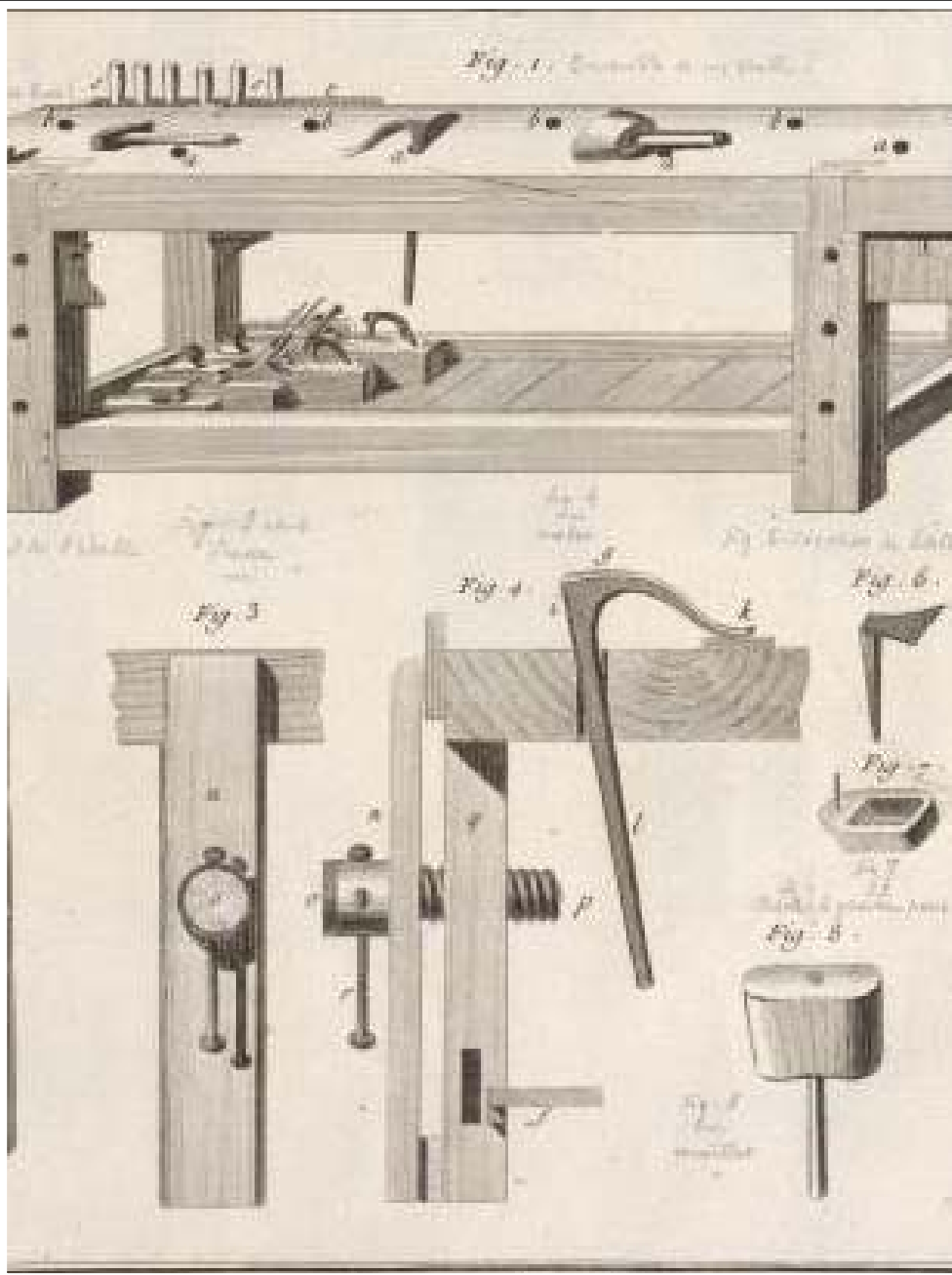




THE CORNEBARRIEU BENCH

A 14+ month joiner's workbench build



My GROG (garage and shop combo) in Seattle was too small for a proper joiner's bench. I made due with a slim, high, wall-mounted work counter, a bolted on machinist-vise, Quick Clamps, and the top of my table saw. It worked – mostly/sort of – but was a pain in the ass a good bit of the time: I never once planed a board on a stable, solid surface. My GROG here in France is roughly the same size as the one in Seattle, but is absent the huge cast iron machines and saws. I have some room to move and finally have the space for a big, heavy, proper work bench as well as some time to build one – or so I thought.

