

History

- Ancient Roman

- limestone
- silica

- first cement

1850' Reinforced Rebar

Type I Normal

IA Nonl. air entraining

II Moderate Resistance to surface attack

II Δ ↓ Air entraining

III High early strength

III A ↓ Air entraining

IV Low heat of hydration

V High resistance

Cement
Aggregate → Sand
Water ← Gravel

- ① Stone is first Reduce to 5mm size then 3/4
- ② Raw Material to Powder Blended
- ③ Burning Changes raw mix Chemically into cement
- ④ Clinker with Gypsum added is Ground into portland Cement

Reinforcing

- MADE Recycled Steel scrap

Compression Tension
 STONE ←
 BRICK
 Concrete
 STEEL

Admixtures

Alter properties

- weather
- Acceleration

Form Work

- Braced Panels
- Joist Pan
- Form Release

Curing

- 28 days

Concrete is tension

STEEL ROLLS
IN FIRE

Reinforcing

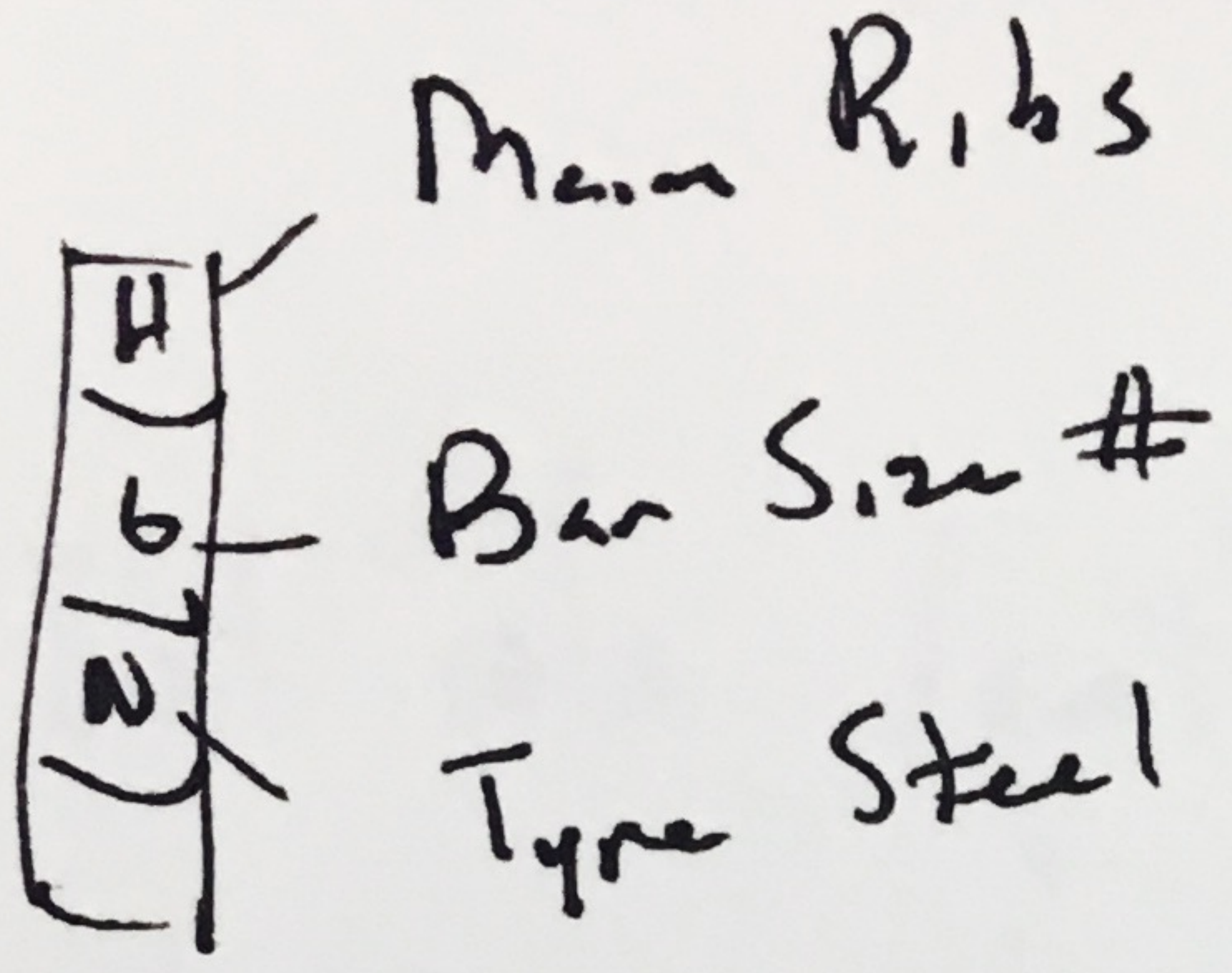
- steel reinforcing

Rebar - tensile
Concrete - compression

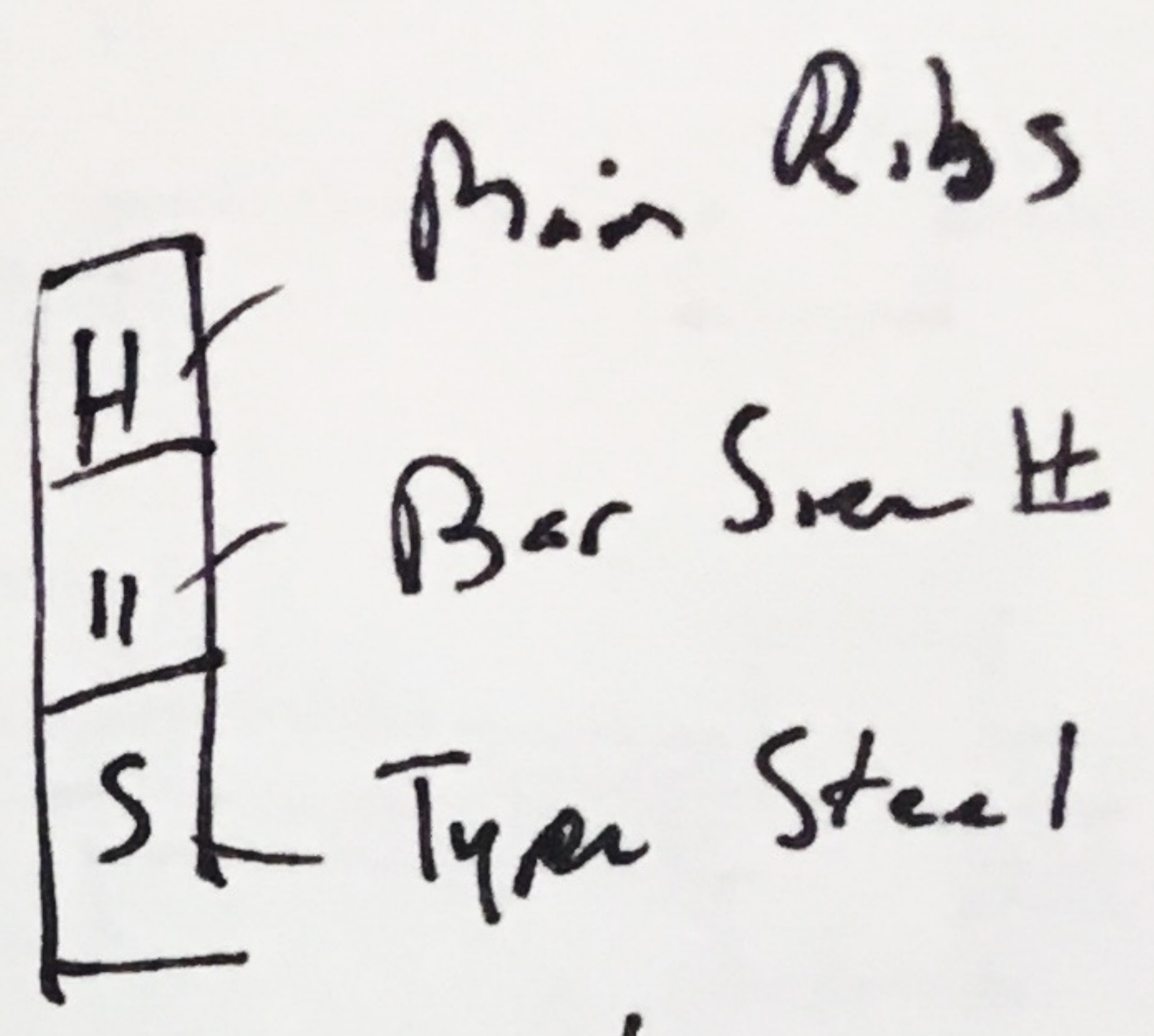
Bar Size

3 -

18

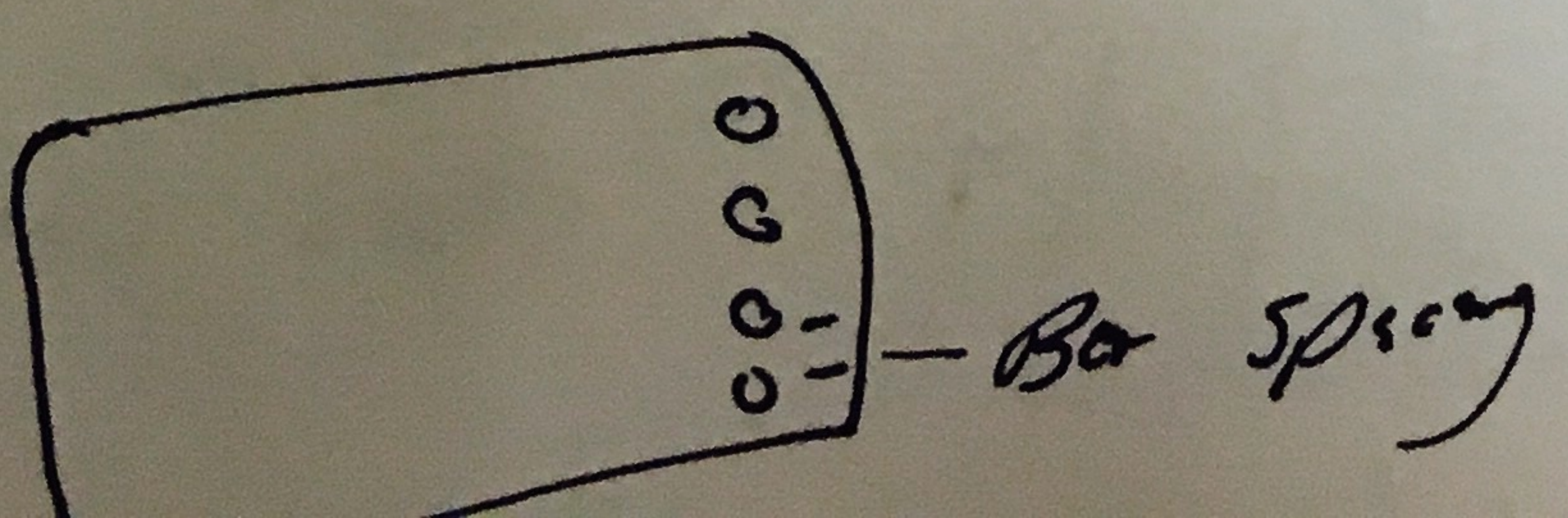
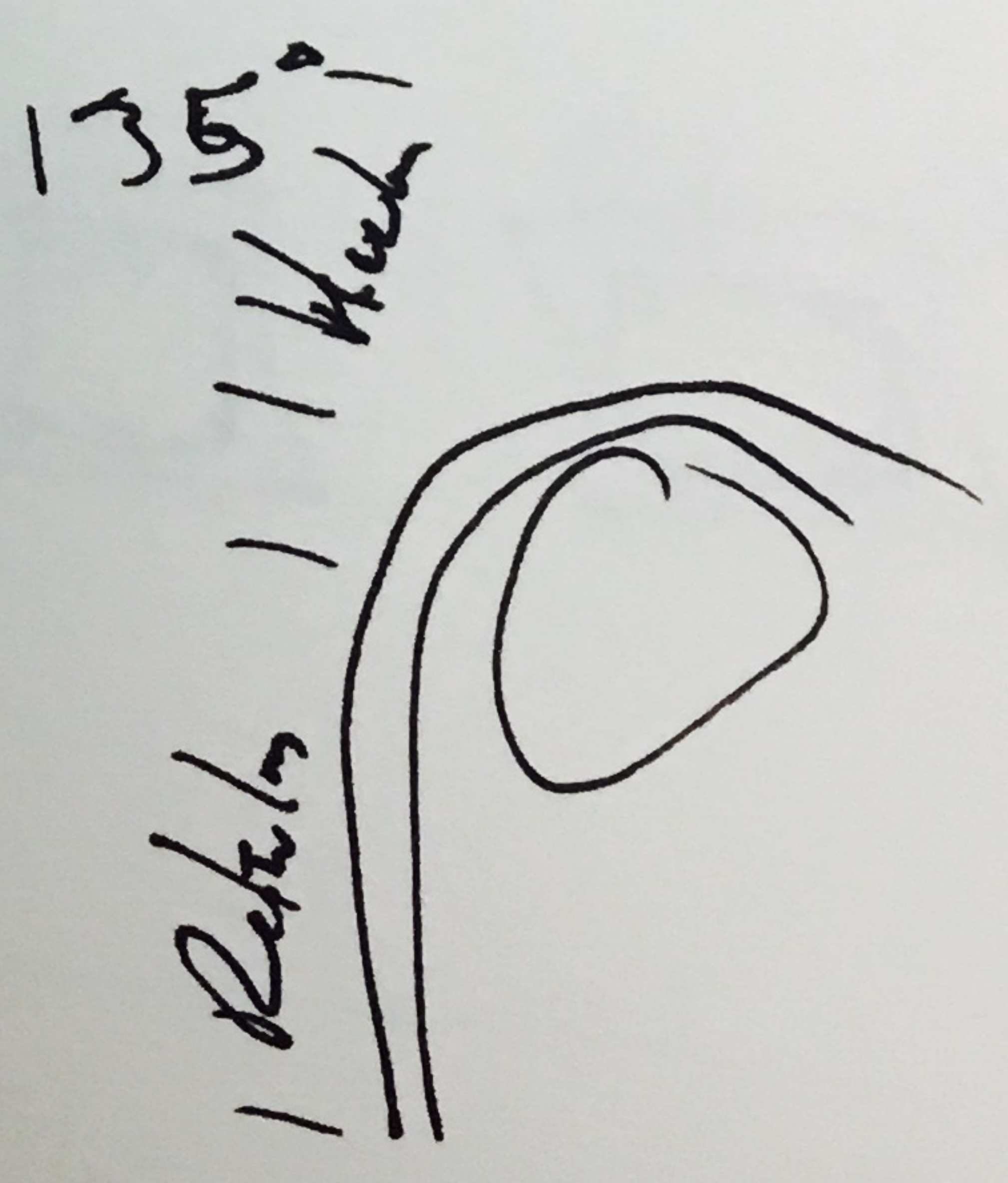
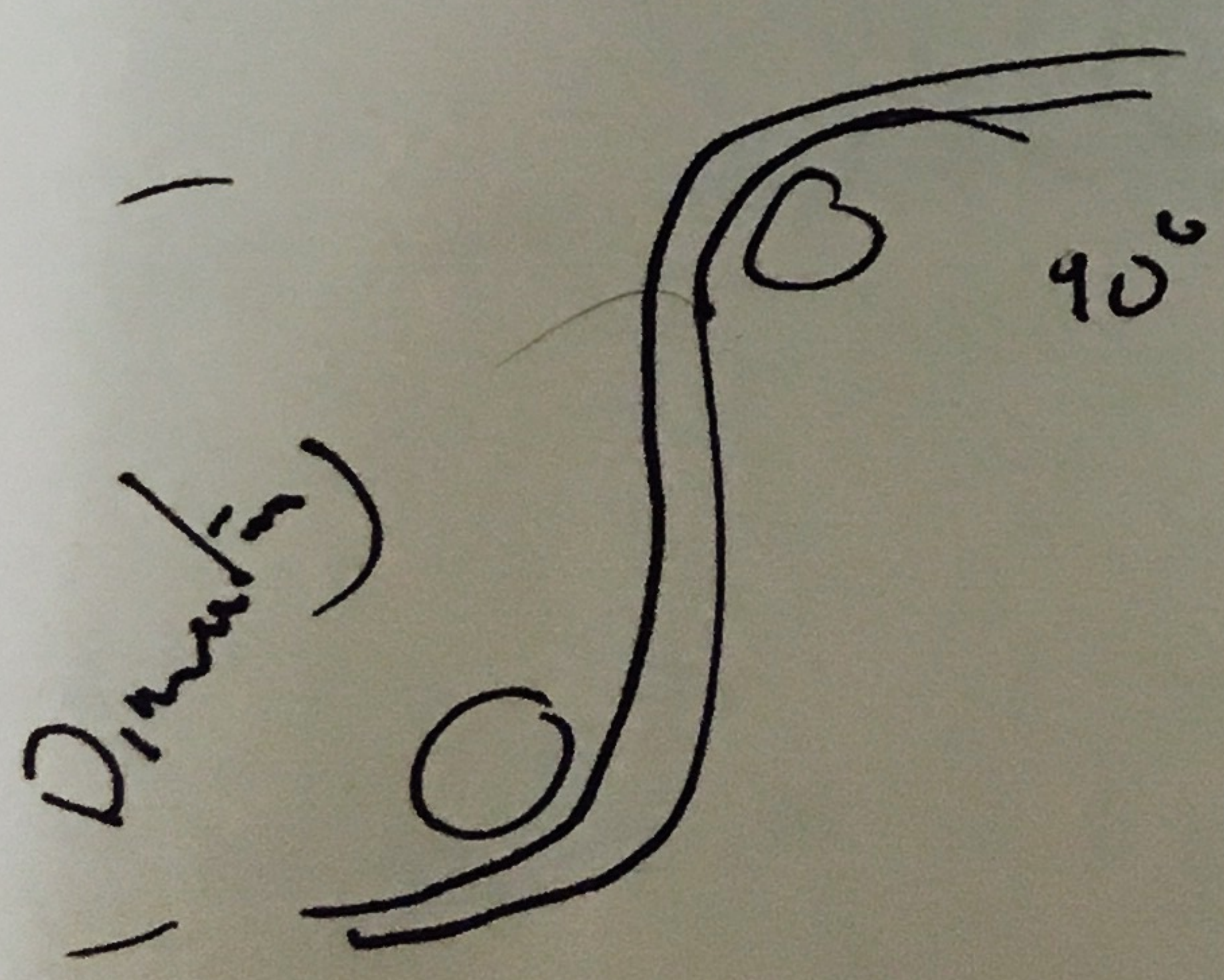
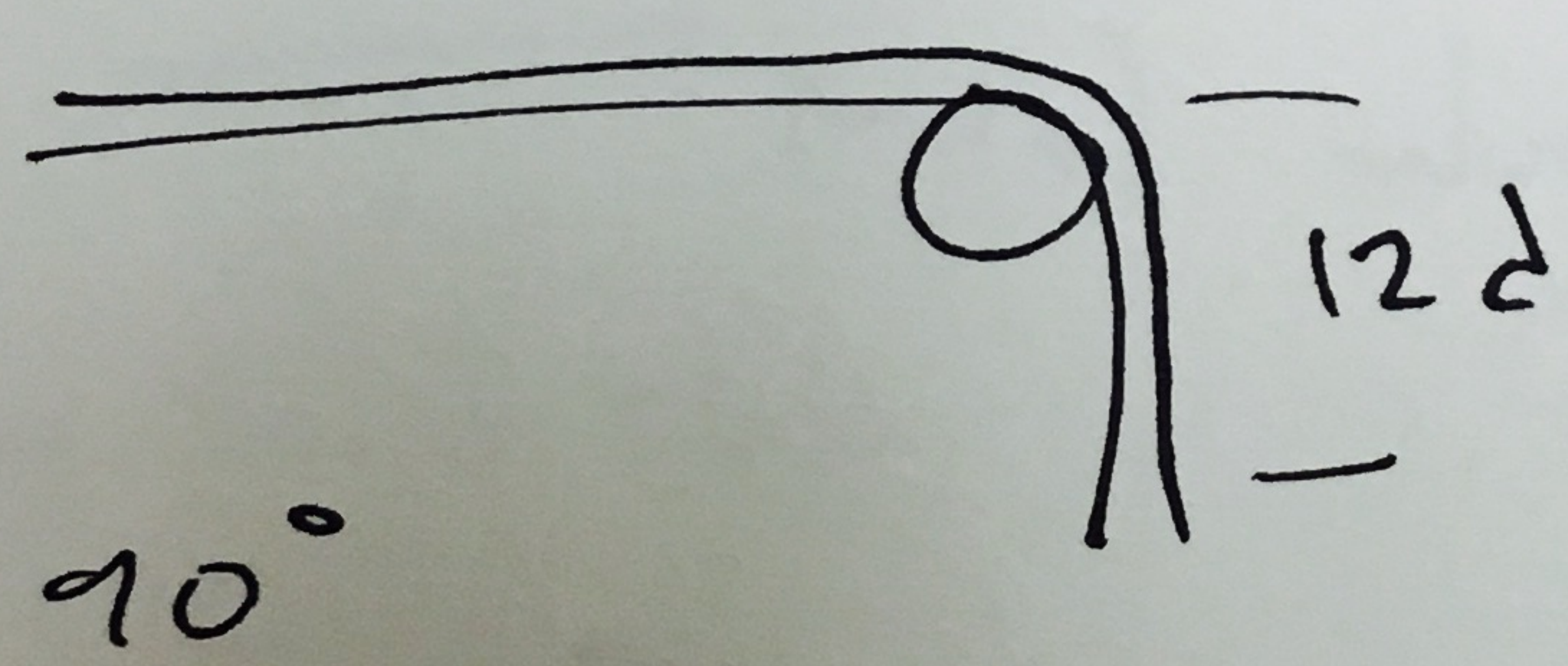
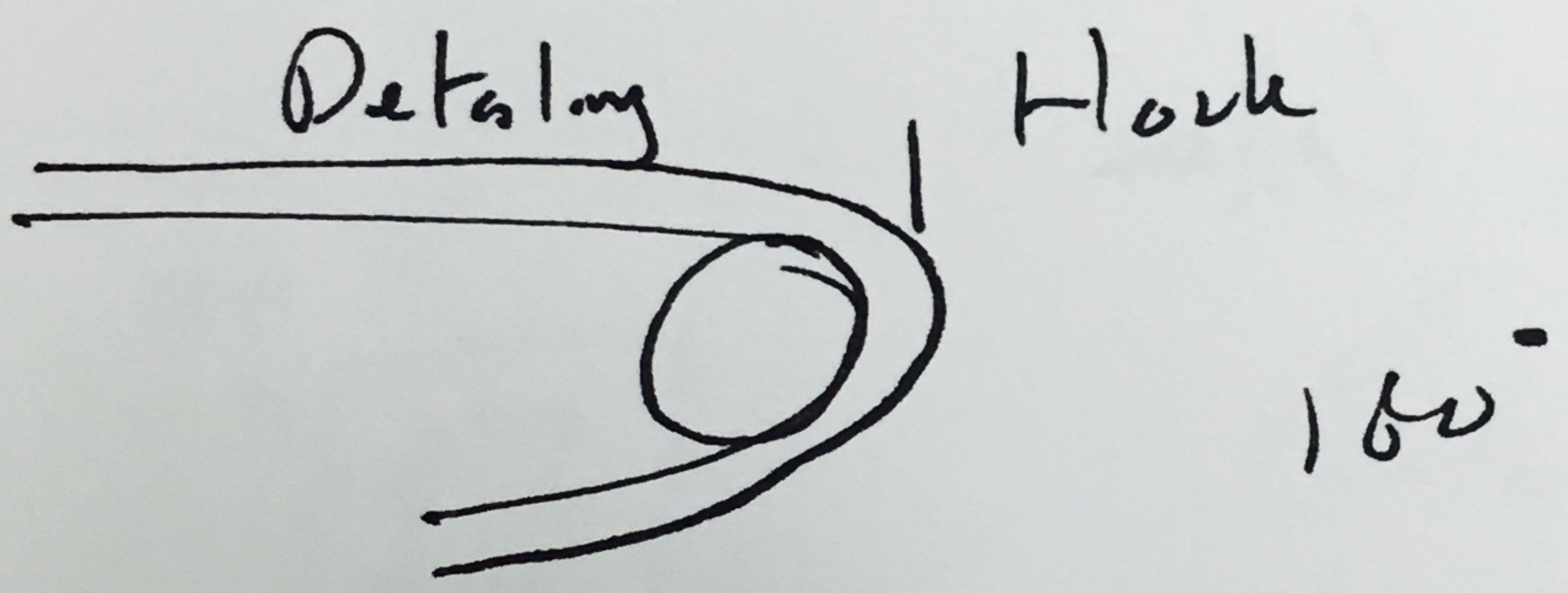


