Make an Incurved Undercut Bowl

Wells Shoemaker
Santa Cruz Woodturners
March 19, 2022

Trouble with the Curve?
Not Us!

But not all curves are created equal

The Catenary: Most Naturally Appealing Shape for a Vessel

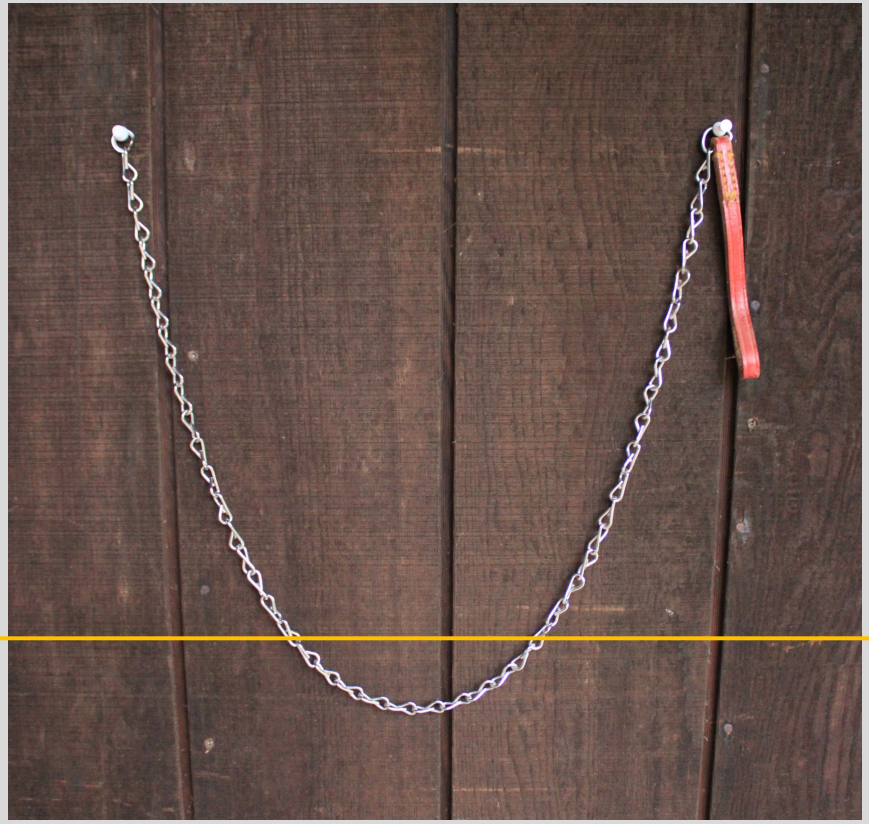
Medium

Narrow

Catenary with a Cheshire Cat Smile

Shallow Bowl & Platters

The Turner's Catenary: With a flat bottom



Medium

Narrow

Catenary with a “Return” Incurve

This is what we'll address: 3 bowls w different curves

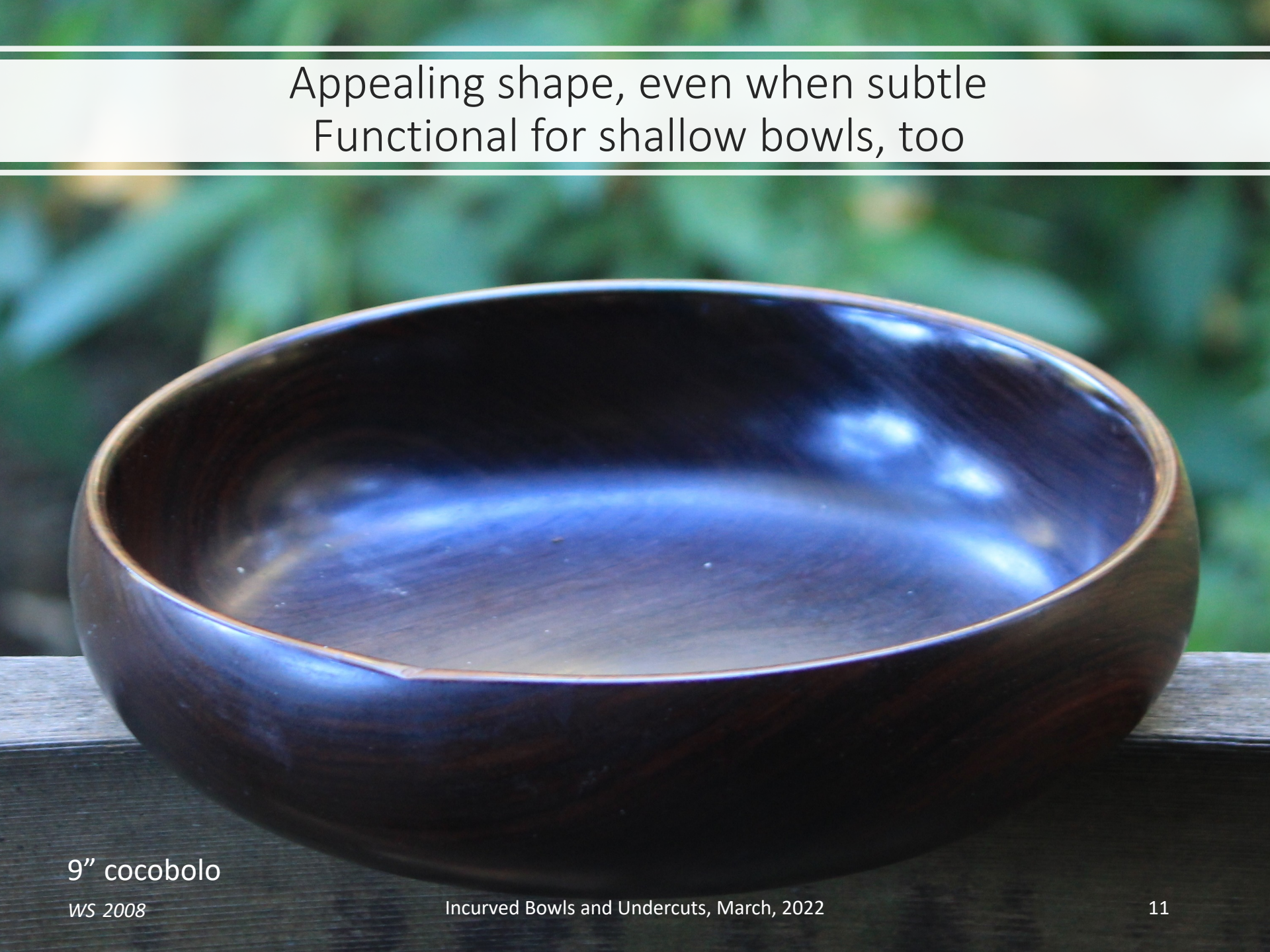
Same maple tree, roughly same size, main difference = degree of incurve


