PERFECT CUTS

OR WHAT I LEARNED FROM STUART BATTY

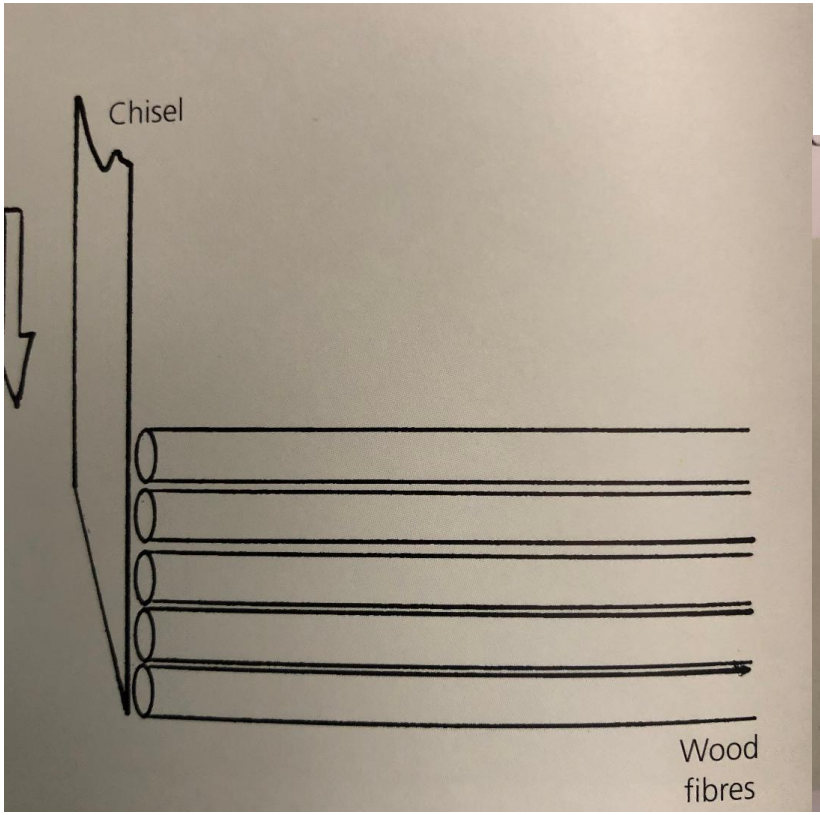
Tom Gaston April 2022

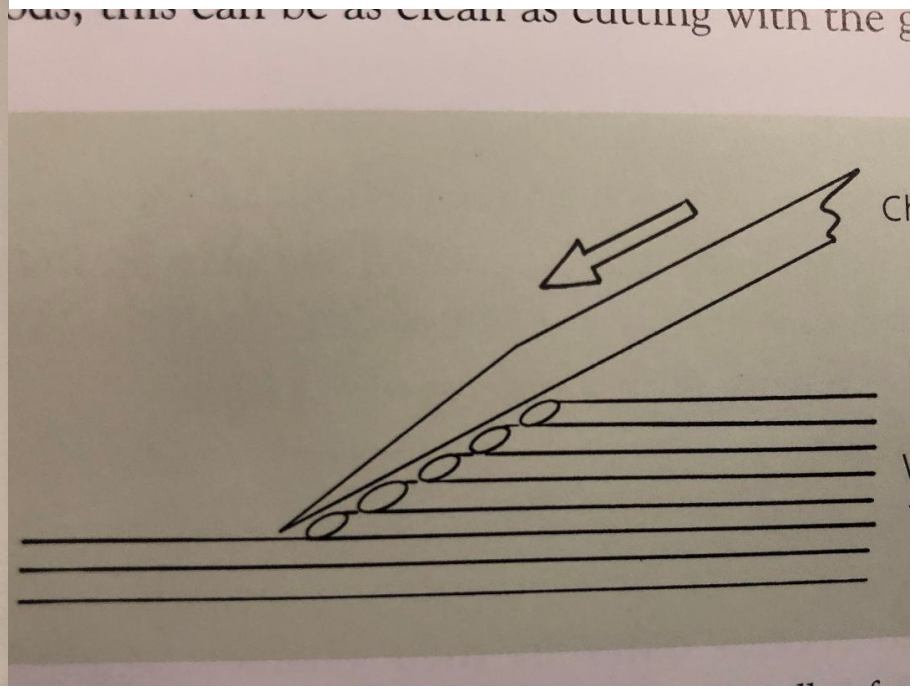
7 Principals that lead to perfect cuts

- 1. Grain: side/end/mixed
- 2. Chucking: secure/accurate
- 3. Sharpening cutting edge: type/size/shape/angle
- 4. Tool rest: height/distance/angle
- 5. Lathe speed: fast but safe
- 6. Stance: position of feet
- 7. Technique (push cut): straight/concave/convex