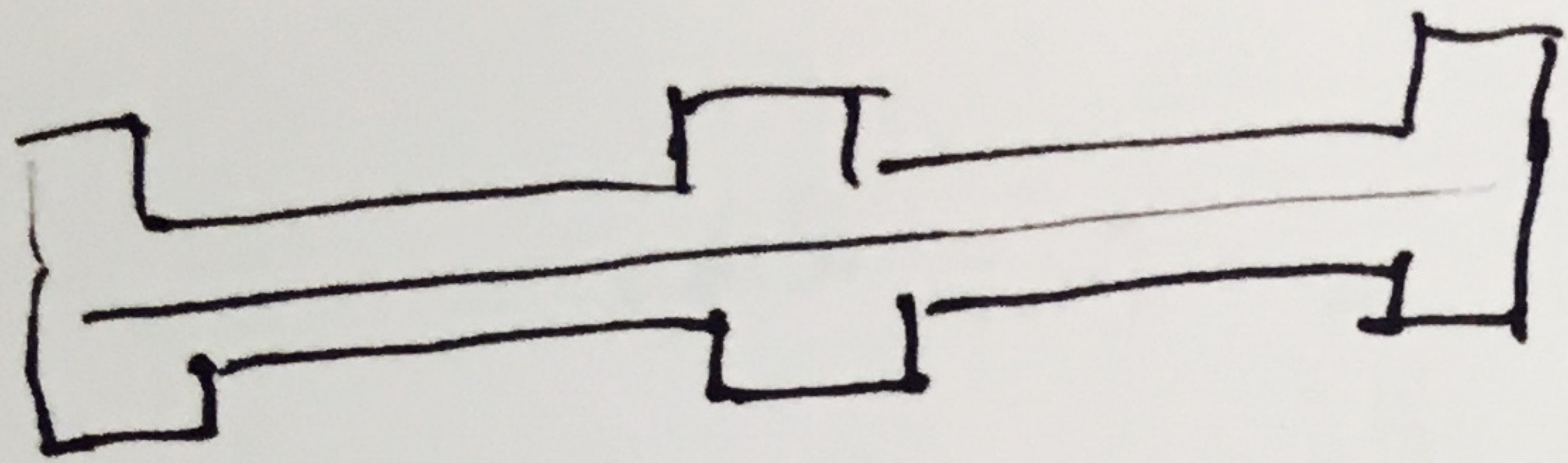
Grade 40
Grade 50



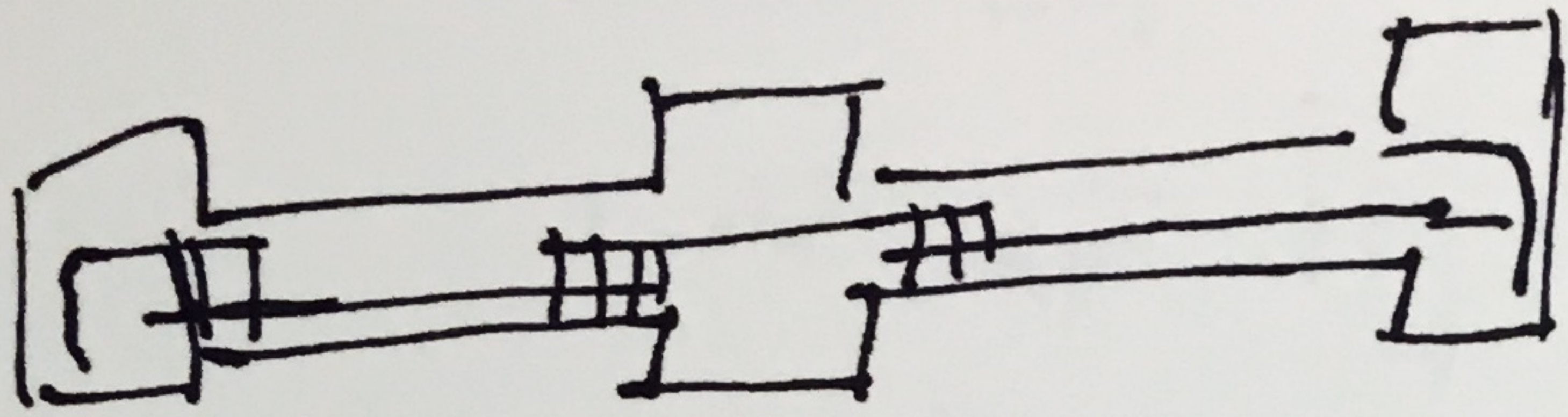
Grade 60
A706

STANDARD HOOKS

