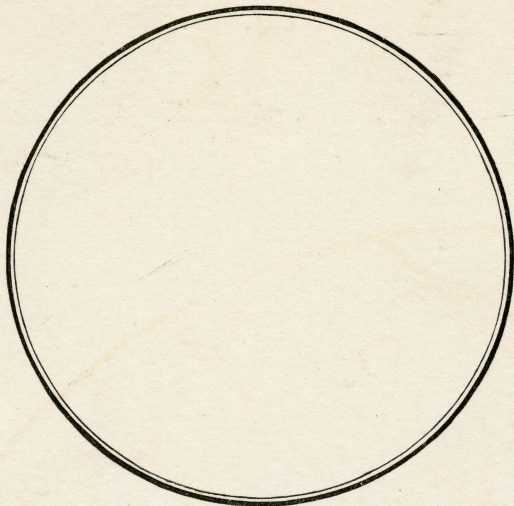


FIG. 1.

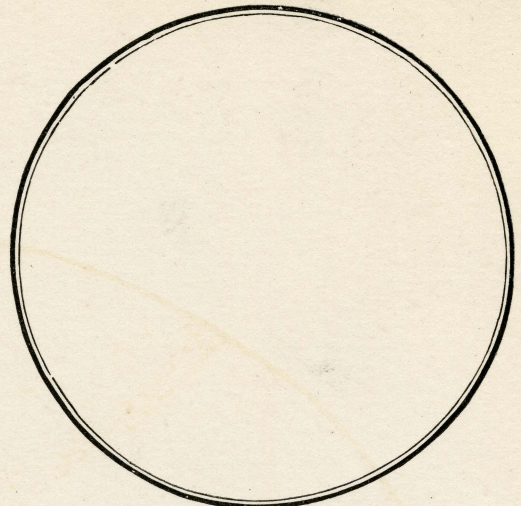


FIG. 2.



FIG. 3.

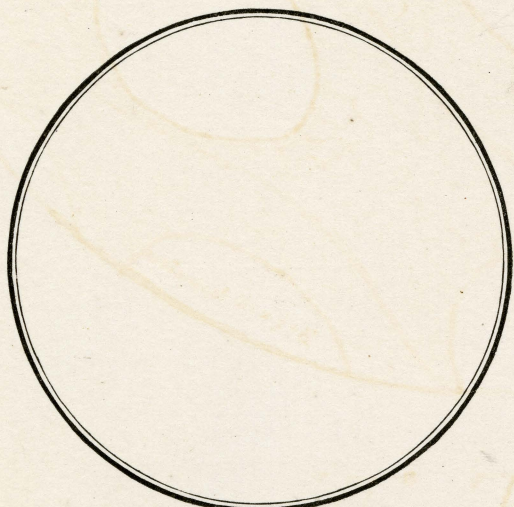


FIG. 4.