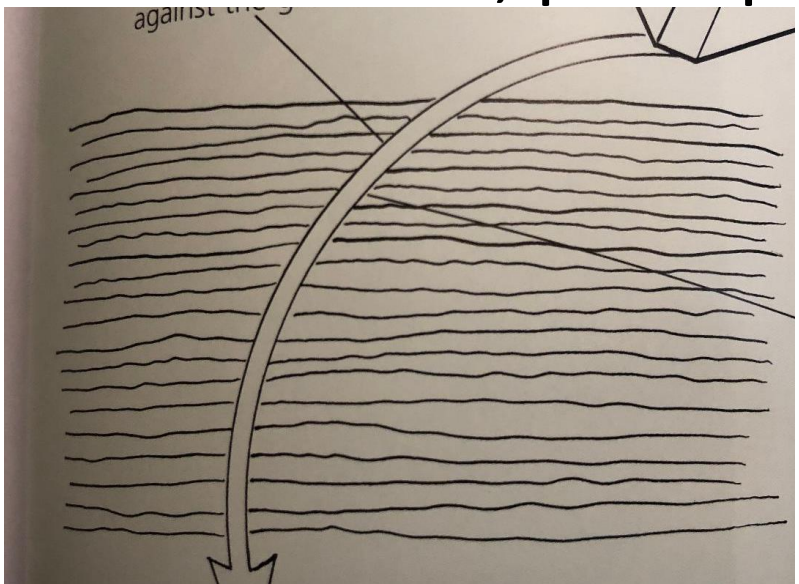
1. Grain

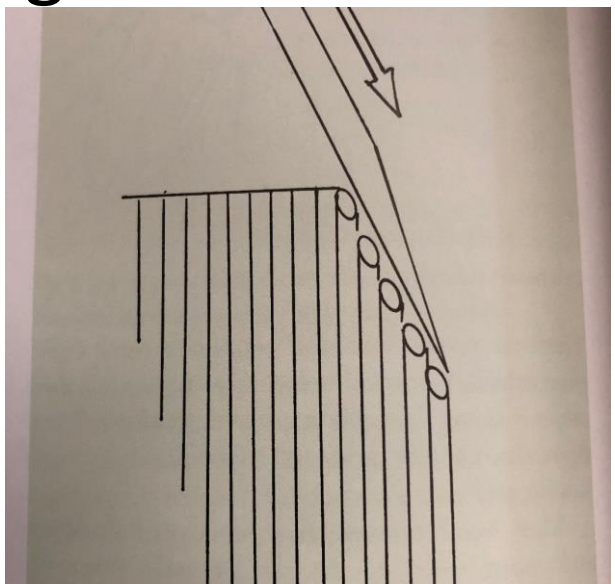
Spindle turning is side grain turning





- Bowls can be either end/side grain - mixed grain (grain mounted perpendicular to the lathe bed), or end grain (grain mounted parallel to the lathe bed).
- Try to avoid cutting into mixed grain directly as this causes catches, and never cut directly into end grain especially up hill as this will cause a catch, perhaps a dangerous catch





- 3 types of cuts:
- 1. Slicing (like a skew): There must be bevel contact to create a slicing action.
- 2. Peeling (like a parting tool): Only side grain can be peeled, trying to peel end grain will cause the tool to self feed and catch. The bevel needs to be in contact, and without contact scraping is taking place.
- 3. Scraping: A scraper isn't the only tool that scrapes. All tools can scrape if handle is in wrong position. Inadvertent scrape can occur if the handle is too high, the front of the tool is being pulled by left hand, or if the left hand/thumb is used as a fulcrum.

- A gouge is the only tool that can peel and slice at the same time. The tip of the gouge creates a slicing action, and the wing produces a peeling action.
- A bowl gouge is better at this action of slicing and peeling than a spindle gouge. A bowl gouge shape is a V (or U) or elliptically shaped flute while the spindle gouge is a radius flute.
- A skew can slice or peel, but not at the same time.

2. Chucking

- Wood must be mounted securely and accurately to prevent vibration during cutting process. Vibration produces a spiral cut or instability and failure to hold piece.
- The shape of the recess or tenon, and more importantly the seating of the wood against the jaws are critical.

3. Tool and sharp cutting edge

- Select the right type and size of tool. Do not use a roughing gouge or skew on a side grain bowl as major catch can occur. Do not use a skew to rough down a spindle.
- Size of tool and length of tool blade/handle takes into account overhang from tool rest. With spindle turning, rarely need a long handle and blade as the cutting edge is close to the tool rest. With bowl turning, the overhang can be considerable, especially for the interior of the bowl, so longer handle and blade is needed.

Overhang ratio

- Cutting: 5 to 1 (for every one inch of overhang need 5 inch of blade/handle)
- Scraping: 7 to 1
- Negative rake scraping: 3 to 1

Gouge diameter and maximum overhang to prevent the tool from vibrating.