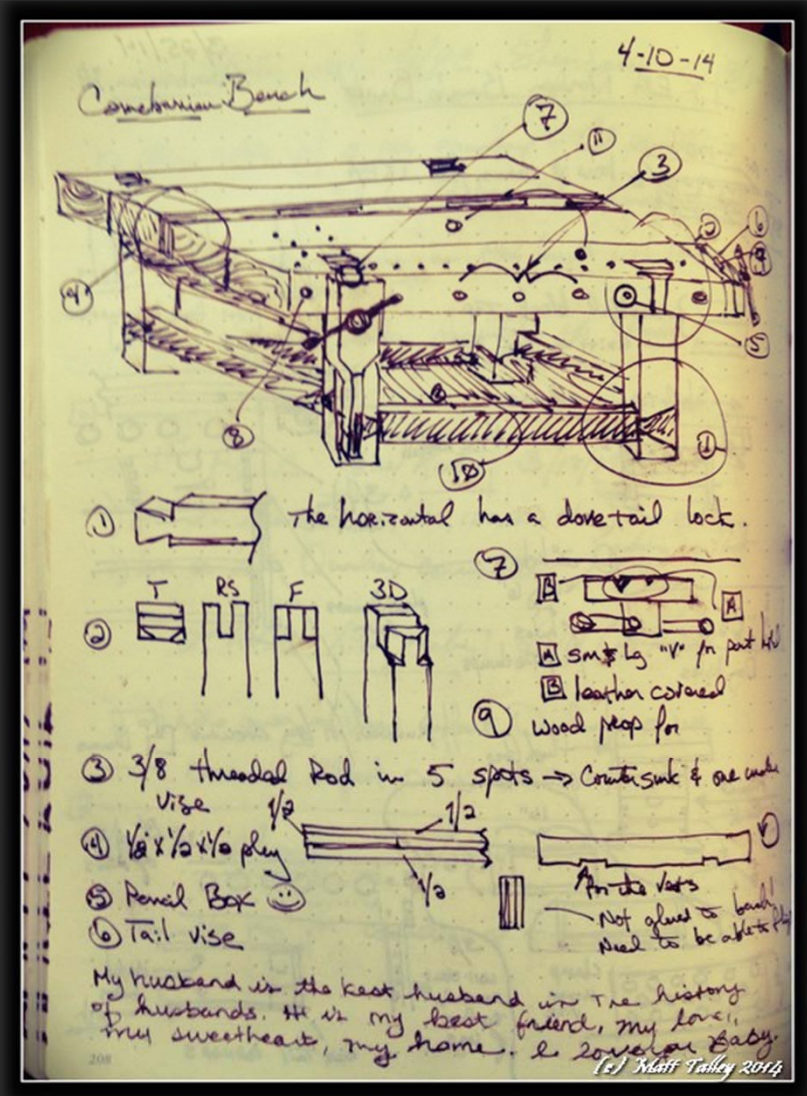
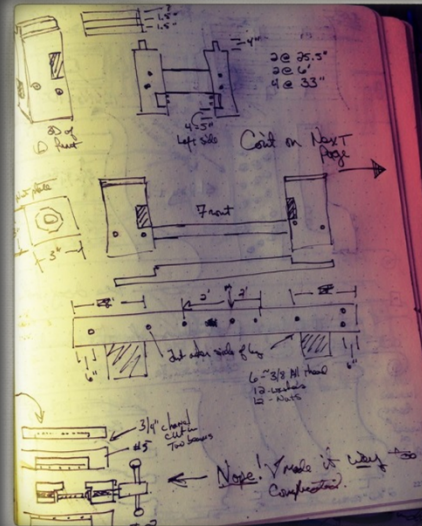
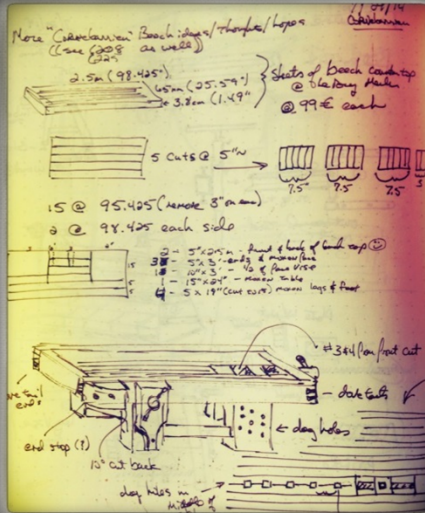
As I live in France, I built a somewhat traditional 8'3" (2.5m) m long, 24" wide and 36" high (as that is MY optimal bench height). It includes a wooden leg vise, dog holes, a cast iron German tail vise – all the bells and whistles! I built it so that it would take a mule to move the thing as I will do some serious plane work on this baby over the next 40 years or so.

It is an amalgamation of benches by M. Roubo, Roy Underhill, Chris Schwartz, and Bill Schenher. I am calling it the "Cornebarrieu Bench" after the small village in southern France where we live, where the lumber has been sourced, and where the bench was made and first used.

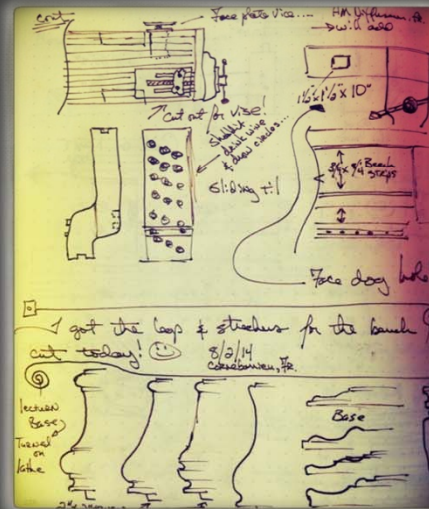


I picked up some of the rough construction lumber for the bench base at a lumber yard near the house, strapped it to the top of my tiny car, and carried it home, giggling manically. The wood was in my GROOP, drying out for months as life swirled around it waiting for me to attack the timber and fashion it into one fine, sweet hunk of usefulness.