17”

Incurves pleasant even for small vessels appreciated by small hands, too

4” madrone

Appealing shape, even when subtle
Functional for shallow bowls, too



9” cocobolo

WS 2008

The Undercut

Roy Holmberg's Stock and Trade Form...

With a Steel Belt!

Roy does a lot of these

Mango

Lots of Variations

It’s Santa Cruz, after all!

Raf Strudley

Redwood

Linda Anderson

Tanbark oak

Bill Hopkins

Black Acacia

Dan Aldridge

Monterey Cypress

Illustrating one of the challenges of incurves

…and the clever response!

Frank Roest

Monkey Pod

John Wells

Kauri

Dwain Christensen

Chuc Nowark: Add the undercut

Tom Eovaldi—Incurve, Undercut, and a resin drape

Chuc Nowark

Range of Depth and Curvatures

3”
|
16”

Deep bowl, catenary with subtle incurve

Wells S
Cypress
10”

Shallow bowl, mild incurve

Norway Spruce finished

Accentuated “globular” incurve

Rough out
black acacia

Shallow undercut

Shallow undercut
Ash

Rough out

Finished shallow flat rim with undercut

Pine (!) with naturally weathered gray face, “Budsorter”

Sharper incurve with accessible undercut

Monterey Cypress, Deep “Budsorter”

Tight undercut—Tricky!

El Brazo de Onofre

AKA

The Hand of Roy

Hard Rock Maple

Time to Git ‘er Done

Four Steps for an Incurved/undercut Bowl

1. Choose the blank wisely
2. Proper tools
3. Cutting
4. Sanding and Finishing

Step 1: Choose the Blank Wisely

- No cracks! Big torque on this puppy
  - *De-tensioning can aggravate weaknesses*
  - *No UFO's—unintended flying objects—please!*
- Spalting and punk—hard to cut cleanly inside, nigh impossible to sand...unless you love the wood
- Wood prone to tear out—like figured redwood—only for the brave and patient (see Raf's gallery!)
- Knots and voids will drive you crazy. Advanced and/or tranquil turners only!

Deep radial cracks → Trouble

Ash that waited too long before rough out

Good for ornaments and apples

It takes special hands for voids, soft spots, knots, & “features”

John Wells

Step 1, continued... Blank Wisdom

- Uniform grain ideal—chatter inside is rough duty
  - *Think maple, cherry, dry madrone, acacia, cypress...*
  - *Not oak, Doug fir...you'll figure it out*
  - *Exotics for the adventuresome*
- Use dry wood—warping of moist wood makes uniform wall thickness challenging, even overnight
  - *Moist madrone, oak, sycamore "dynamic warpers" → headaches*
  - *Unless you want to finish it all in one day and let it wiggle*
- How wide? Small, Medium, Large
  - *All Good, Same Steps*
- How deep? 6-8" max feasible over the toolrest without special rigs. (That's a 'nuther demo...)

Not quite dry yet?

In Aptos, 14% is equilibrium moisture content (MC).

If internal portions of a blank are still 16-20%, do an Intermediate “refine roughout” with early development of the incurve.

That takes some patience, but your incurved bowl is more likely to relieve the stresses that would otherwise jeopardize the final product. Patience...

