Model Shipwrights
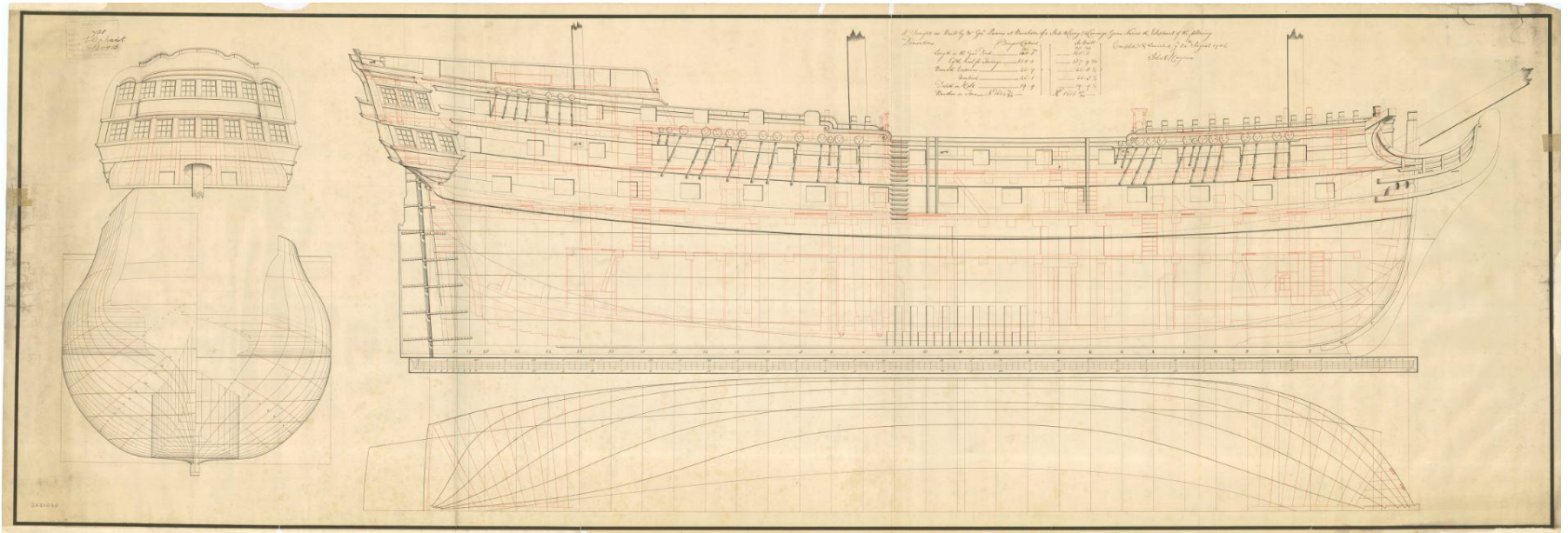## of Niagara

TRACING IMAGES WITH CAD
(COMPUTER AIDED DRAUGHTING)

by Alan O'Neill
for the 9 December 2018 meeting

Download a FREE 2D CAD Program from the Internet

Start by opening a new
template sheet to draw on.
Pick FILE and NEW and finally a
Template type
(I used the Standard Template)

DraftSight - [NONAME_2.dwg*]

File   Edit   View   Insert   Format   Dimension   Draw   Modify   Toolbox

New...
Open...
Close

Save
Save As...
Export

Publish eDrawings

Sheet

DraftSight

File   Edit   View   Insert   Format   Dimension   Draw   Modify   Toolbox   Tools   3D Mouse   Window   Help   Try DraftSight Professional

Properties

No Selecti

General

1.0000

ByLayer

PrintStyle

monochrome.ctb

None

View

Specify Template

Computer ▸ Local Disk (C:) ▸ Users ▸ Owner ▸ AppData ▸ Roaming ▸ DraftSight ▸ 11.2.001 ▸ Template

Organize ▾   New folder

DraftSight
  Template

Favorites
  Desktop
  Recent Places
  Downloads
  Dropbox

Desktop

Name	Date modified	Type	Size
standard	14/04/2015 10:50 ...	AutoCAD Template	31 KB
standardansi	14/04/2015 10:50 ...	AutoCAD Template	31 KB
standardbsi	14/04/2015 10:50 ...	AutoCAD Template	31 KB
standarddin	14/04/2015 10:50 ...	AutoCAD Template	31 KB
standardgb	14/04/2015 10:50 ...	AutoCAD Template	32 KB
standardgost	14/04/2015 10:50 ...	AutoCAD Template	31 KB
standardiso	14/04/2015 10:50 ...	AutoCAD Template	31 KB
standardjis	14/04/2015 10:50 ...	AutoCAD Template	32 KB

This is the Standard Template.
Note the ORTHO and ESNAP buttons at the bottom.
ORTHO aids in moving vertically and Horizontally. ESNAP automatically picks the line end, middle, or perpendicular to a line, and many other helpful points of a line.

HELP is accessed from the top pull down menu
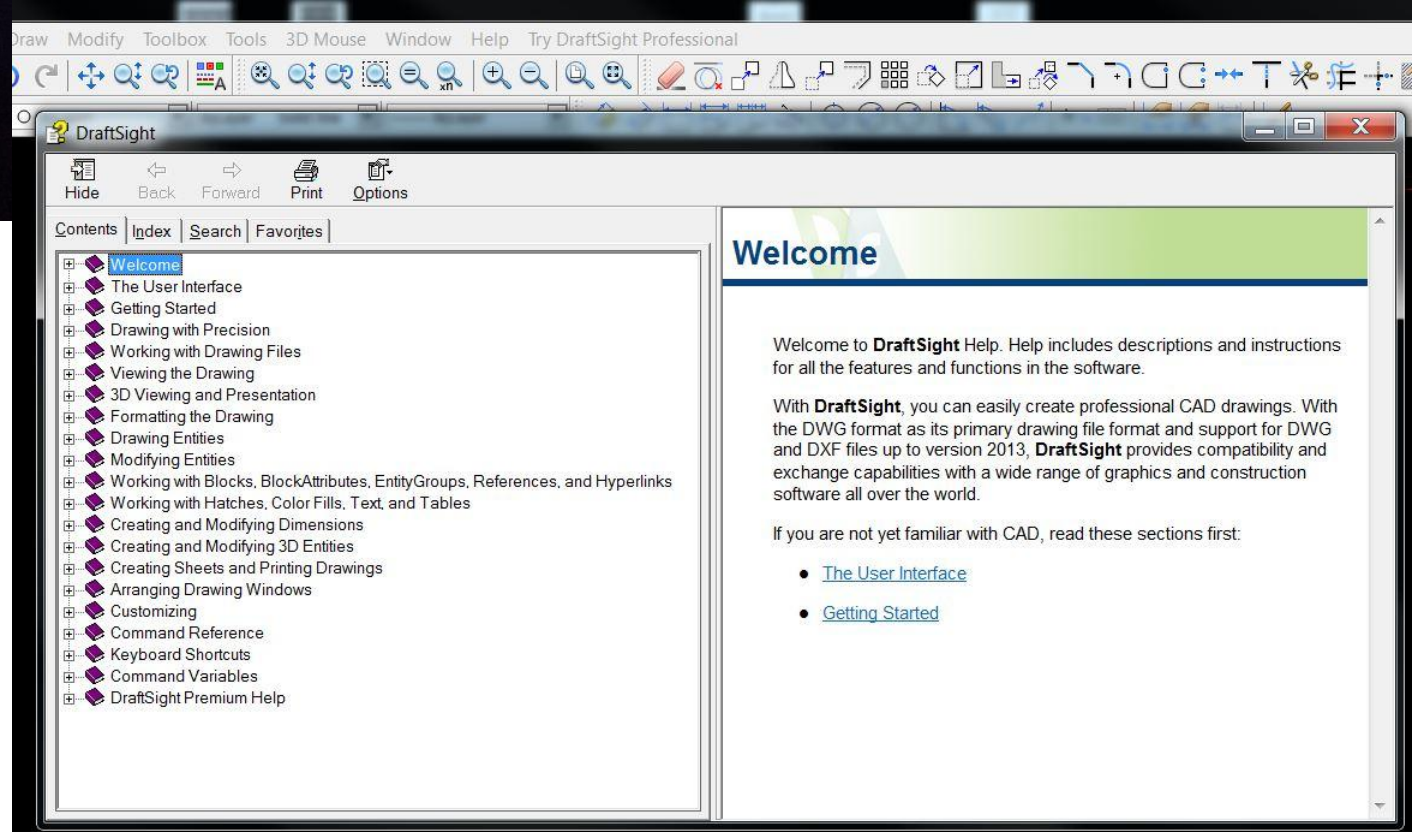
For our example we are going to trace an 71 Lb Bower anchor