DOODLING, SKETCHING AND DESIGN:



I have to sketch stuff out to get it out of my head. It is my way of pondering. I started sketching up bench ideas about 6 months before the build began -here and there - to figure out the difference in what I thought I wanted and needed vs. what I actually needed. The dimensions of the bench will be 25.5" wide, 34" tall, and 8.2 feet long.

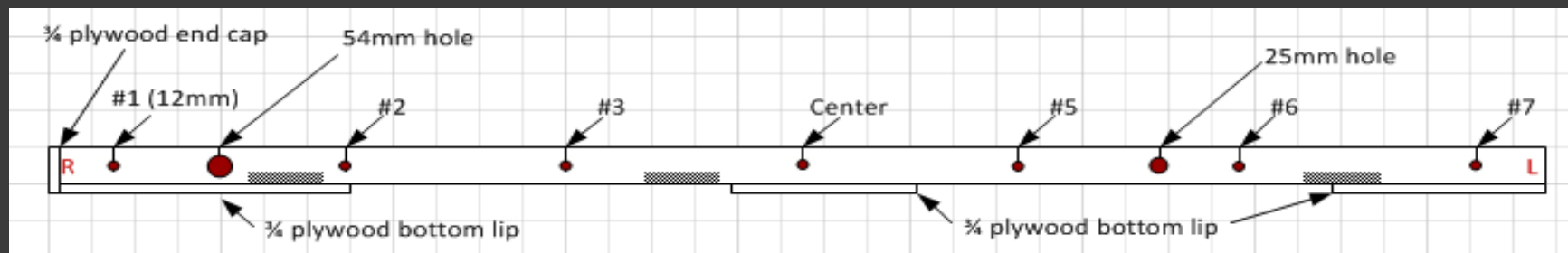




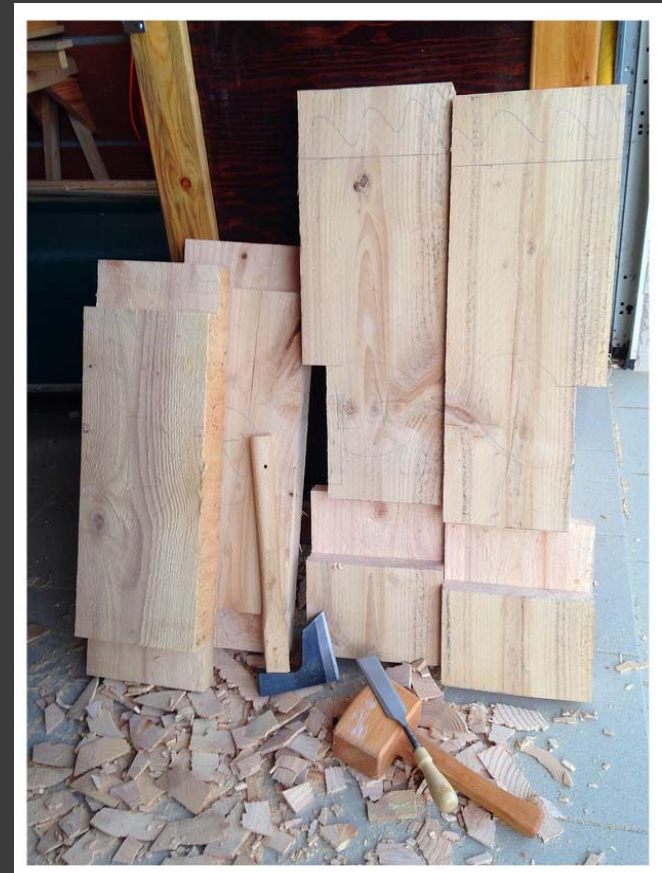
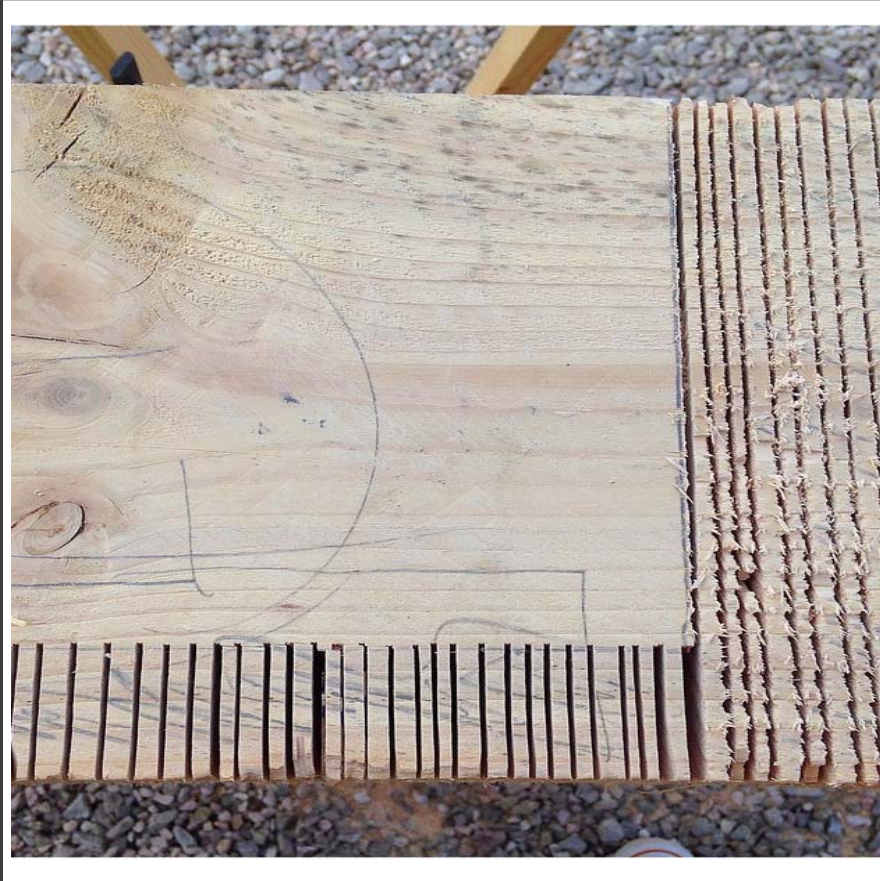
When I decided on the re-purposed IKEA beech counter tops for the bench-top I knew that I would need to rough up the surfaces for a strong glue joint. Instead of sanding them all down, I pulled out my 19th Century toothed scraper coffin plane and prepared the surfaces before cutting down the slabs. This technique was/is used to prep the surface for marquetry laminates and both provides a lot of surface area for glue to adhere to and removes the high spots on a piece. I made the blade adjustment hammer a few years ago from a childhood game-day baseball bat and some scrap bronze and no, I do not whack the wood body of the plane with it.