Big Leaf Maple, 13” D, 6” deep, MC = 16%. Ready for May

¾” thick

Read the crudely roughed blank

Surprises
Lurk
Beneath

...even with
a bland
wood like
holly

Read the “directions” before cutting! Undercuts & wide rim allow capture of shallow character

Bottom view

Rather plain, alas

Madrone 10”

WS’ bowl...

John Wells’ tree

Top sports a gaudy but shallow red stripe Would be lost on narrow rim of a regular bowl

Beauty displayed by the wide rim
Slope of rim also creates taper pattern

Side angle view

Another example
incurve and undercut to max features

Maple with nice Stripe

Rough out stage, sealed

About 10” D

Volunteer blank for this slide show

7” diameter

6” deep

No cracks

Nearly dry

Soft Maple with rather bland figure.

Won’t be special for grain, but an incurve might improve visual appeal.

Mold suggests spalting inside.

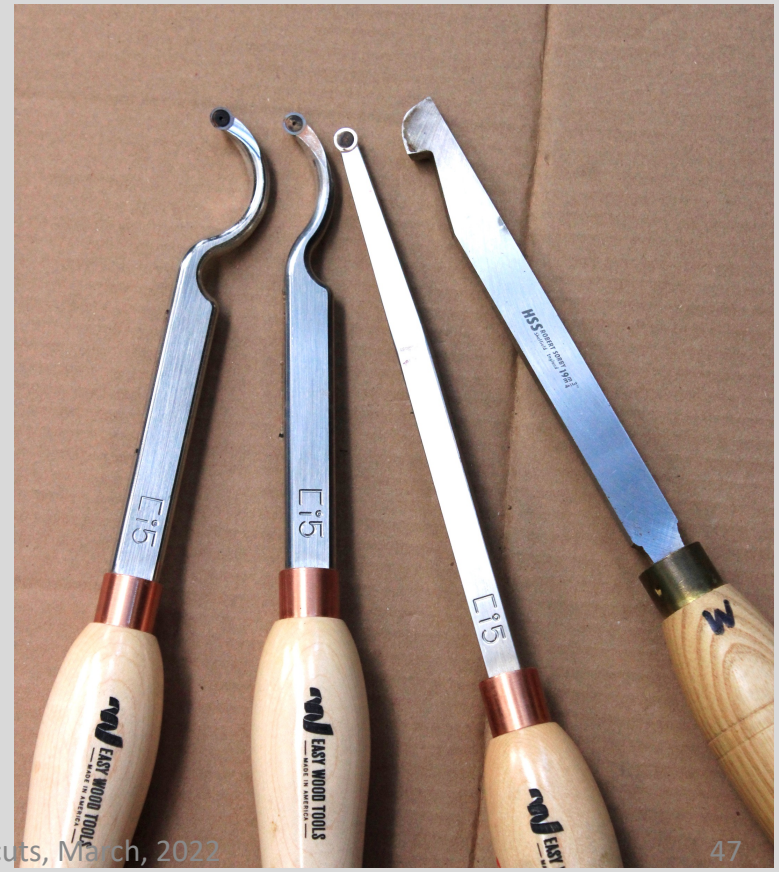
About max feasible depth

Center pith needs to go

Step 2: Tools for Today

Exterior-Convex:
Standard Shaping Tools

Interior-Concave:
Undercutting Tools



Deep Undercuts Require Custom Designed Cutters

- Gouges won't reach. Can't make cutting angles. Catches likely to be "spectacular"
- Most turners use HSS and carbide cutters fixed to sturdy steel shafts
- Deeper penetration verges on "hollowing," which is another conversation and major investment in tools

Roy forges his own custom cutters

Roy at Work Under the Rim

Steps 3: Cutting

1. Rough out
2. Form tenon and outer shape—bottom up
3. Form incurve—Outside first!
4. Think—how will I grasp this—expansion vs jam?
5. Design opening to accommodate that dimension
6. Progressive hollowing
7. Wall thickness tricky—calipers and patience!

Use screw chuck or faceplate

Bring up tailstock to secure blank

Uh oh!