Pick and Insert the image
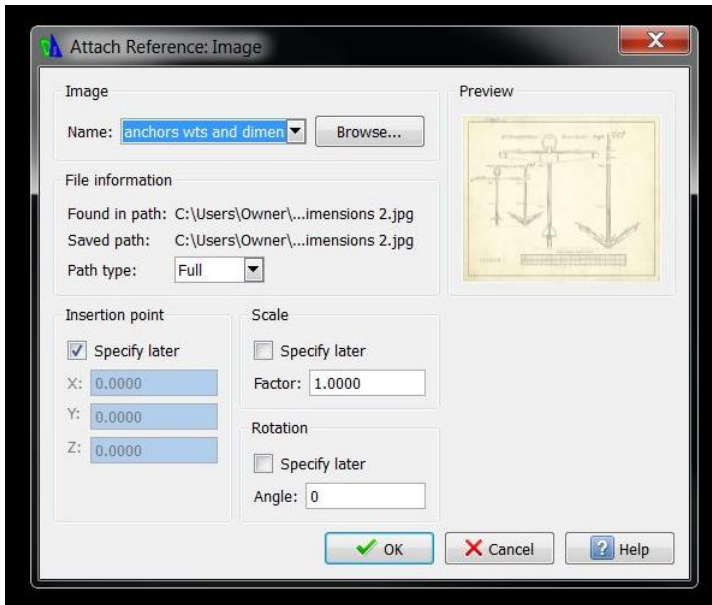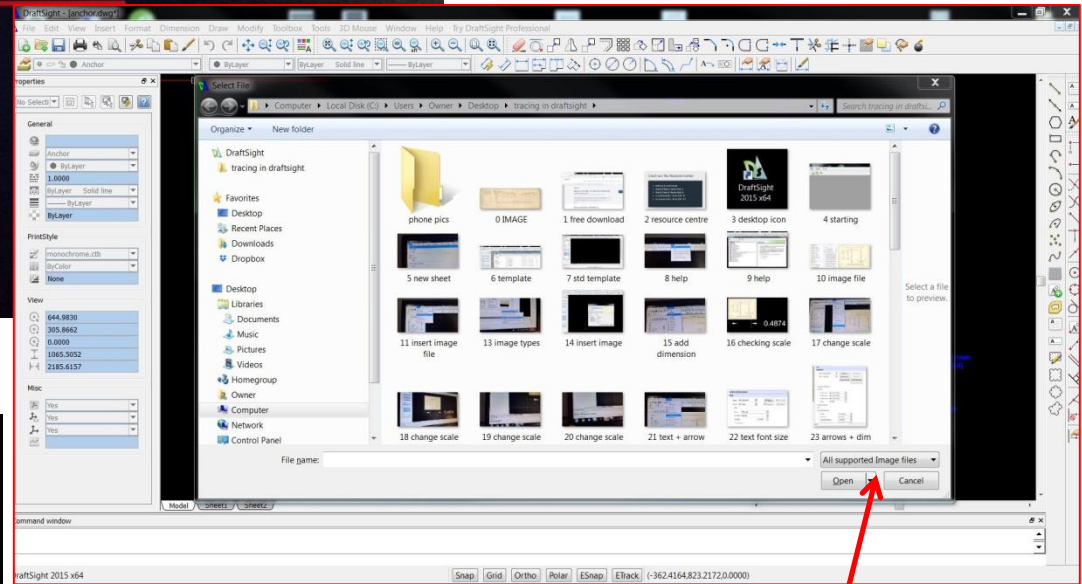
Insertion (Base) Point (X, Y location)
should always be 0,0
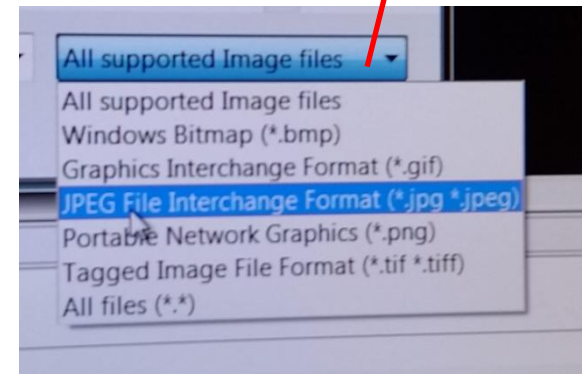
Always draw FULL SIZE