I do not have a table saw here in France, so I had to improvise a bit to cut the slabs down for the top sections. The square/saw combination worked really well to cut the 5" sections, but I was only getting one section cut per battery and it was taking forever. I went down to the local Big Box tool and lumber store with the ripping square and bought a "cheap" circle saw that it fit. It came with a decent rip blade and the cutting went SO MUCH faster.



After ripping down the tops, I measured and re-measured for laying out all the holes in each one. I decided on 7 sections of 10mm all-thread spaced out over the entire length to both aid in the glue-up of all the sections, and to keep it solid and limit cracking for its usable life. In the first 8 sections, I drilled additional holes for a removable bench-hook and a pencil/marketing knife drawer. The latter is something I saw on-line and decided that I had to steal and incorporate. To mark off the holes in EXACTLY the same spot, I built a layout stick with all the positions marked out and stops nailed to the bottom and one end to assure exact placement each time. After everything was marked, I drilled each all-thread hole with a 12mm bit to allow for a little variance with the possible tilt of the hand drill. Then went over the drill holes with a mini jack plane that I use for about 1000 other things. Very Handy. I used a 54mm hole saw for the removable bench hook hole and a 28mm (had planned on 25, but I already had a 28mm) hole saw for the pencil/knife holder



The pine slabs had been drying in my GROF for 5 months and were ready to be cut down into their rough size. I had a little time one weekend and spent 4 hours making all the leg and stretcher joint cuts – hogging out the material with successive circle-saw cuts and then chiseling them out. I chiseled and planed all the joint cuts smooth and I really wished I would have had a timber framing slick. **When** I do another bench or some large furniture with this type of joint anytime again, I will buy a well-loved slick since it will pay for itself with the labor saved, in comparison to a 1.5” bench chisel, on 12 big lap joints. As a note: I did the rough math and I think that I have made 1123 total handsaw and circle saw cuts on this bench.



I let the cut up base sections sit for a while to dry a little more (and because I was swamped at my J-O-B...) and even though they were stored flat with clamps applied, the pieces twisted and cracked here and there. Just before the 1st dry fit, I unclamped everything and drilled 5/16th holes and installed multiple oak dowels and glue in the areas that had cracked. Probably overkill, but I wanted to do it all right the first time out of the gate. After the glue dried, I flush cut the dowels and went over their ends with a sharp block plane



I hadn't really paid attention while I was cutting all the lap joints, but as I was giving all the base parts an 80 grit sanding before the 1st dry fit, I noticed and really liked the sawmill marks on the front and rear stretchers. They were crosshatched from where the blade cut and then the log was pulled back through the blade so it could be reset for another ripping cut. I was originally going to cover the base in Federal Blue or Barn Red Milk Paint, but after seeing the saw marks I decided to just coat the whole thing with polyurethane and forgo the milk paint.