Crumbly tear out in the soft sap wood

Despite *very* sharp edge

Hogging out

Incurved Bowls and Undercuts, March, 2022

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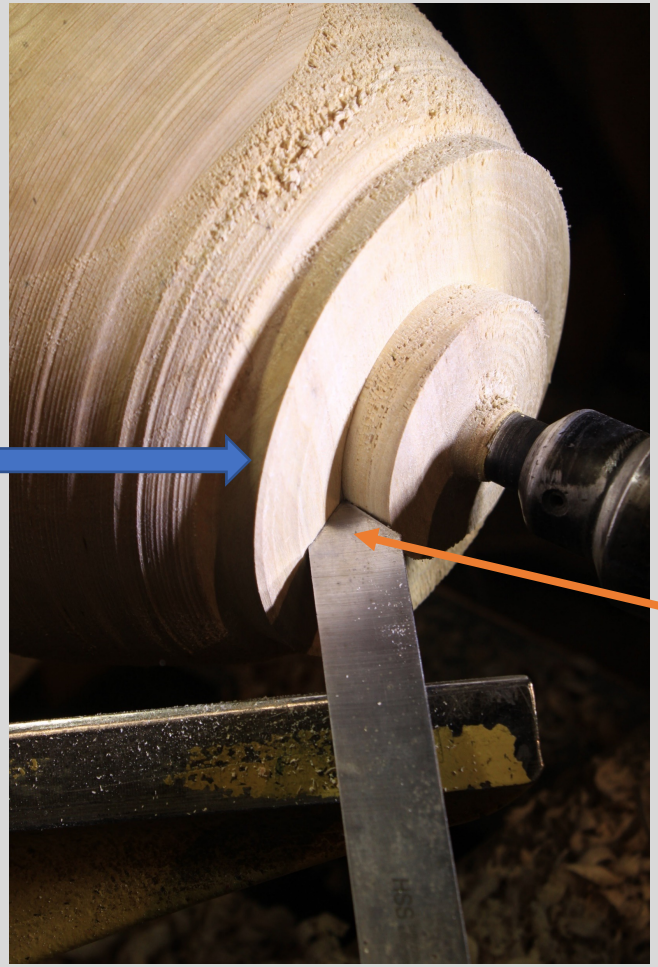
Form Tenon w 77-degree dovetail

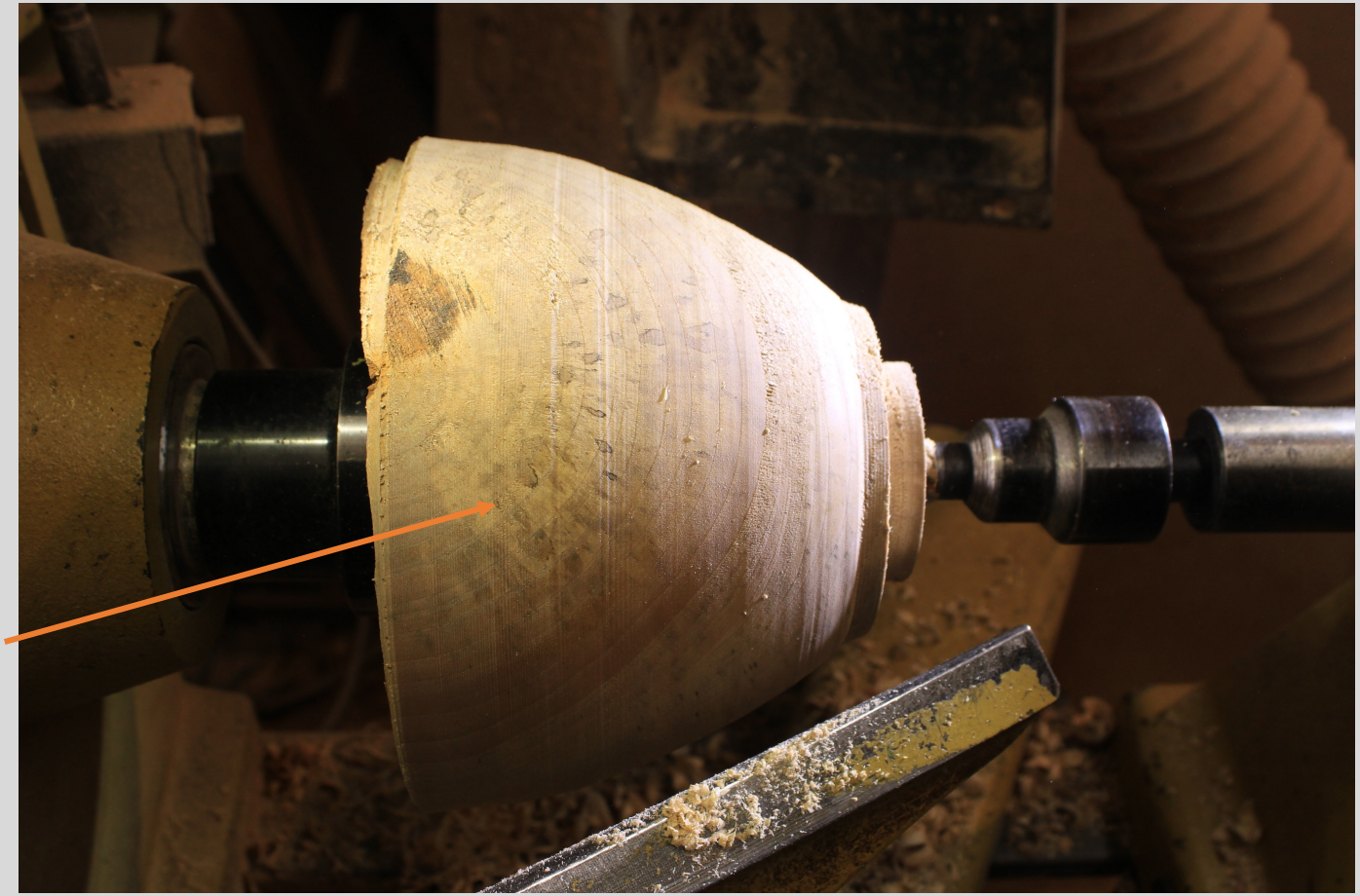
Wells' Contingency Shelf

AKA

"No Funnels"



Rough out exterior to shape while between centers



Spalting Revealed!