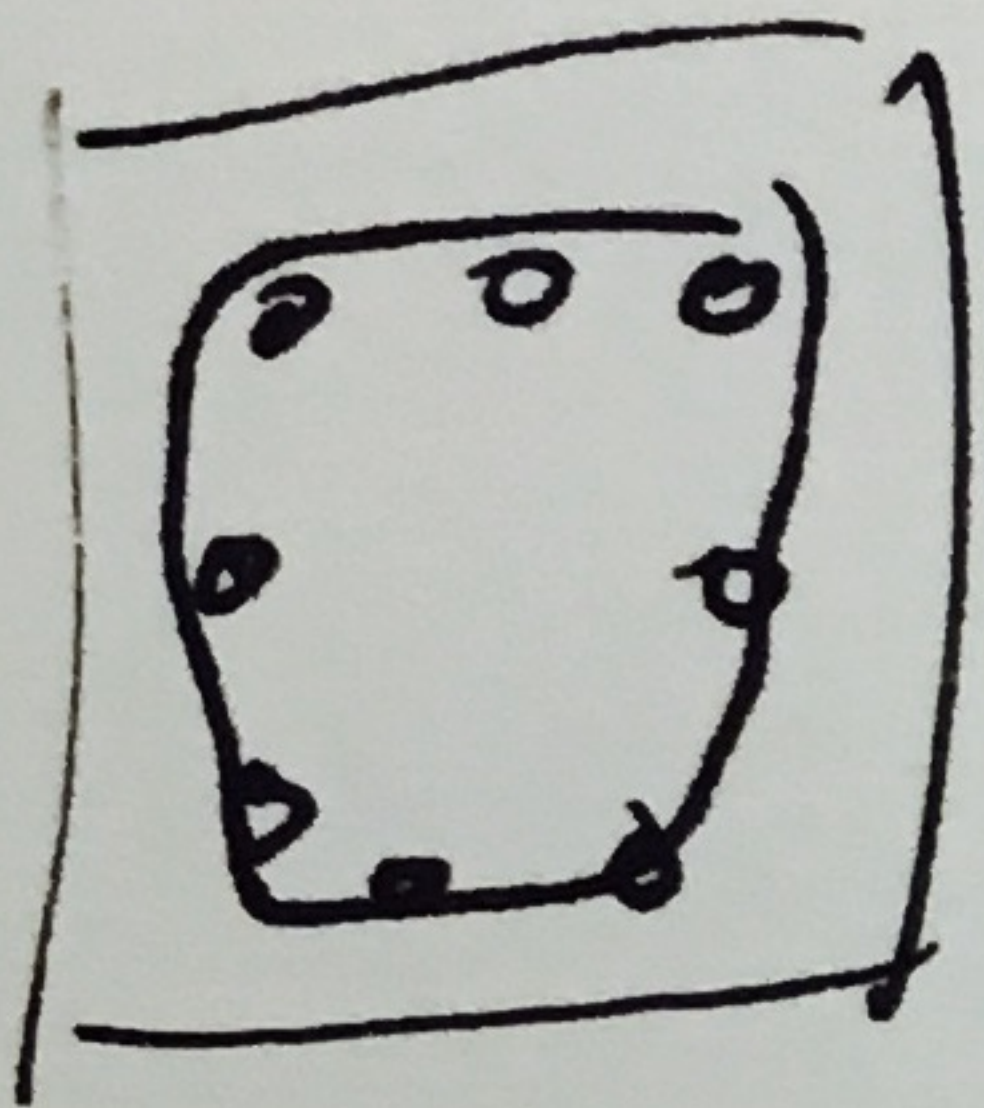




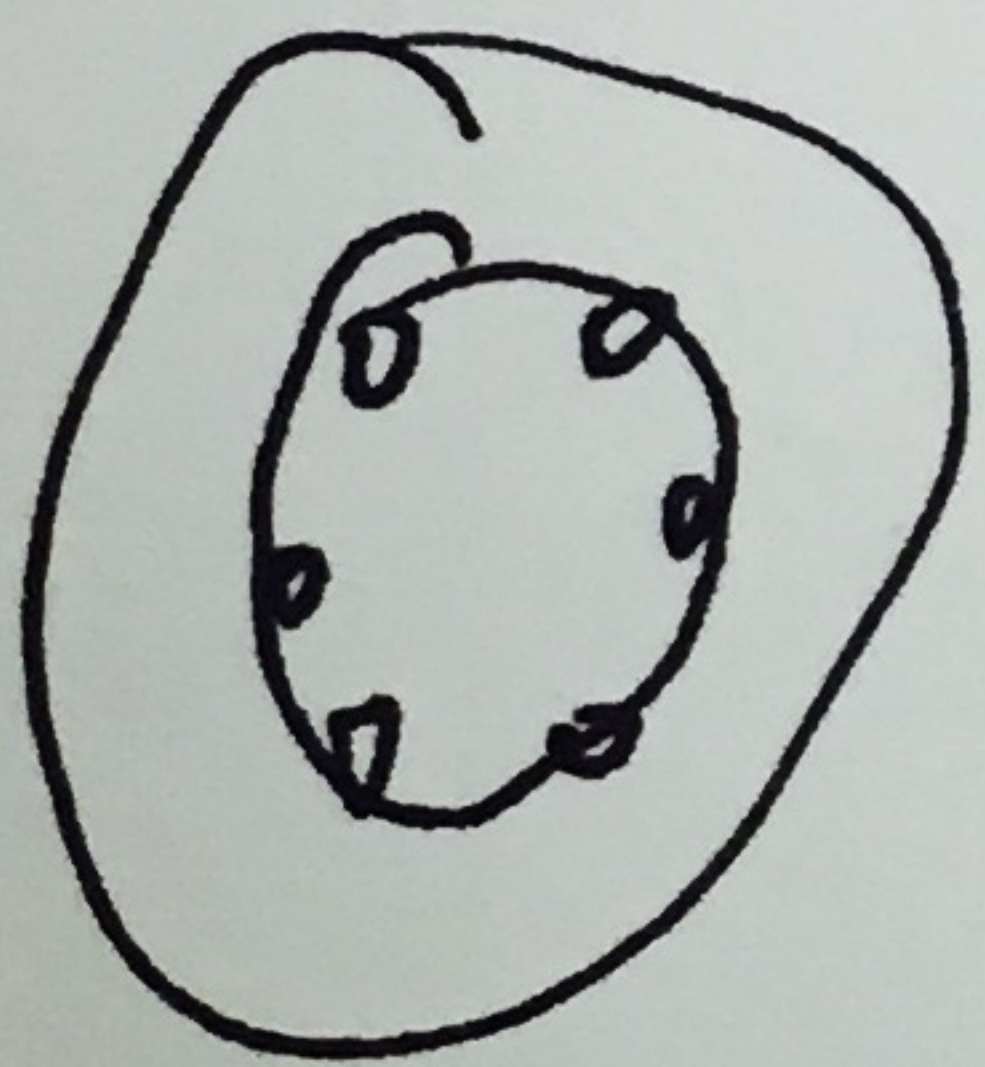
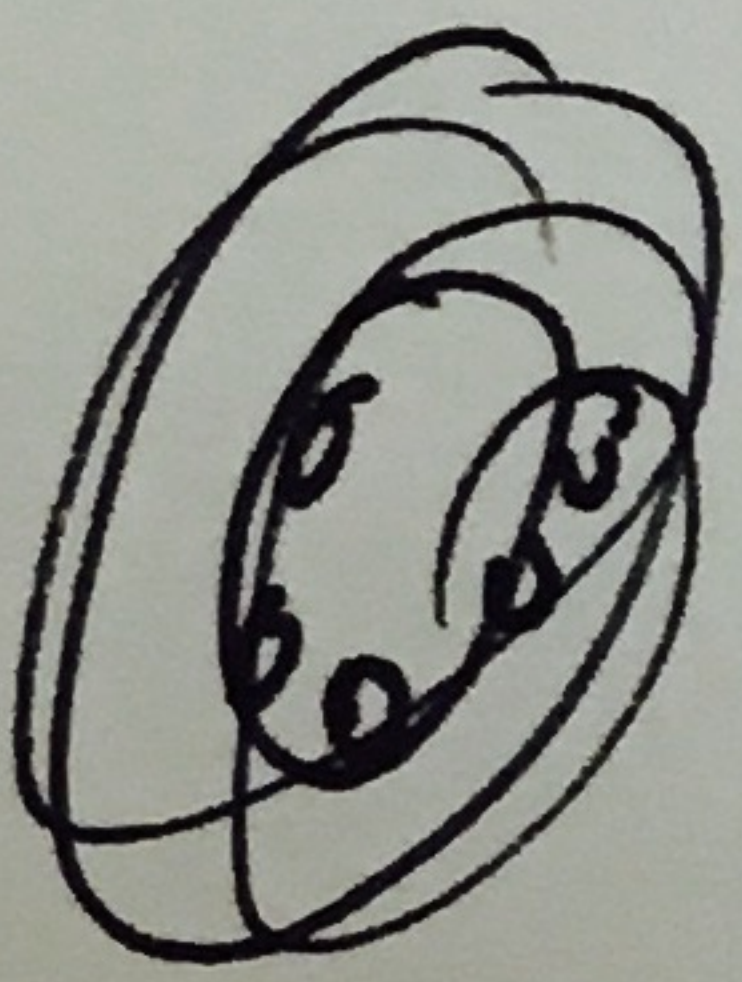
Beams Penetrates