Check the image size by adding a known dimension.
Our drawing conveniently supplies a 20 foot scale to measure to.
All items drawn should be at full scale (1:1).
We are drastically undersize by:
(20'x12)/.4874"
= **492.24086992 times**
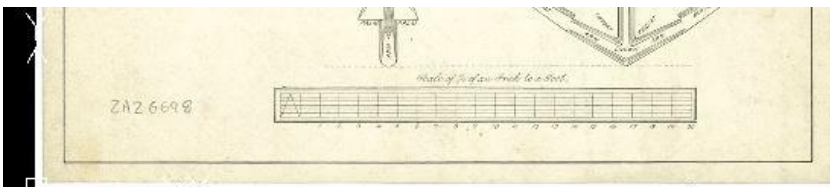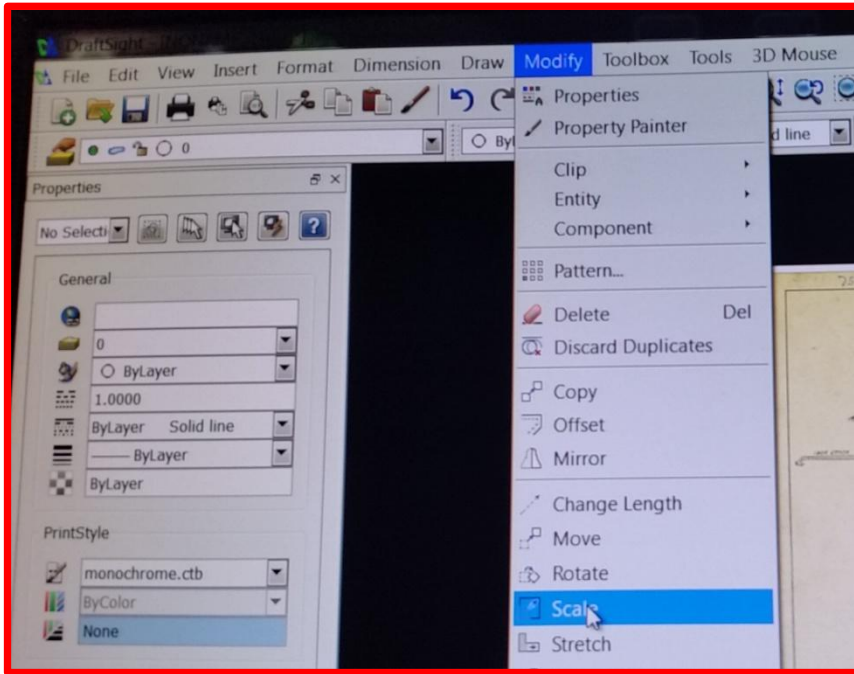
Change the scale of the image.
Select everything on the drawing sheet.
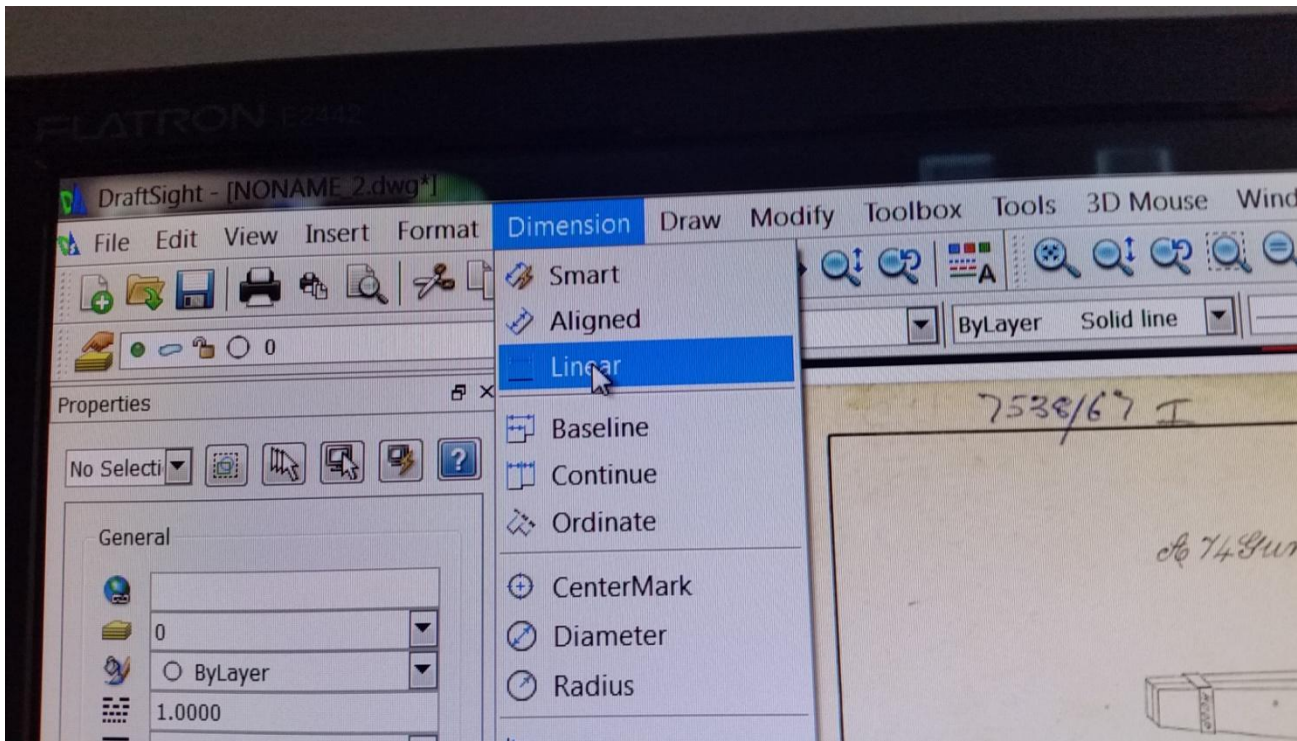Enter the X,Y location of the base point = 0, 0.
Enter the new scale factor = 492.4etc