Sharp gouge cuts clean convex curve

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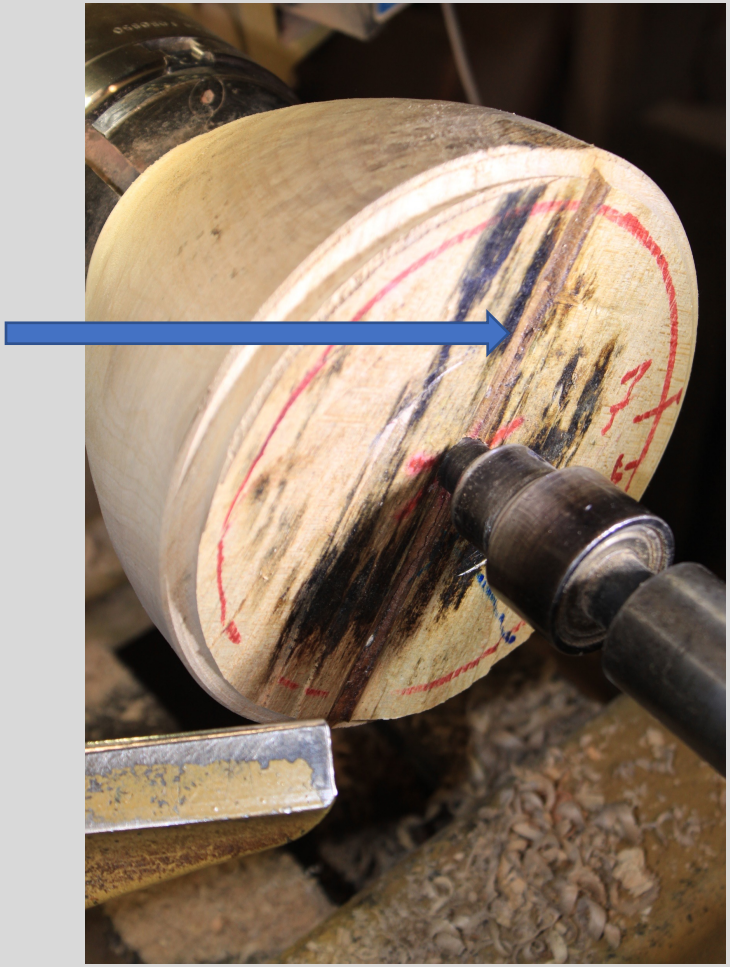
Time to grip new tenon w chuck

Face off the Top

Note: Delete center pith and punky wood

Needed to take this one down ½” to eliminate punk and minimize checking

You won’t miss the depth!



Faced off…Exposes pretty spalting!

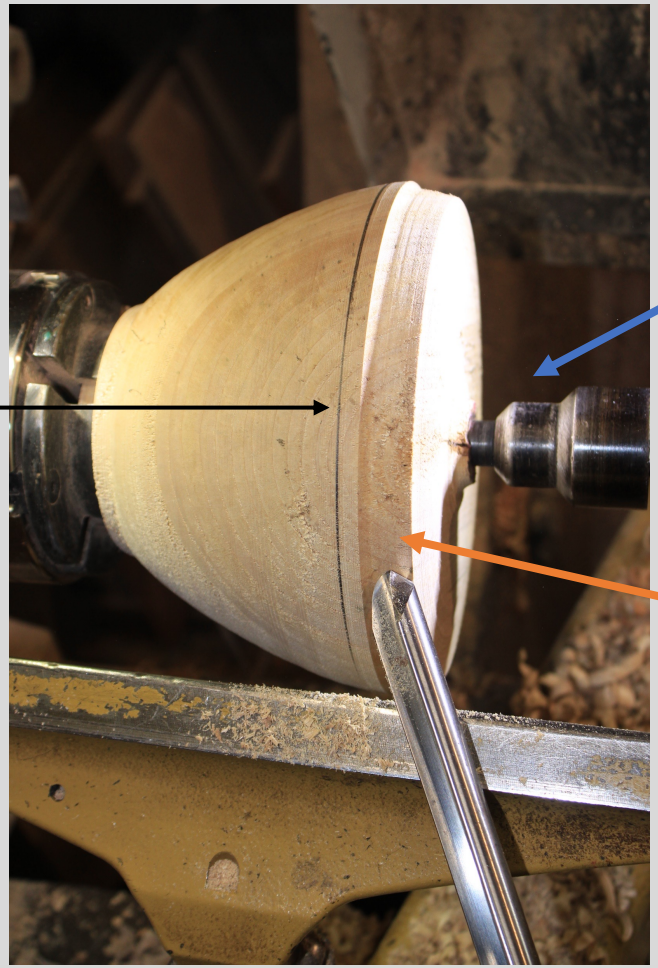
Will leave wide, undercut rim to display spalting bonus feature!