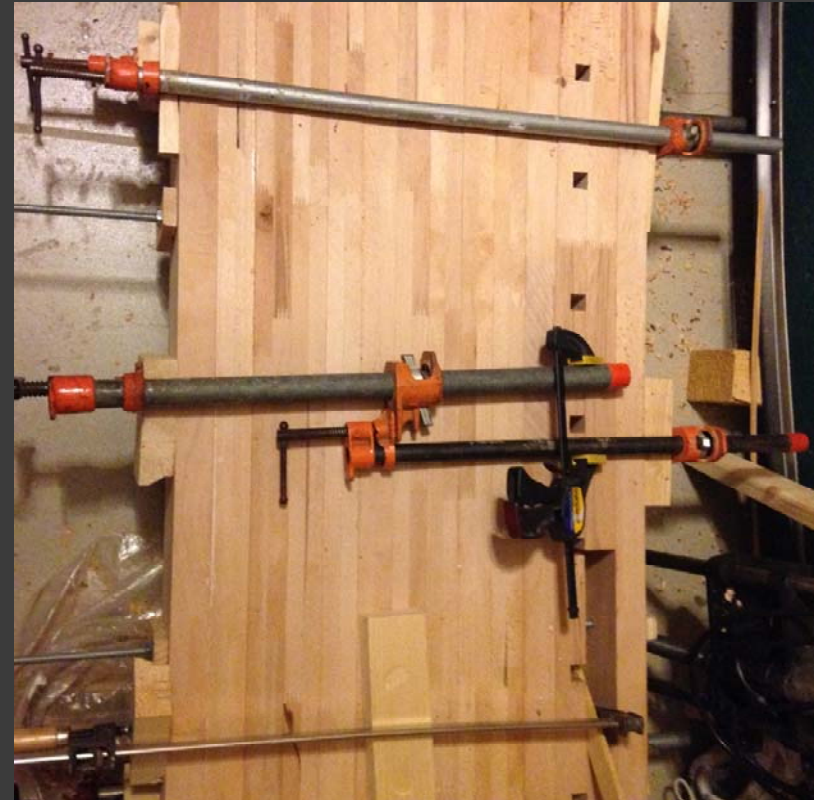
It is a little wonky looking, but I set up a speed-square to mount at 5 degrees (al la Norm Abrams) so that I could cut dog holes in one of the beech slabs (#3 to be exact). I marked and measured everything 4 different times and check three times to make sure they were slanted in the right direction – toward the vice! I made multiple cuts in each with the circle saw to remove waste material and then broke the veins of wood out before cleaning it all us with a sharp ½” bench chisel. I gave all the slim hardwood cut outs to my neighbor. He loves them for starting fires in his wood stove and he takes all of my lathe shavings for his garden to control weeds and add roughage to his compost.



A couple of weeks after I cut the dog holes, I measured and marked for the top pockets of the dogs. I then chiseled and cleaned the mouth of the holes, also cut at 5 degrees. It took me a couple of hours to do all twelve. I have had the sliding-T bevel pictured since I was 14 years old and I sometimes think that it is smarter than me...



I glued the first three sections up at the same time to get a dead flat point of reference for the rest of the sections. You can just barely see the pipe clamp in the middle of the 1st section all the way to the right. I used a string line to determine if there was crown and found that I had to pull this section down a little. There is a pine I-beam under the saw horse that I am pulling against. I used a LOT of glue on this project – almost 2 liters



The final sections of the top were glued up just before New Years Eve - using every single clamp I brought to France and more than a little ingenuity. I left all my 4' and 5' - $\frac{3}{4}$ " pipe clamps in Seattle. I found that I had to double up smaller clamps to span the width of the top as it neared completion. I glued the last two sections together with lots of pressure and then glued them to the rest of the top to ensure that both edge sections were bonded as tightly as possible as they will get the most abuse.



It makes my black heart more than a little happy to think about the look on movers' faces when they see this thing when they come to pack us out for our eventual move back to Seattle. Mwahahaha...

When I made the first dry-fit of the base to the top: Everything lined up, fit perfectly, and was as square as I could ask for. With that done & dusted, I drilled holes in the base sections for connector through-bolts and lag screws. I used a little beeswax on the lag bolts to ease their installation and lock washers on the through-bolts. Always use lube.

There is LOTS of hardware and some sweat, glue, blood, and curse words that hold this baby together. Add the weigh of the wood, all the hardware, the leg screws, and the end vice and the bench weighs over 400 pounds.

I signed and dated the bottom of my bench with my Dremel tool. Yes... I could have done it with my Swiss carving chisels, but I realized at one point that this bench is not a piece of Art Nouveau furniture. It is a tool and my time would be better spent getting it done and adding carved details to actual pieces of furniture.

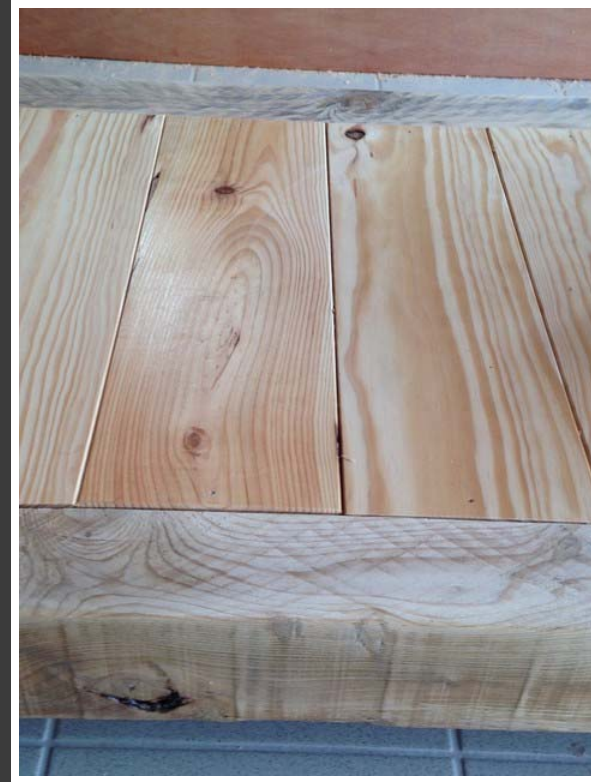
After carving/cutting the letters, I painted the whole thing black and sanded off the surface paint. If and when I do this again, I am going to paint the surface with clear paint or poly before carving and then spray colored paint. The black soaked into the pores of the wood and I spent a lot of time sanding.