- 1/4”dia – 3/4”overhang
- 3/8”dia - 1 ½ “
- 1/2”dia - 2 ½”
- 5/8”dia - 4 ½”
- 3/4”dia - 6 ½”

Shape and angle of cutting edge

- The more acute the angle, the sharper the blade, but at a cost… a weaker edge. Examples: Carving tools 15-20 degrees, kitchen knives 20-30 deg, bench chisels 25-35 deg, axes 20 to 35 deg.
- Optimal, 40 degrees for most turning tools.
  1. Good compromise between sharp and sturdy
  2. Able to get into corners, can create dovetail for chuck.
  3. Majority of pressure in direction of cut.
  4. Will need larger angles to get to bottom of bowls.

4.Tool rest, height

- 1. Just below center for gouges, unless deep hollowing a bowl to ensure a slight upward angle. Keep in mind tool diameter and lower tool rest for larger diameter gouges.
- 2. When planing or rolling beads with a skew, raise tool rest above center.
- 3. When scraping, the tool rest is generally above center so that the cutting edge of the scraper is pointing downhill. With negative rake scraper, only the top angle needs to point downhill.

4. Tool rest, distance

- Usually as close to the wood as is possible as the tool rest acts as a fulcrum. When the rest is far from the wood more leverage is needed (longer blade/handle length). Remember it is where the handle is held the determines the leverage.
- Keep in mind the size and shape of the cutting edge so that the tool can get in and cut.
- 1/8 “ to 1/4” is ideal, possibly further with larger bowl gouges

4. Tool rest, angle

- The angle of the tool rest is set for both shape one desires and control of the tool.
- One must be able to both start the cut in a controlled manner and complete the cut comfortably.

5. Lathe speed

- Lathe speed is a balancing act: fast enough to effectively cut vs safety. With higher speeds there is a greater potential for injury, as more stress is placed on the chuck attachment and/or between centers attachment. Also the wood blank can fracture and pieces fly.
- Remember the blank diameter and mass of the blank. Examples:

3 inch diameter- max speed 2,200 RPM- outer dia speed 20 MPH. (30 feet per second!)

6 inch dia–max speed 1,700 RPM-out dia speed 36 MPH

12 inch dia- max speed 1,250- out dia speed 45 MPH

6. Stance

- The three basic stances:
- Parallel straight cut: Feet are parallel to the lathe bed or may be parallel to the angled cut for example removing the corner of the side grain bowl.
- Oblique straight cut: Left foot is forward.
- All curved cuts, concave or convex, both directions: Right foot is forward. For longer cuts with larger bowls the right foot must be very far forward. Short bed lathes or head stock close to the end can be an advantage here.

7. Technique (push cut style)

- The method to control the tool, both with the type of cut and the correct use of the hands.
- The push cut: The tool is pushed around the cut, with the handle aiming in the direction of the cut. The pull cut: The tool is pulled around the cut with the handle proceeding the cut.
- WITH THE PUSH CUT THE CONTROL COMES FROM THE RIGHT HAND. The right hand has four controls and their opposites:

1. lift or drop
2. push or pull
3. twist (left and right)
4. swing (left and right)

- Straight cut use the first two motions (lift and push). Nearly all straight cuts have body contact throughout the cut.
- Curved cuts require all four motions to produce a fair curve. All curved cuts do not require body contact. The cut may start with the the handle away from the body and end with body contact, or less commonly, start with body contact and move away from the body.

- What does the left hand do? It is an assistant that adds no controlling action on the tool.
- 1. Weight: most important function, adds weight to the front of the tool
- 2. Position: Accurately positions the tool at the start of the cut.
- 3. Prevent skid: At the beginning of an entry cut, the tool has a tendency to skid or skate as there is no wood behind the bevel. The left thumb on the tool rest can prevent this. As soon as the cut is initiated the left hand should move back and just provide weight.
- 4. Brake/squeeze: At the end of the cut the left hand counters against the right hand so that the tool doesn’t go past center. On the outside of a side grain bowl, the left hand reduces the bounce that can happen from too much pressure into the wood-floating the bevel rather than rubbing the bevel.

Other aspects of tool control:

- Handle height: too high and cut turns to a scrape, too low and aggressive cuts result.
- The bevel must be in contact to be cutting, but should float rather than rub. If too much pressure is applied, the cut will bounce. This is especially apparent with bowl turning as end grain and side grain have different densities.
- Flutes must be correctly oriented, too open and the cut will be aggressive, too closed and the tool will not cut. During curved cuts the flute must be twisted/rotated to enable the cutting edge to re-orient to the grain. Concave cuts start with flute on its side (almost closed) and end with flute open. Convex cuts start with flute open and end with flute almost closed.