Punky

Price to pay for flirting with fungi

Develop incurve with small passes

Give yourself a guide mark



Secure with Tailstock!

Unforgiving Torque!

Take 1/16” cuts

Easy to overdo

Rough incurve

Not refined yet
...but getting there

Good idea there's
A lot of spalting here...pretty, but
Hmmm...

Needs Work to blend curves

Use shear scrape to clean up curve

Approach transition from smaller diameter to larger—fibers supported.

Shear scrape to reduce tear out and future sanding burden

Fine touches to blend curves

Steps 3: Cutting

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2. Form tenon and outer shape—bottom up
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Initially use gouge efficiently to define opening and remove bulk

Easy part won’t last long

Cut orifice in rim to accommodate expansion jaws & allow access for tools

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Getting deeper
Gouge cuts clean shavings

Reaching end of utility of gouge
Can’t get cutting angle deep inside

Time for the undercutting tools

Easy Wood Tools
#3,2,1 L→R

$130 +/-
but everlasting

Sharpenable
(or replaceable)
carbide cutters

Flat shaft to
Stabilize on
toolrest

Only diss = Funky
1/16” hex screw

Sorby HSS
Scraper
with small
undercut
former

Straight shaft #1—good for deepening central portion

#2 allows better angle to clean up walls and start undercut

#3 cutter gets deeper without binding on rim. Note cutter aligned with shaft.

Carbide makes clean shavings in solid wood…

...but raggedy tear-out on spalted wood

Eeeuw!

With tear out, leave extra thickness for final cuts and sanding

We've come this far

It's going to be difficult

Call it a test of perseverance

Measure depth—No surprises!

Still a ways to go...

I’m not going to be able to cut this internal spalted wood cleanly, so maybe it’s time to use drugs

Thank you, Mattie Guthrie, for the hints about penetrating epoxy!

Check our website: 2021 educational tab “Resinators”

Low viscosity epoxy will solidify the punky wood so I can cut it more cleanly

100 ml penetrating epoxy into cavity, set to slowly rotate on the lathe to bathe the side walls constantly... without spilling!

Better than gravity, less wasteful than filling the cavity

Applied to external contours also. Saturate fibers from both sides, ideally.

Note darkened tones, accentuated contrasts with spalted rim

Go back with carbide cutters to clean up raggedy cuts in the now stabilized internal walls

#3 Easy Wood Tool

Steps 3: Cutting

1. Rough out
2. Form tenon and outer shape—bottom up
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Calipers at Work

Steps 4: Finishing

1. Sanding outside—standard
   - Incurved bowls will be handled by the users!
   - Sand to 320 or finer
2. Sanding interior...this is hard
3. Embellishment
   - Opinion: Simplicity is a virtue
   - Sometimes pragmatic reasons, sometimes artistic ones for inlays, texturing, turning touches, color, etc.
   - Secret is to make it look “integrated,” not chaotic
   - You’re in charge!

Sanding the Inside

- Possibly the hardest part! Especially under the rim
- By hand works...but takes forever & hard on the hands
- Power sanding faster but reach is a challenge

The Law of Eovaldi

There are at least three solutions to every turning problem.

Oh, to Sand: Hints from our members

- Roy Holmberg—Shop made back sander
- Tom Eovaldi—The Glove, Abranet on a surgical clamp
- Bill Hopkins—Cindy Drozda You Tube method
- John Wells—By hand, angle drill, or Sanding Solutions
- This Wells—Arbor Shaft Extender, Wave edge disc

Sanding mandrel extender choices For difficult interior contours

2” disc on extender shaft

Abranet “wave form”

