- Lathe → Mother of Machine
- Galvanizing → process of coating iron & steel with zinc in order to provide greater protection against corrosion for the iron/steel base.
- almost all galvanized iron & electroplated steel
- two methods:
  - a) Hot dip galvanizing (molten zinc)
  - b) Electro galvanizing (zinc sulfate / cyanide)

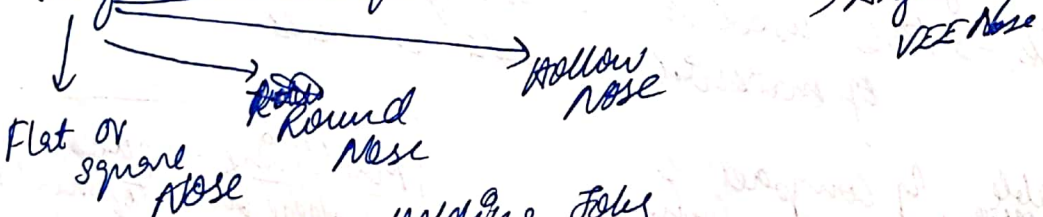
Spangles: after coating of zinc freezes into a crystalline pattern

- Not popular method - Sherardizing

Type of Forge

a) Hand forging (small)
b) Power forging
c) drop forging (Mass prod" of stones)
d) Machine forging (medium to large)

Smith forge - open hearth - robust cast iron
Closed furnaces - larger job (small job)
Sledge hammers - 0 to 4 times heavier than Hand hammer.
Swage block - used as a support in punching holes & forming dip-shapes
Tongs - made of still mild steel.



Tools used for Holding Jobs

- Bench vice.
- V-Block with clamp.
- C-clamp / G-clamp.
- Chucks (used extensively for holding work for Machine)

Marking tools
- Letter punch (27)
- Number punch (0-8)
- Try square
- Drift punch
- Angle plates
- Surface plate (testing the flatness)
- Universal Scriber
- Dividers
- Dot punch (60°)
- Centre punch (90°)

- Caliper (precision)
- Vernier caliper (accurate) → 19 main scale – 20 equal parts division
  (or) depth gauge

types of vernier calipers
- dial
- digital vernier (with more accuracy)
- vernier height gauge.
- outside micrometer / screw gauge.
- Feeler gauge.
- Radius gauge.

Cutting tools
- Hack saw
- chisel

are annealed, hardened, tempered to produce a tough shank & hard cutting edge.

Finishing tools
- Files → swiss / needle files (double cut)
  - round file
  - flat file
  - 3 square file
  - Hand file
  - square file

Drilling → process of cutting holes in metals by using a drilling machine as shown.
Drills → tools used to cut away fine shavings of material as drill advances.

portable drilling → compact & handy

Drill bit type
i) Twist bit
ii) Brad point bit
iii) Auger bit
iv) Plug cutter
v) Gross / Pole bit

Machining → process where minute / small quantity of material is removed from the parent material to get required shape, size, surface finish.
- Lathe is machine that is used to perform several operation on the work piece.

- Tapping → To create a internal thread.
- The plumbing & sanitary system is an essential part of every house / building.
  - i) hygiene requirement
  - ii) & present & construction cost
- plumber's job → installation, repair, maintenance & service of plumbing fittings & fixtures.
- Carpentry → process of making wooden articles & components such as roofs, partitions, doors & windows.
  - Involves cutting, shaping & fastening wood.
- Joinery denotes connecting the wooden parts using different points
  Eg: lap joints, mortise & tenon joints, bridle joints.
- Carpentry tools
  - i) Measuring
  - ii) Marking
  - iii) Holding
  - iv) cutting
  - v) planning (to produce flat surfaces)
  - vi) Boring (Ratchet brace, wheel brace)
  - vii) Striking
  - viii) Miscellaneous

Eg i) Steel tape, steel rule, calipers, try square.
ii) Striber
iii) Bench vice, Bench stop, G-clamp, carpentry vice, Bar clamp.
iv) Rip saw, panel saw, Tenon saw, chisel → Mortise (more leverage applied), Gouge → paring, cross cut saw
vii) Ball-pein hammer, plain faced claw hammer, rivet hammer.

- Welding → material joining process which produces coalescence of materials by heating them to suitable temperatures.
  → make permanent joints

types i) plastic welding (pressure)
ii) Fusion welding (non pressure)