0.4874

2 found
Specify base point»
DraftSight 2015 x64

Model / Sheet1 / Sheet2

Options: Reference or
Specify scale factor» 492.4086992
DraftSight 2015 x64

Model
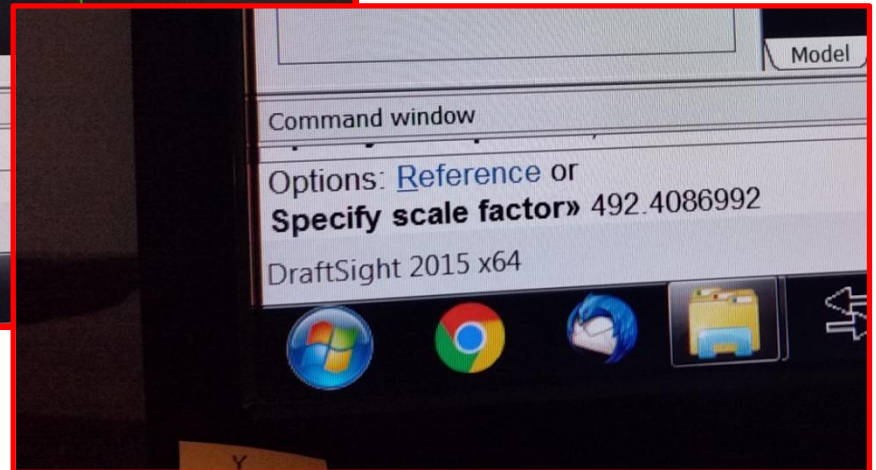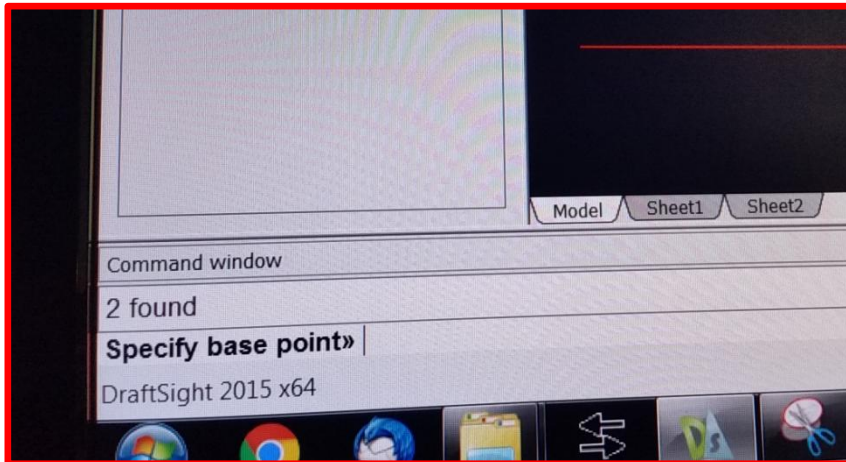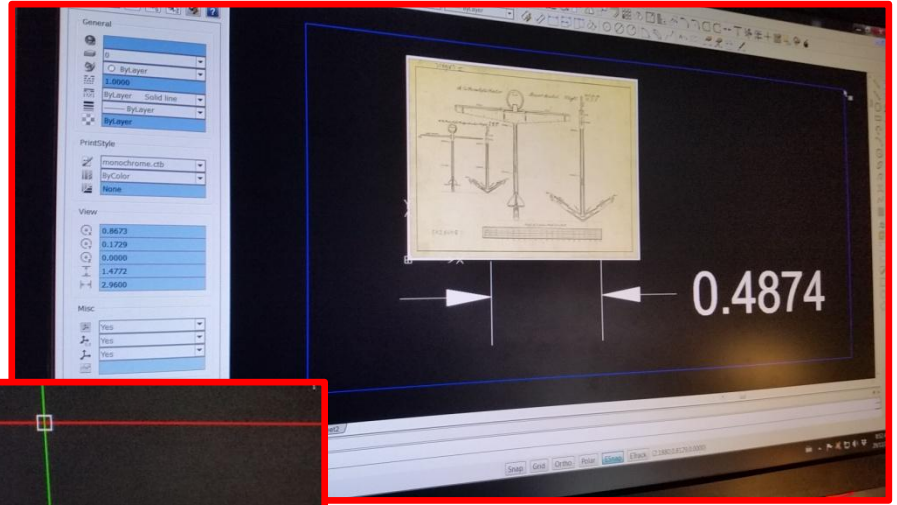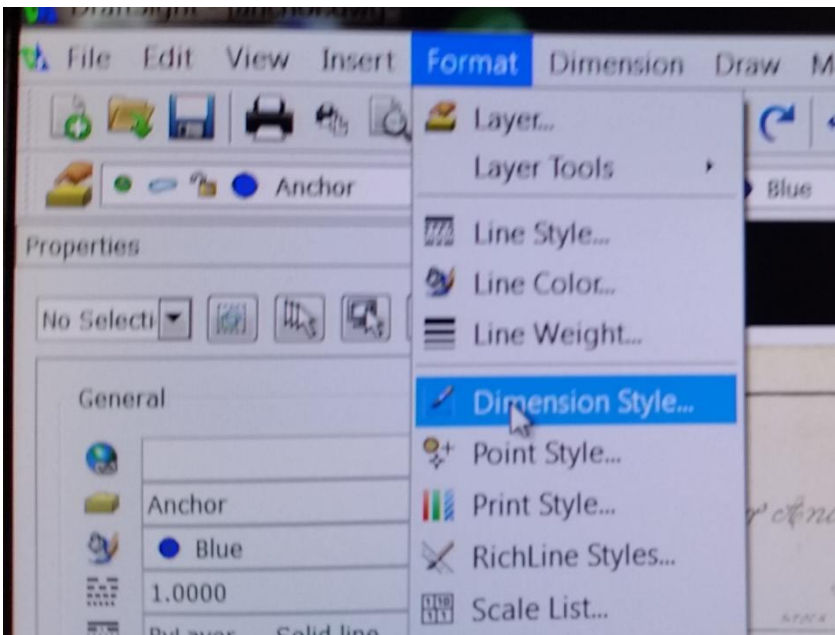
The dimension text will be too small to read and the dimension line arrow heads will be too small also. These need to be resized for the scale.

From the top pull down menu pick FORMAT and DIMENSION STYLE. You will be able to access and change the text height and arrow head size.

Scale of ¼ of an Inch to a Foot.