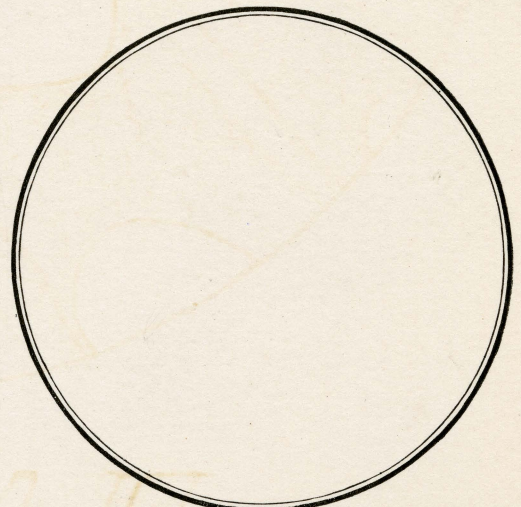
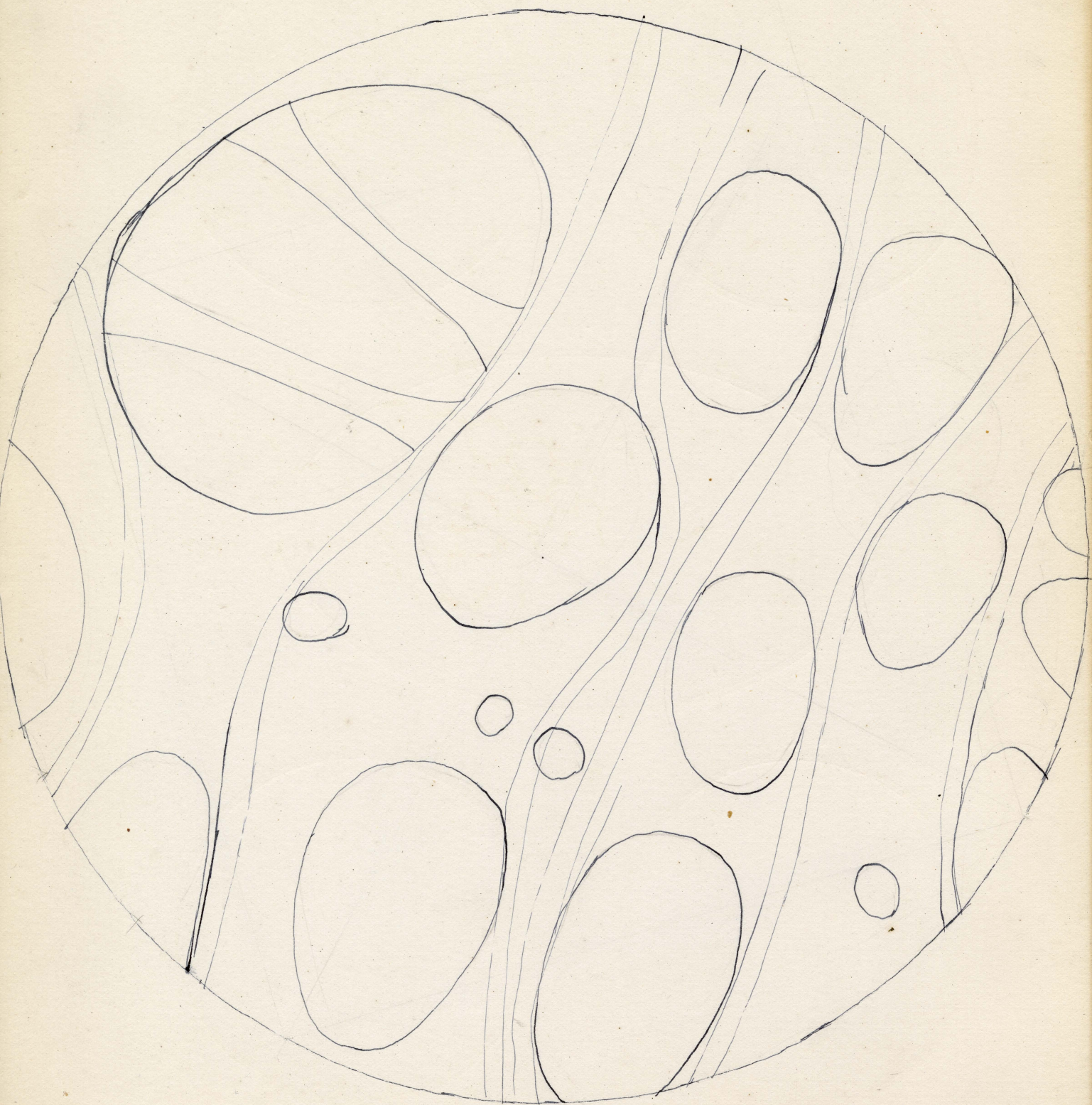


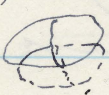
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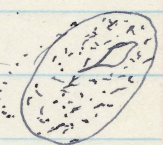


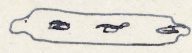
Claw D.

Ex of *Conferia* showing
thin strings made up with 
cells of all size filled with
various stuff. the cells divide & change
forming new cells & thus multiply.

Ex of Pollen of *Azalea* - four pollen
grains united but separated from mother
cell.    spotted & having
opening on side.

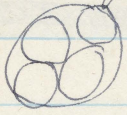
Pollen of *Abutilon* = single pollen grain
spherical & covered with spines. inside filled
with fertilizing powder.  which
escapes by means of lid which
breaks off.

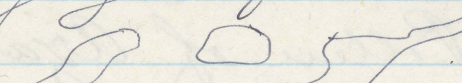
Ex of *Agapanthus* anthers. Pollen grains
are irregular in shape. (cucumber shaped)
some have become so from drying.
edges smooth & some of the
grains have nucleus in them. 

Ex of *Spyrogyra* 
showing spiral arrangement of
chlorophyll & no end cells.

Ex of tip of corn root showing small
hairs. cells very small at point
where more off as root grows.

Ex of *Fuchsia* pollen shows mother cell
and four pollen grains inside.



Ex of *Amoeba*, *Paramecium* = animal life
constantly changing in form. multiply
by division  takes
food by surrounding it. moves
when the temperature is warm.