I used a #5 Jack plane, then a #8 joiner and finally a #4-1/2 Smoother over the course of two evenings to get the top of the bench flat. There was lots of checking and rechecking with a level and multiple strait edges.

I haven't spent that much time and effort pushing a plane in years and my arms and back were kind enough to remind me of that fact for three+ days after.



I cut the base shelf cleats from 5/8" left-over pine decking and screwed them to the base stretchers without glue in case they ever needed replacing. I put them on while the bench was still upside down for ease of installation and then coated the whole base in two coats of polyurethane. I cut the 12 sections of 5/8" tongue & groove pine and put two coats of poly on them before mounting. I did not glue the tongues and groves together when installing and left about 1/16th inch between them for expansion. Each one only got 1 finish nail – pre-drilled – to hold it onto the base.



I cut off the sections of all thread to minus 1/4" of the width of the top and ground/filed the threads so that the nuts would go on and off without issue. I then drilled countersink pockets for all of the nuts to ensure a nice flat bench face. I used a Fostner bit, but because there were already large holes where I needed to drill, I had to use a jig to hold the bit in place while it made the initial cuts. I used a piece of scrap pine, clamped in place each time, and it worked out great.



We had lived in France for 2-3 months when we happened onto a junk shop near Limoux. While scrounging through the outdoor yard, I found an old work bench that was destined for the burn pile. I rescued the wormy leg vise and rusted vise screw. Treasure! I spent a little time unfreezing the metal parts and used the leg as a pattern for a new one built from laminated oak and beech



After laminating the new leg vise jaw, I used a lathe-mounted sanding drum, a circle saw, a hand rasp, and my block plane to do the final shaping, smoothing it all out, and added the edge treatments.

I countersunk the vise screw mounting plate for two reasons: to give the screw just a little more length of draw and because it just looks better that way! I hogged out most of the waste with a 1" Fostner bit and then used a ½" and a corner chisel to clean it all up.



Instead of a piece of wood with pin holes to support the leg, I decided to use a hunk of Acme threaded stock. It is not something that I have ever seen and thought it was an elegant solution to keeping the leg vise square when under a load



Because I wanted the vice to sit flush against the leg most of the time I had to inset the inside retention nut and washer

I used a Fostner bit and a circle saw to get to the right depth and removed the waste with a chisel. The support screw is mounted at the very end of the leg vise to provide as much mechanical advantage as possible.



With the leg vise in place, you can see the support screw and the vise screw as well as the overall leg profile.

What you cant see is the screw vise thread nut on the other side of the leg or the adjustment mechanism on the support screw. The latter is made from a lawn edger blade that is welded to a threaded nut which allows me to move it back and forth with my foot as I use the vise. The former is also inset into the leg – about $\frac{3}{4}$ " – to semi-capture it in place and also gain a little more usable thread length. It is installed with the corners pointing diagonally (thinks points of the compass) – just because I could - and I cut an oak board to hold it in place, but also allow it to float a bit. A little bit of float will keep it from binding and make the screw work more smoothly



My holdfasts were salvaged from the same junkshop near Limoux where the vise screw was sourced, but on a subsequent visit. I cleaned the posts and the pad where they will touch wood with a steel brush and then a brass brush to remove the decades of rust. Both as forged and are neither metric nor standard in diameter. I had to drill their holes and then whittle away for a proper fit with a round cabinet rasp. There are 4 holes in the right base leg for the smaller holdfast and three in the top for the larger one.



After months of miss-starts, I installed (2 hours of cutting, drilling and chiseling) a pricey German-made cast iron end vice that I got on 65% sale and made wooden vise handle out of 2 sections of cherry that were in the firewood pile.

I didn't want a permanent bench-hook so in the design phase of the build, I figured out a way to make a removable one. I had planned on turning down a broken baseball bat and laminating up some beech scrap for a square stop, but after checking the fit of the turned taper on the bat, I decided to just use it alone. The thing works great and I ended up using it to plane two boards even before the bench was finished.



I wanted it to be removable because I sometimes want to clamp up some really long stock and a fixed one would be a hindrance to that. When not in use it sits on the base shelf behind the leg of the leg-vise.



A picture of me the afternoon that I installed the leg vise – I was super proud that day. The shot to the right is picture of my long suffering wife atop the bench.



And done... It seemed like it took me forever, but it fits perfectly in the shop and I started using the bench even before it was finished. You can see the re-built miter saw and my French Cleat organization wall in this shot as well. Am very happy with the outcome and am currently working on projects that have been piling up all winter.