20'
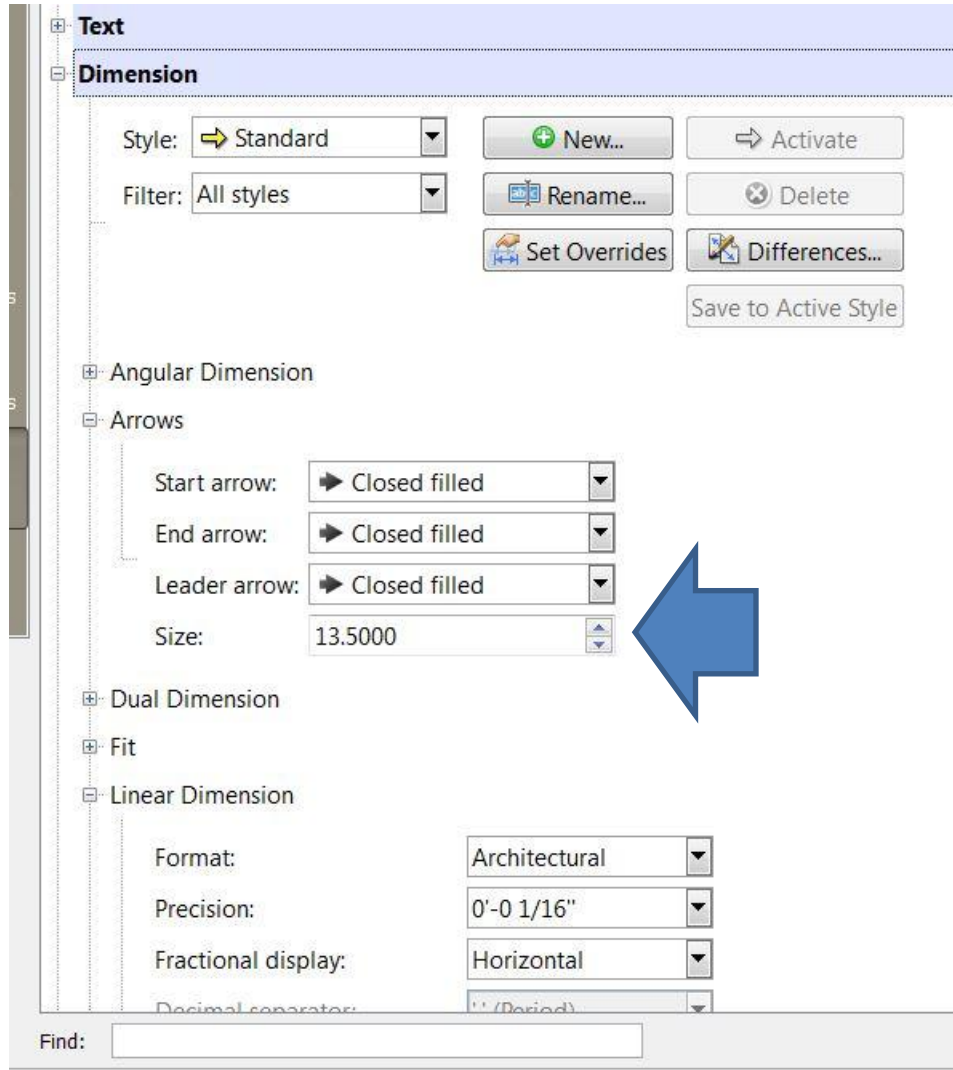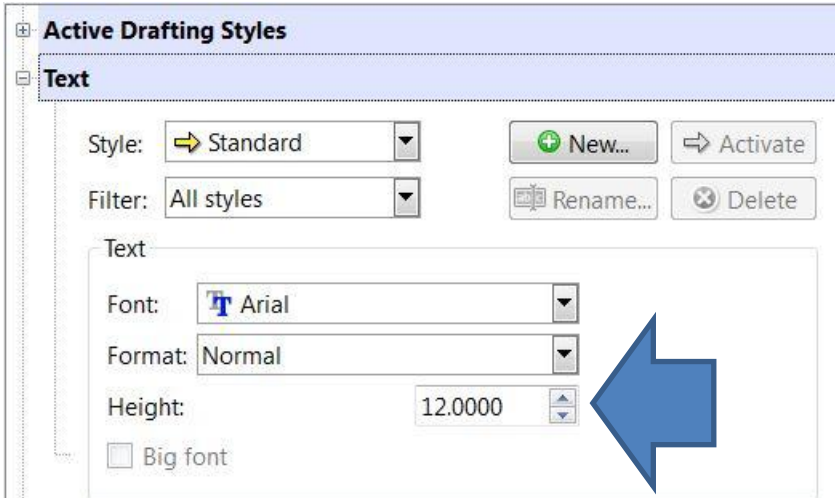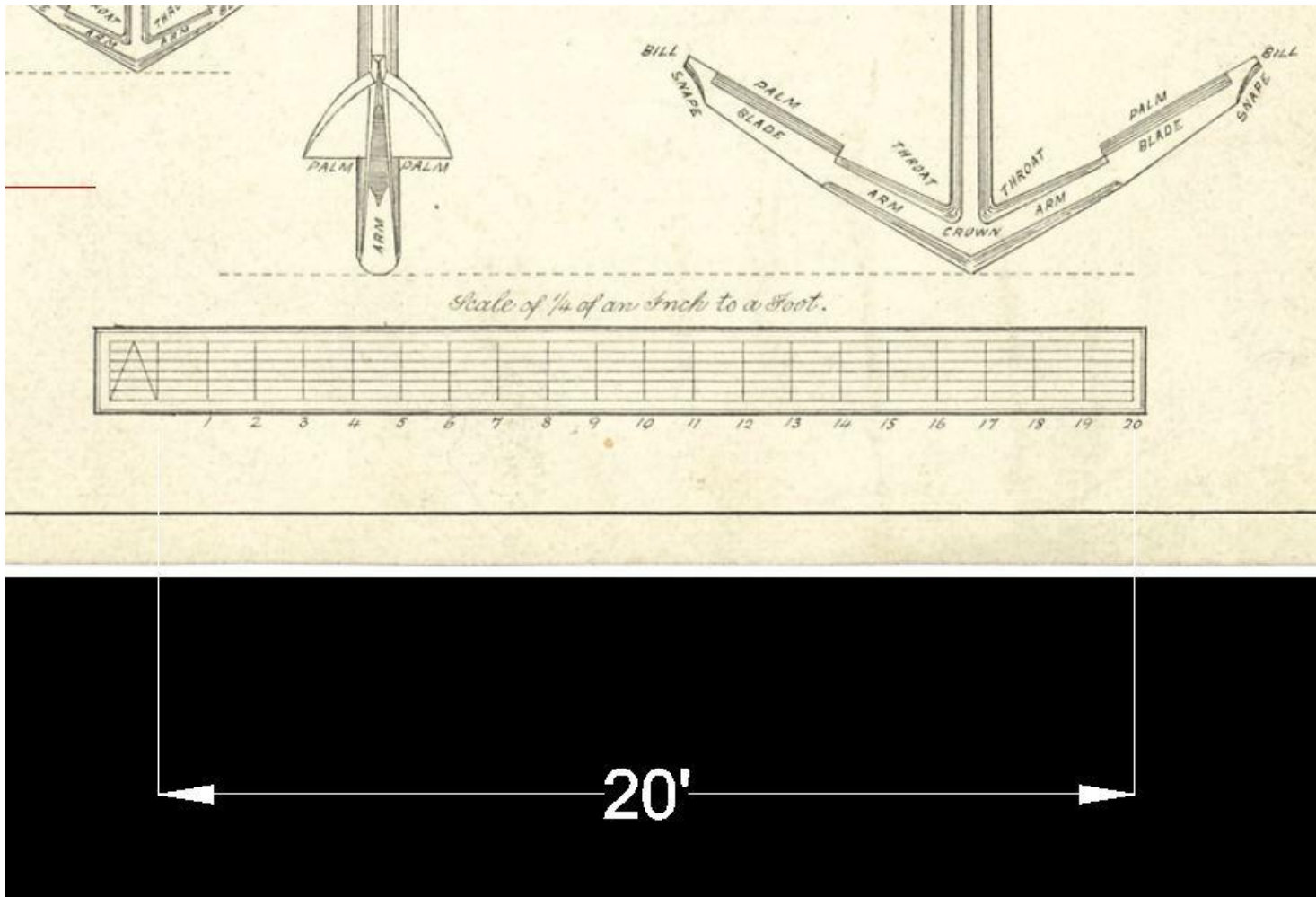
Now you can read the dimension at the proper FULL SIZE scale
and see the dimension arrow heads.
The white dimension leader lines are indistinguishable over the image.
This can be fixed by changing the colour!
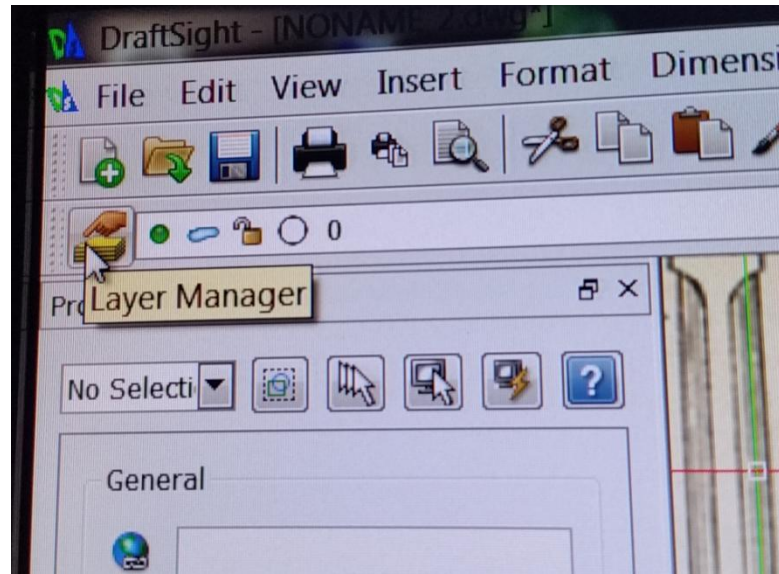
There are two ways to change the line colour.
OPTION ONE:
Create a NEW LAYER and set the new colour as shown here by accessing the Layer Manager.
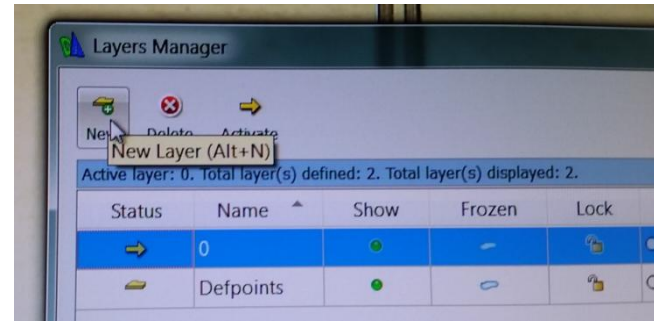
Rename our new layer ANCHOR and then change the Line Colour.
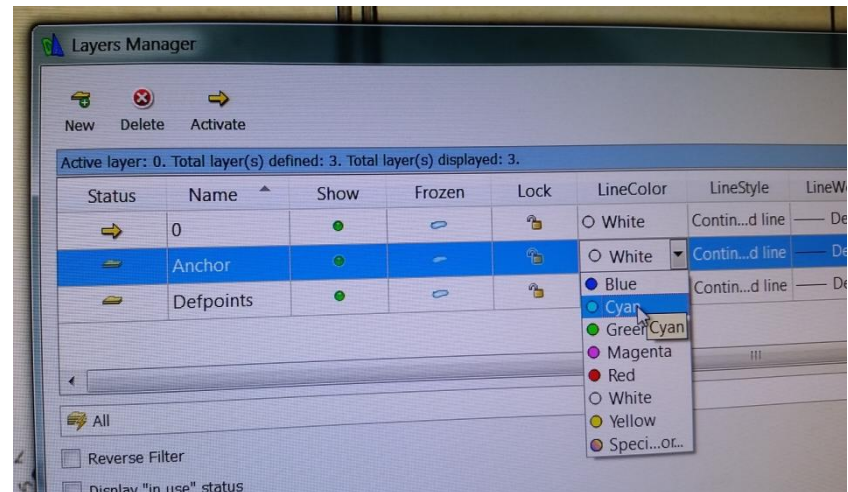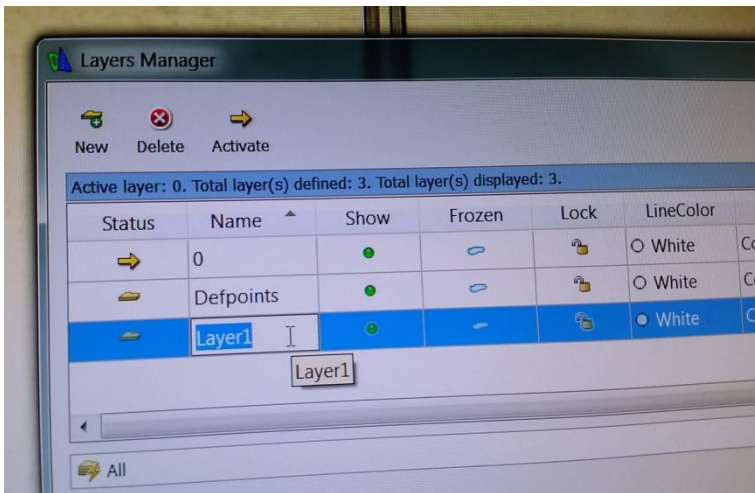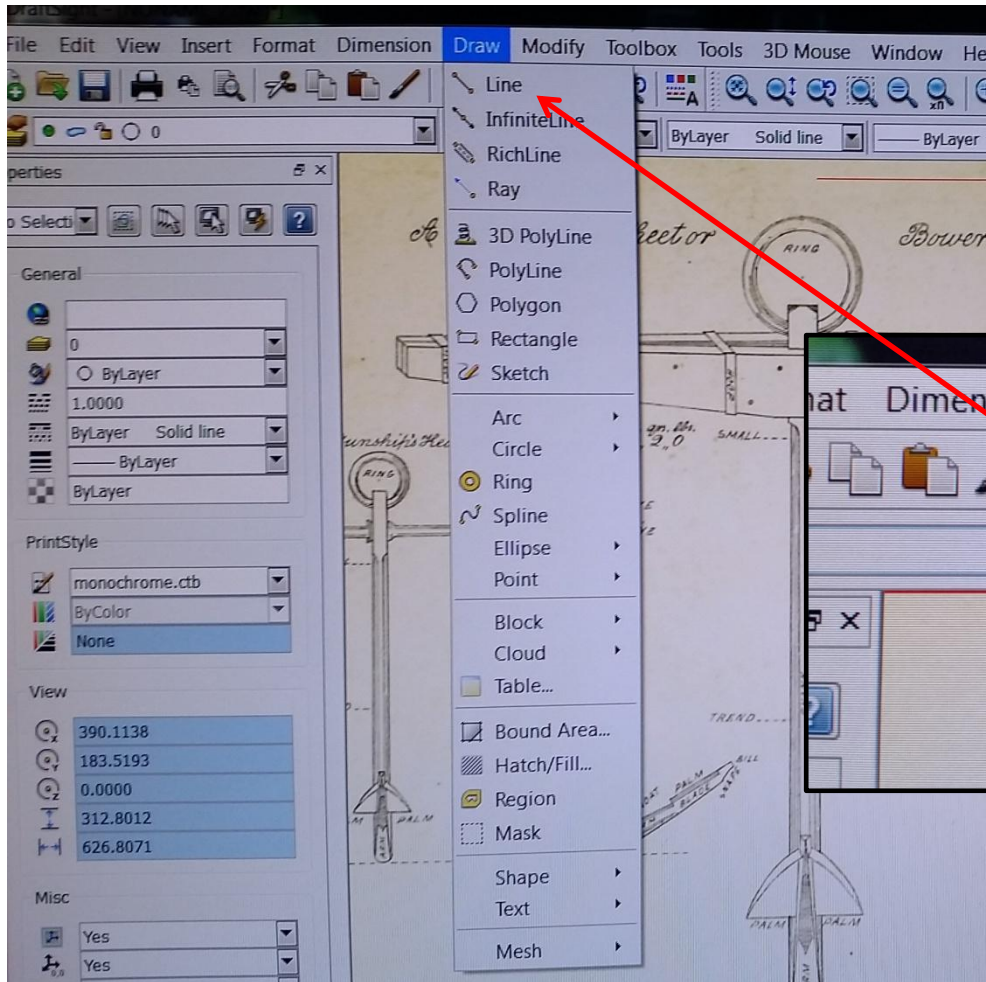
Now we are finally ready to start tracing the image!