Tom Eovaldi: Master of the Glove

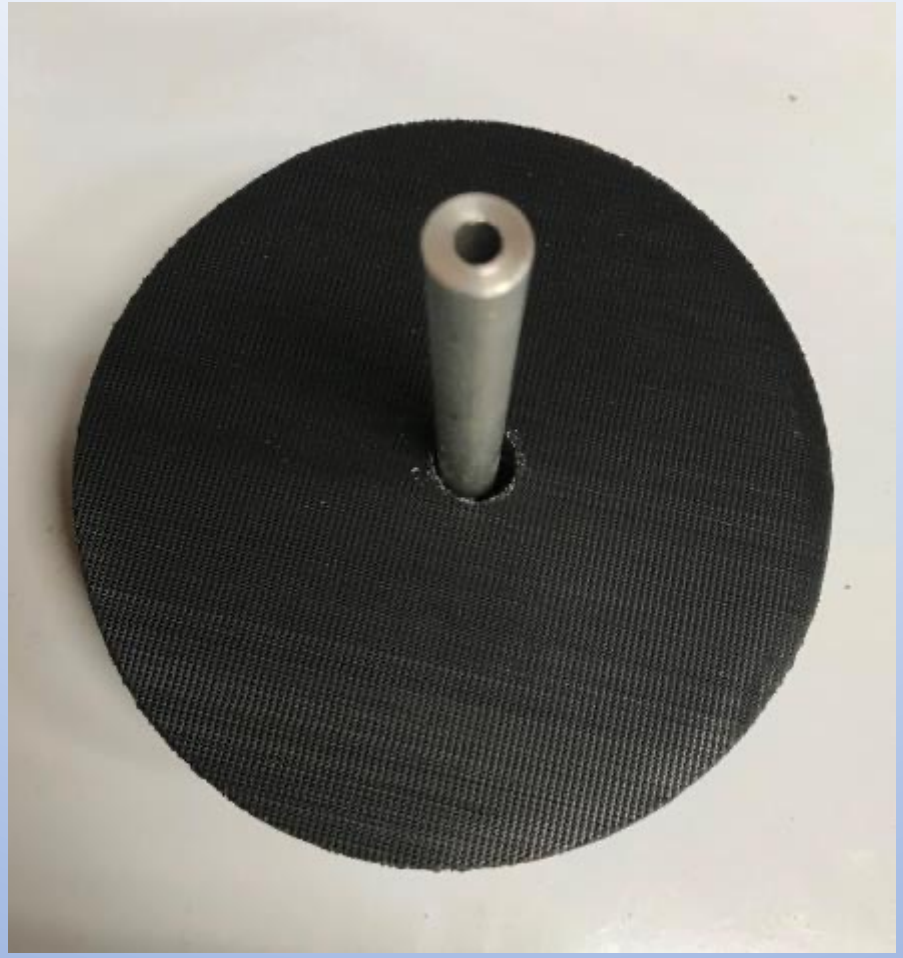
Tom’s Sanding Glove + Abranet

Roy's Hack: Reverse Mandrel Back Sander...Knuckle-Sparer, too

Originally displayed for June, 2020, **"Hacks"**

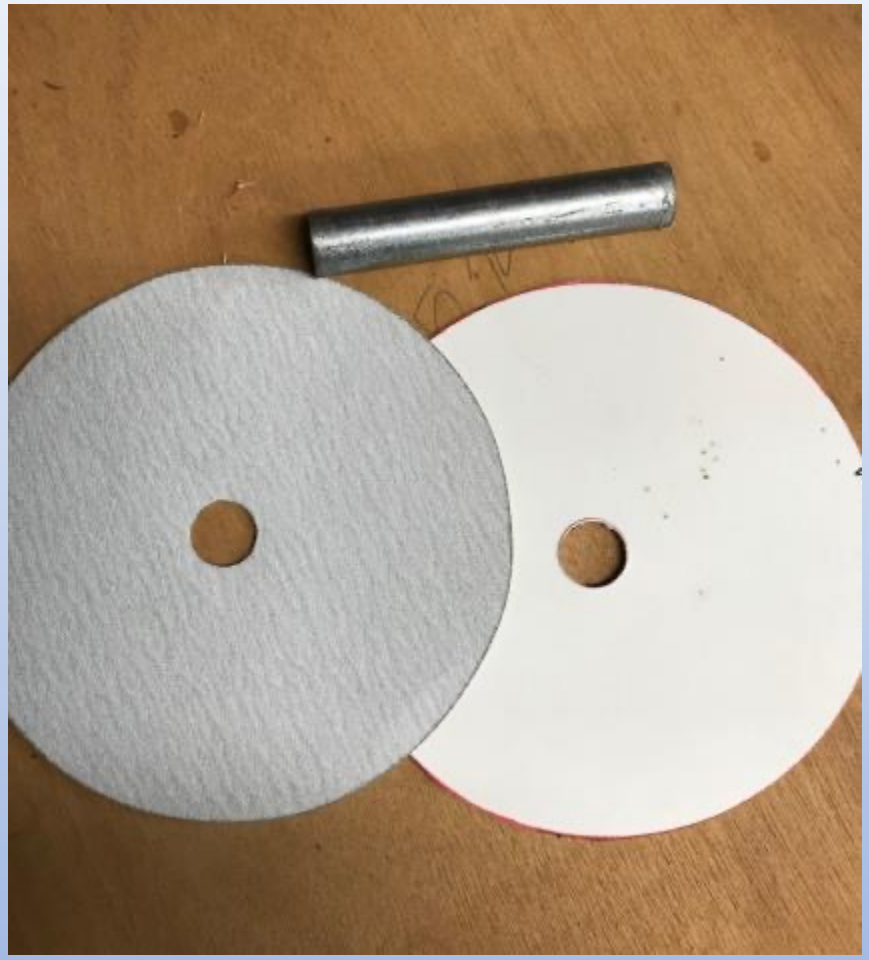
A collaborative "virtual demo" with club wide contributions

How to Make It: 1
Reverse the Mandrel



Backer Piece: 2

Ready to Assemble: 3



Done: 4

Steps 4: Finishing Steps

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   1. Opinion: Simplicity is a virtue
   2. Sometimes pragmatic reasons, sometimes artistic ones for inlays, texturing, turning touches, color, etc.
   3. Secret is to make it look “integrated,” not chaotic
   4. You’re in charge!
4. Finish the bottom

Rim embellishment
For a practical reason

Copper powder inlay in a groove—to hide a copper wire spanning 2 cracks I feared would open up

13”

Rim detail

Embellishment for Aesthetics

Raf Strudley

Time to cleave off the Tenon Mount using expansion chuck

Time to surrender the tenon and finish the bottom

Thank you, Lou Tenon, for your service!