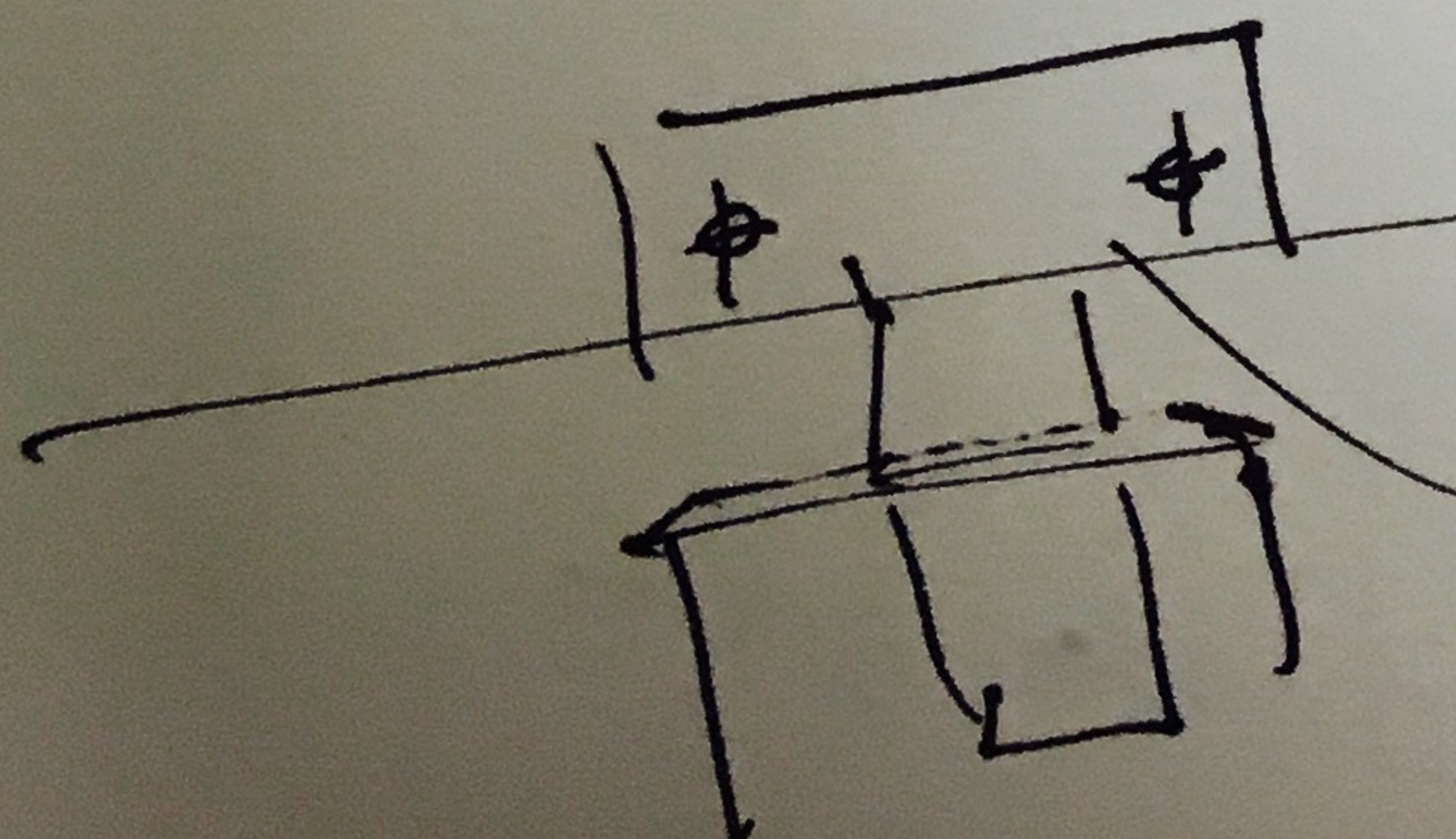
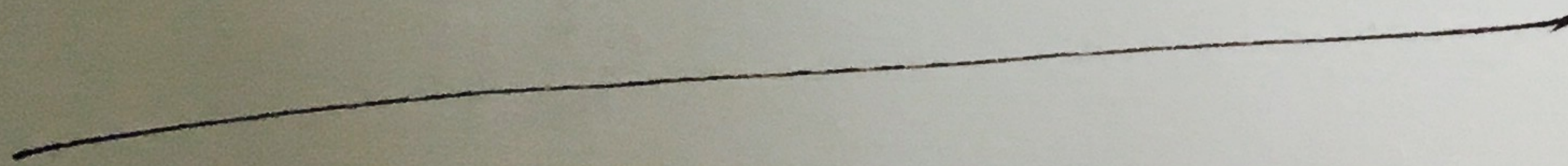
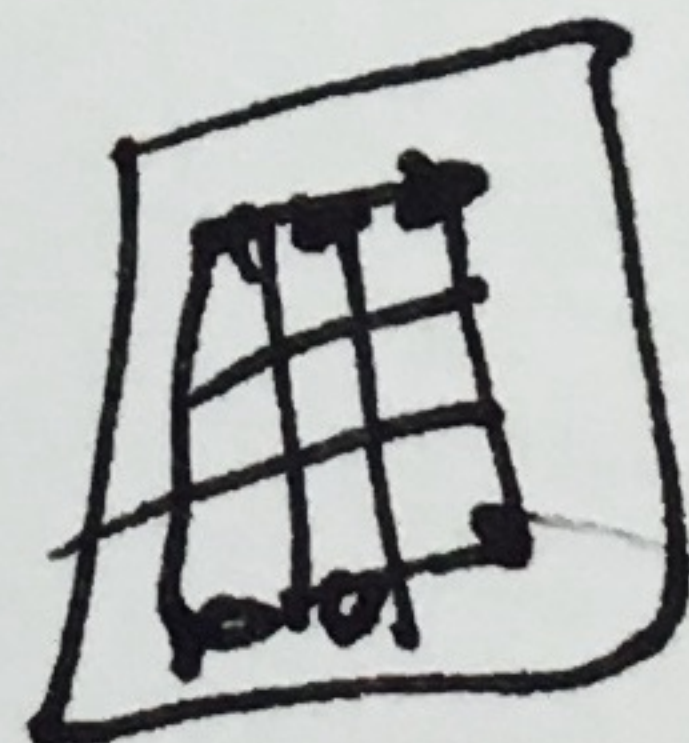
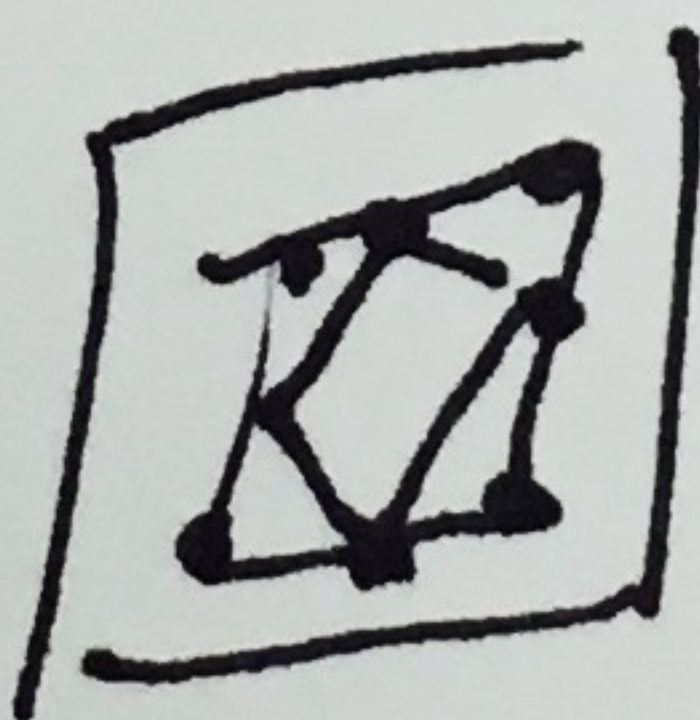