We will start with a straight line.
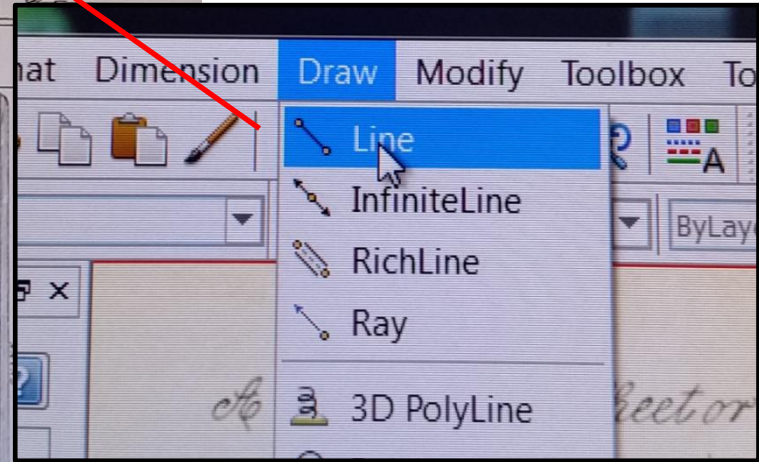
There are many styles or types of lines to use, (straight) Lines, unstructured curved (Splined) lines, Arcs, PolyLines (many short straight lines joined as one), Circles, Ellipses, etc...
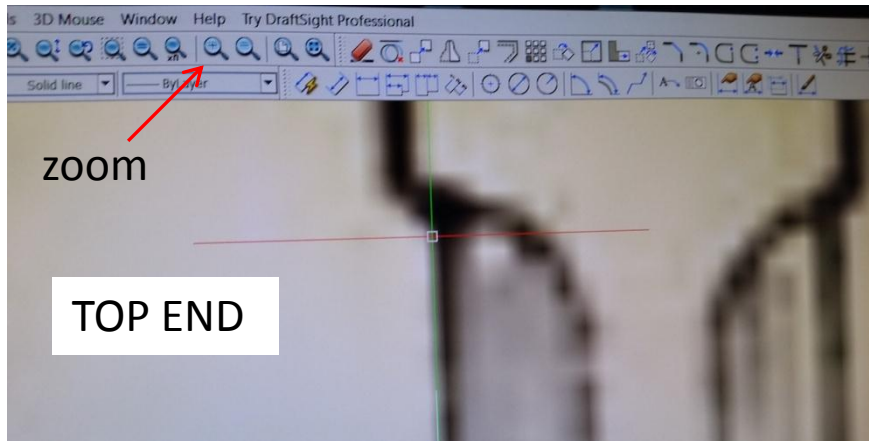
zoom