Matt Talley
Cornebarrieu France
March 2015

Parts/Material Used:

Costs:

8 – 10X80mm machine bolts	\$6.00
8 – 10X70mm lag bolts	\$5.00
7 – 10X700mm all-thread	\$20.00
4 - 500ml bottles of glue	\$35.00
22 – 10mm nuts	\$2.00
38 – 10mm washers	\$2.00
3+ feet of 5/16 th oak dowel	\$8.00
4 – 3.8mmX40cmX250cm beech countertops	\$480.00
4m of 10X10cm pine or hardwood planks	\$25.00
1 cast-iron tail vise	\$120.00
1 steel leg vise screw	\$20.00
2X10X40cm section of plank	\$65.00
8m of 2X16cm tongue and groove subfloor pine planks	\$15.00
50+ finish nails	\$3.00
1 liter of water-based of matte-finished polyurethane	\$34.00
20+ #8X45mm woodscrew	\$10.00
1 pure beeswax candle (screw lube)	<u>\$3.00</u>
	\$853.00 Total

Tools that I had to buy:

Costs:

1" Fostner bit	\$6.00
¾" Fostner bit	\$6.00
12mm auger bit	\$15.00
Circle saw	\$70.00
20mm spade bit	\$4.00
32mm spade bit	\$4.00
6 - 4' bar clamps (Didn't need. Wanted)	\$400.00*
2 - 4' F-clamps	\$55.00
2.5" (54mm) hole saw	\$25.00
2 Metal cutting blades for reciprocating saw	<u>\$20.00</u>
	\$205.00 Total*

**Again, I didn't need the bar clamps, but I wanted them and they made the job easier. They shouldn't be counted in the total cost though.*

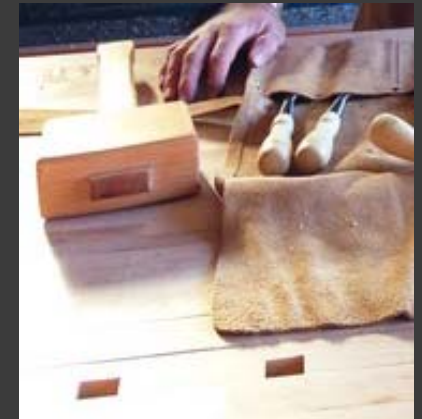
Steps to Build the Cornebarrieu Bench:

1. Source the inter webs and books for the "perfect workbench."
2. Design a hybrid version based on designs by Chris Schwartz and Norm Abrams.
3. Write a blog post about your plans and then do nothing for 3 months.
4. Find two antique hand wrought iron bench dogs at a junk shop near Limoges, France - one to the top and one for the legs
5. Buy them as a set for ~\$15.00 and run away trying not to laugh manically as you have just SCORED!
6. Redesign and second guess 6 more times.
7. Add some bells and whistles just because you can/should
8. Obsess over the tail vise design
9. Buy lumber for base from local shop that sells roof beams
10. Overload car roof rack by 200% and drive SLOWLY home, silently praying that the cheap OEM roof rack will hold
11. Let base lumber sit in garage for 5-6 months to dry and stabilize.
12. Search for months - really - for a shop in the 4th largest city in France that sells a bench vise
13. Fail utterly - use amazon and wait
14. Bitch about it online while drinking 1/2 a bottle of wine.
15. Measure and mark legs and stretchers.
16. Measure again.
17. Remark to fix what would have been MAJOR screw-up.
18. Cut all parts and hog out lap joints with circle saw.
19. With chisel and mallet, flatten out and finish lap joints.
20. Drink a beer after and dream about buying a timber framing slick (huge heavy chisel)
21. Buy four 1.5" thick x 27" wide x 8.5' long beech counter top from local home center
22. Over load roof rack again. Another slow drive and prayer.
23. Find a spot in tiny shop for all the new heavy crap
24. Wait two weeks because of laziness and work travel to start on the top
25. Cut five 5" wide sections with battery power circle saw out of first top
26. Run down six 18vt batteries - twice
27. Decide to buy a plug-in circle saw before 3 other tops sliced up
28. Make a template for all holes, leg cuts, and end vise cut-outs
29. Mark cut sections, drill, and saw accordingly.
30. Obsess over getting all the all-thread holes perfectly vertical.
31. With protractor and sliding T-bevel layout 16 dog holes on 3rd top section at 4-5 degree forward slanting angle (a la Norm Abrams)
32. Re-mark so that slant is pointing in correct direction.
33. Cuss a little.



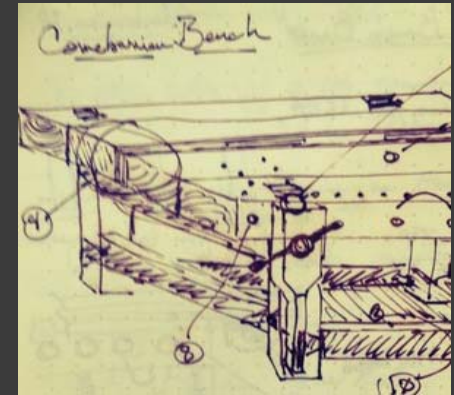
Steps to Build the Cornebarrieu Bench:

34. Rough cut all dog holes with battery circle saw - it will take 5 batteries.
35. Finish with mallet and SHARP chisels
36. Drink 2 beers after
37. Wait 30 days due to work travel, a birthday and the delivery of tail vise
38. Realize that you have to recut the tail vise section of top - published specs wrong.
39. Say dirty words, leave it be for another day and have at least one beer.
40. Glue final top sections just before New Year 's Eve - using every single clamp that you brought to France and more than a little ingenuity.
41. Tail vise never arrives: On back order for months. Give up and buy exact same one while traveling for work.
42. Install (2 hours of re-cutting, drilling and chiseling) a pricey German-made cast iron end vice that I got on 65% sale – was missing two small metric bolts and the wood handle.
43. Make final leg cuts: the tenons that go inside the bench top.
44. Put 5/16 oak dowels in to the pieces that have cracked, even a little, to make sure that the cracks do not spread.
45. Give all the base parts an 80 grit sanding.
46. Really like the sawmill marks on some of the pieces.
47. Decide to put clear poly on the base instead of milk paint to preserve the marks.
48. The legs and stretchers will shrink and warp just a touch in the six months since being cut
49. It will be fine and could have been worse.
50. Make the first dry-fit of the base to the top:
51. Angels will sing if everything lines up true and square.
52. Drill holes for connector bolts and lag screws.
53. Install 3/4" X 6" base shelf cleats with counter sunk screws
54. Cut the 12 sections of 5/8" tongue & groove pine that will be the base shelf
55. Sand base with 120 grit paper
56. Apply 1st coat of poly to base
57. Cut in name and date built on bottom of top with Dremel tool
58. Find spelling error
59. Walk away and drink heavily – Scotch most effective in this situation
60. Chisel out offending letters next day when sober and redo
61. Paint signature black and sand off the flat surface, leaving black letters
62. Apply 1st coat of poly to base and bottom of the top.
63. Let everything sit for 4 weeks while work goes insane and you fly a total of 43,000 air miles
64. Cut and whittle on one leg to make the whole base level.
65. Get neighbor and his son to help flip the monster over



Steps to Build the Cornebarrieu Bench:

66. Once right side up, realize you took too much off leg you cut.
67. Make an oak wedge while muttering hateful oaths
68. Start flattening the bench top with a #5 Jack plane.
69. Check progress with straight edge and winding sticks obsessively - this will take two evenings.
70. Trim excess the all-thread after the 4th time you stab yourself in the baby-maker while walking around the bench trying to flatten it.
71. Complain loudly to wife about your back, triceps, and shoulders after the jack plane kicks your ass. You might get some sympathy and a back rub.
72. After two days of rest, move to next step in flattening process with a hugely heavy cast iron #8-1/2 joiner plane.
73. Finish off with a super-sharp #4 flattening plane.
74. Marvel at the thin shavings of beech.
75. Use beech scrap to make the end vise block
76. Cut two dog holes BEFORE you glue together or you will have to use to more scrap pieces to do it all again...
77. Install end vise block onto screw and tight up to bench.
78. Level with bench top to using above mentioned plane sequence
79. Trim both ends of Bench to make them square
80. Ease all corners with block plane and a file
81. Use wormy 100+ year old leg vise for a pattern and cut one side from oak and one from beech
82. Glue two halves together.
83. Sand and shape leg vise
84. Coat with polyurethane
85. Drill holes for vise screw in bench leg and new vise. Measure for placement 4 times.
86. Measure and mark screw vice inset on front of vise leg.
87. Remove material and install vise – use beeswax screw lube and predrill holes.
88. Drill support screw nut inset on inside of vise leg and matching inset on base leg.
89. Test for fit.
90. Mark and remove material for vise screw retention nut.
91. Install retention nut and add keeper plate made from oak.
92. Make sure that the retention nut free floats.
93. Add a little grease to all the threads on the vise screw and the support bolt.
94. Install the leg vise and marvel at your shear luck
95. Don't push that luck. You are done fore the day. Go have a beer.
96. Remove one all-thread section at a time and drill for bolt and nut inset with 1" Fostner bit.
97. Do not remove all of the all-thread at the same time!



Steps to Build the Cornebarrieu Bench:

98. You will need a jig for the drilling and you will need to sink the bit between $\frac{3}{4}$ " and $\frac{7}{8}$ " into the bench side
99. Trim all-thread to a length $\frac{1}{4}$ " less than the width of the bench top.
100. Clean up the ends with a file or grinder
101. Reinstall bolt and washers on both sides and tighten down whole thing.
102. Repeat whole process 6 more times
103. Coat the base, bench shelf, and sides of the top with a coat of polyurethane
104. Let dry for 2 weeks while you do a stupid amount of traveling for work.
105. Turn the end vise handle from a hunk of cherry firewood.
106. Obsessively check the fit with calipers while turning.
107. Turn second end knob for handle out of more cherry or oak scrap – pay special attention to inside hole diameter.
108. Apply walnut oil to the handle, except for 1" on end where second knob will be placed.
109. Use hide glue to install 2nd end now and place stainless, counter sunk screw through end via a pre-drilled and countersunk pilot hole.
110. Install leg vise and go inside and kiss wife, eat a cookie, and have a beer with dinner.
111. Level with top of leg vise to the bench to using above mentioned plane sequence
112. Drill hold fast holes in right leg and bench top after obsessing over correct placement for months
113. Your Cornebarrieu Bench is done and you spent \$1058.00 in material and tools. Way less than buying a comparable bench.
114. You learned all sorts of stuff, still have all your fingers, and your wife still loves you.
115. Go build cool shit on and with it!