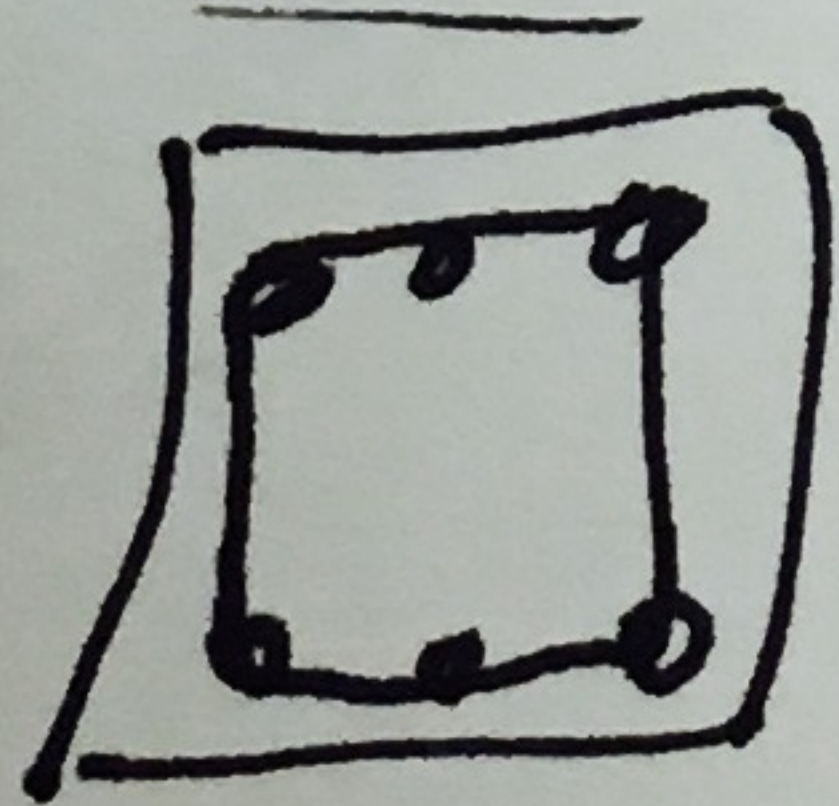
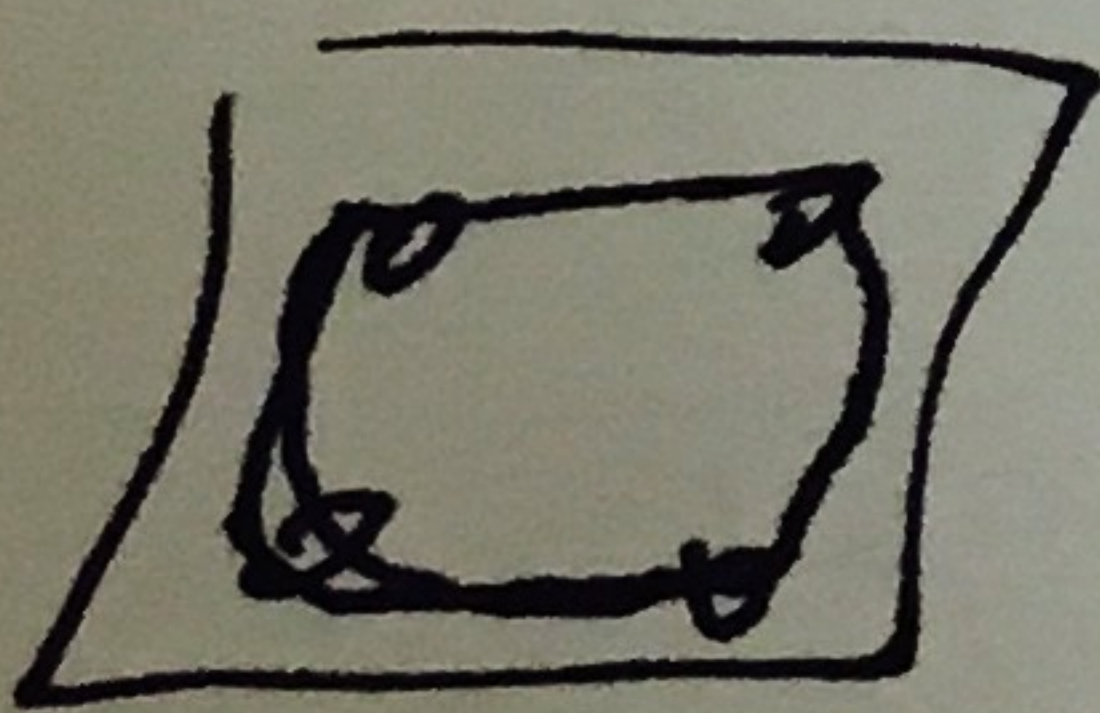
Stanchion also had
to be in sink or under