TOP END

Zoom in and locate the cursor cross hairs over the lower edge of the shank trend at the throat by the crown, then pick the upper edge to create the straight slightly leaning line.
Repeat at the top end.

Top End

Blue line

First pick point
at throat
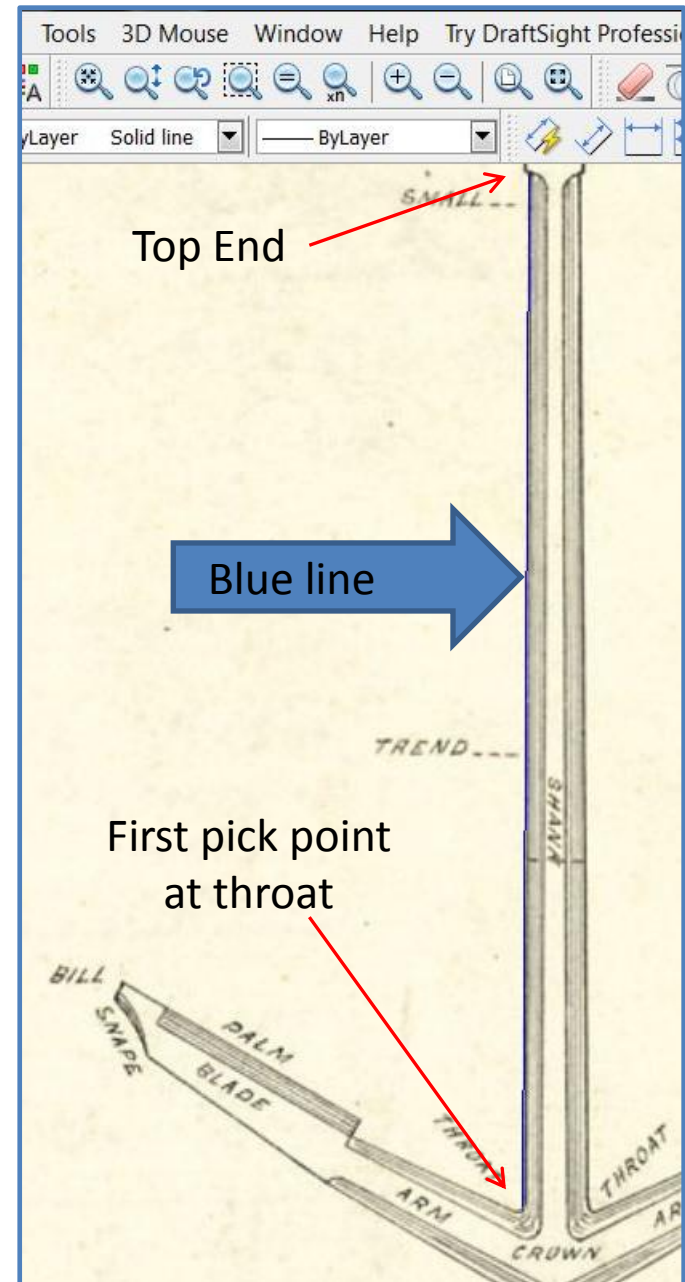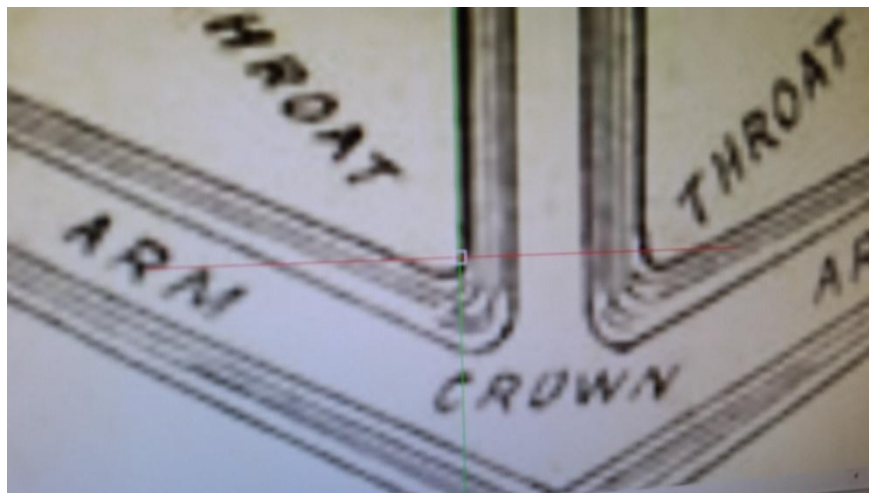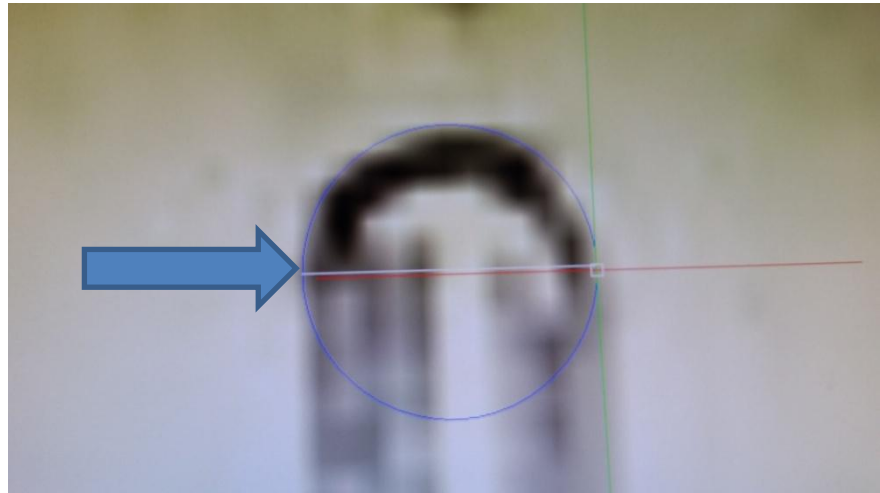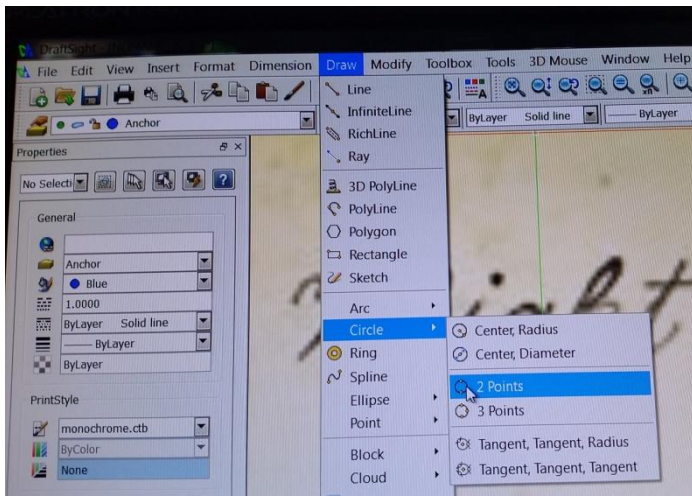
Tracing the ring, we start drawing the circle to get the radius at the top.