Finish Product of Choice

- Oil—easiest, one step. Fine for decorative piece
- Penetrating, polymerizing finish (my preferred)
- Surface film/polish/shiny vs matte...artistic choice
- Wax—yes or no

Finished

Imitation = Flattery
Homage to Roy

Copper belted Ash

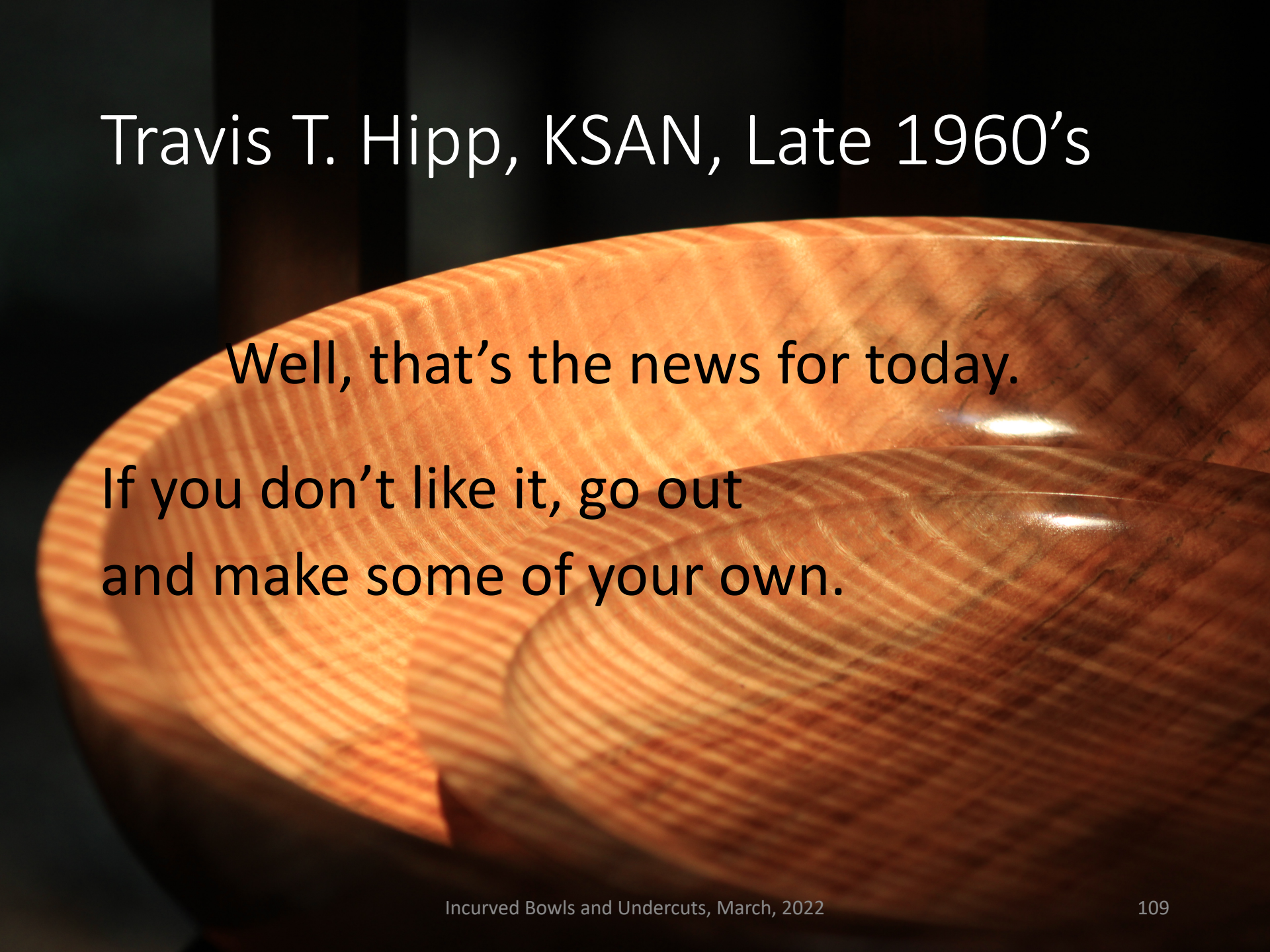
Undercut rim to tag along with Roy's stellar, multimedia demo 12/20

Home Stretch

(Aimee caught those guys)

Questions and Comments?

Travis T. Hipp, KSAN, Late 1960's



Well, that's the news for today.

If you don't like it, go out
and make some of your own.

Santa Cruz Woodturners

www.scwoodturners.org