Rectangular Column



Circular Column



Tracer
STEEL Connecto

Portland Cement

Cement

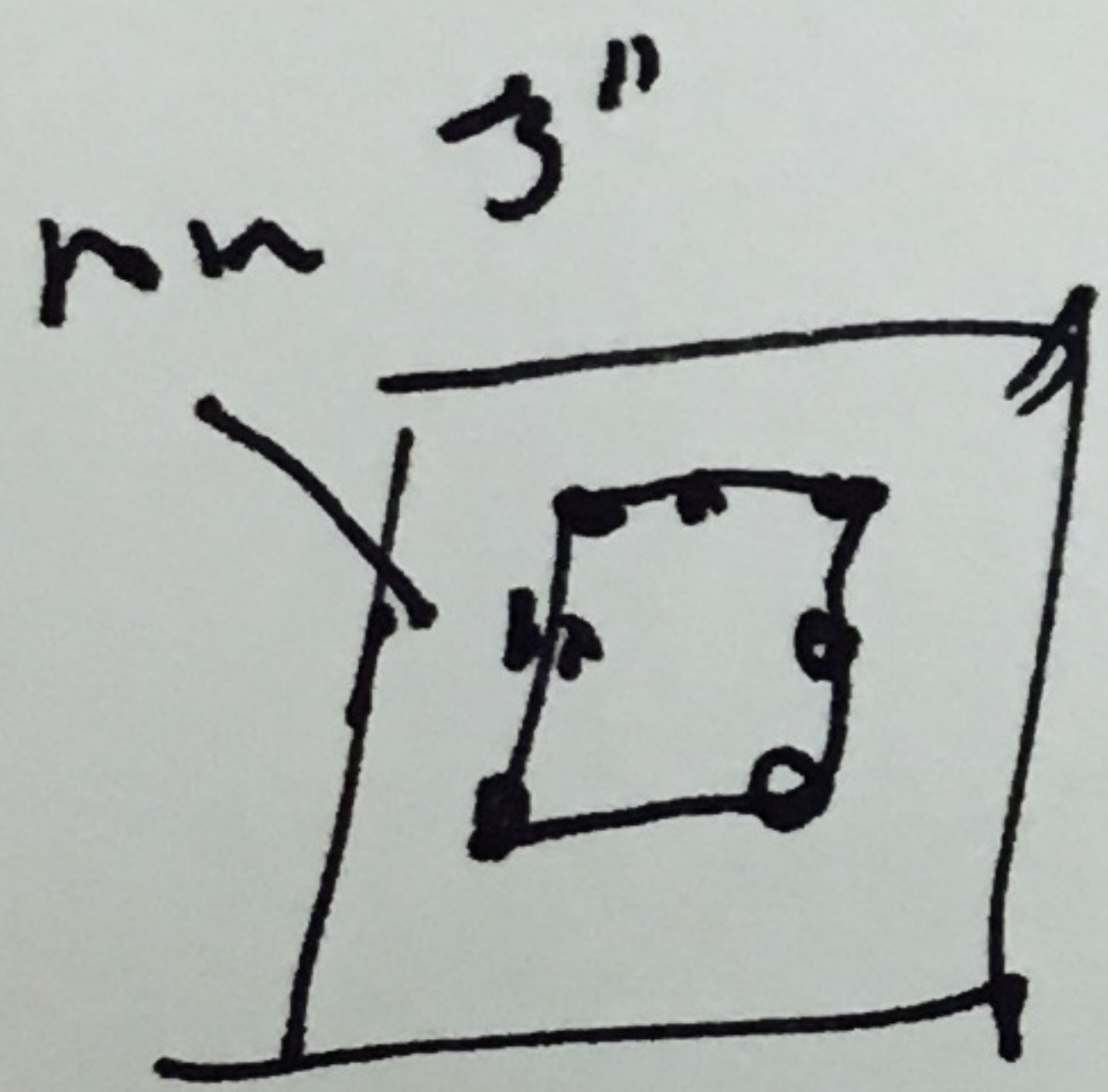
Course aggregate

Fine aggregate

Curing

Cover

band



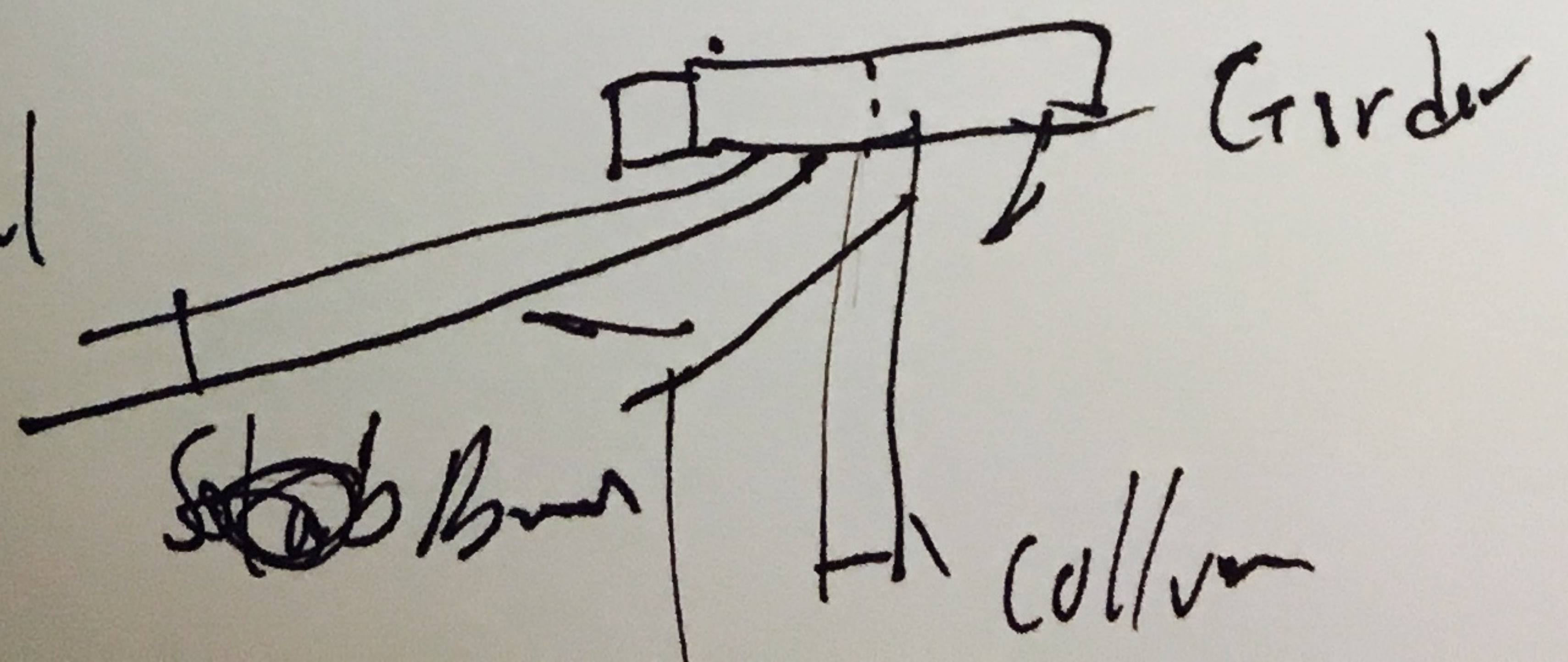
One way solid slab

Two way solid slab

Geometry load

25' to 30'

Two way slab



hydration

drying shrinkage

fly ash

hydraulic cement

Concrete admixture

Chair/bolster

Creep

Rebar towards the ~~top~~
Bottom

One way joist slab

Two way flat slab