From the upper pull down menu pick DRAW, CIRCLE, and then 2 POINT.

Simply pick the left and right horizontal extreme points.

We then simply COPY this circle to the lower position.

HINT: the ORTHO button at the bottom of the screen helps keep the circles perfectly aligned.
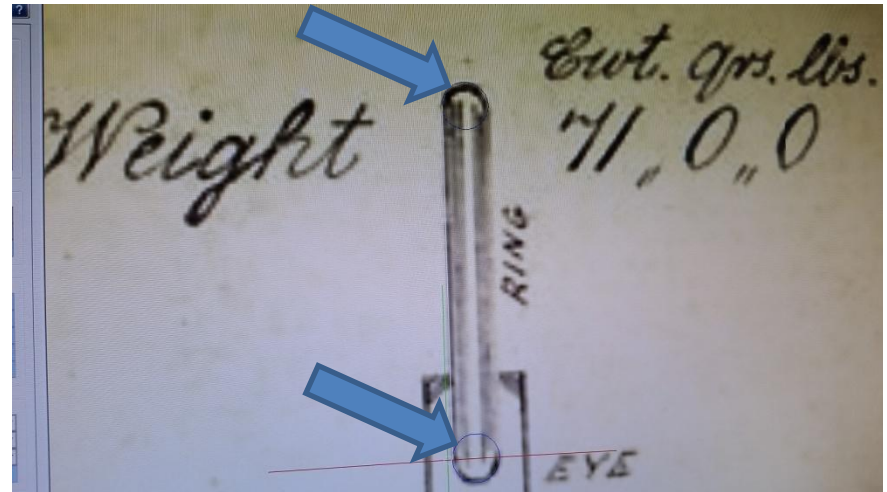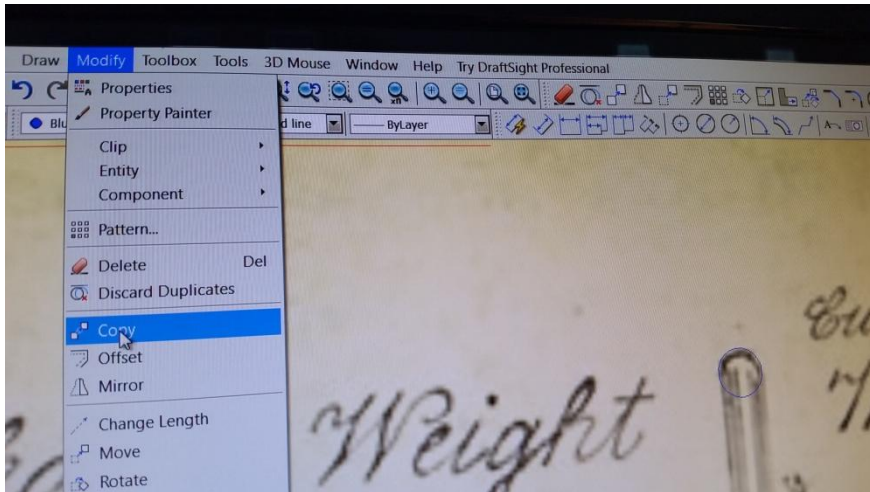
Next we trace the straight vertical lines similarly as done earlier.

HINT: the ESNAP button will assist the cross hairs to lock onto the circle quadrant to start and finish your line.

Quadrant point
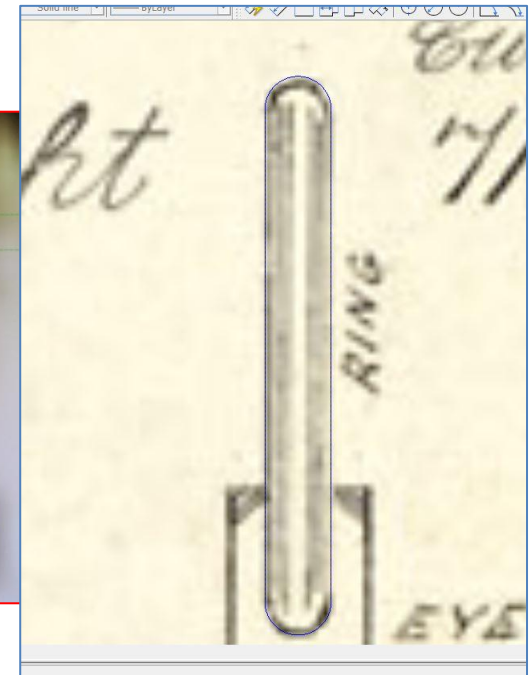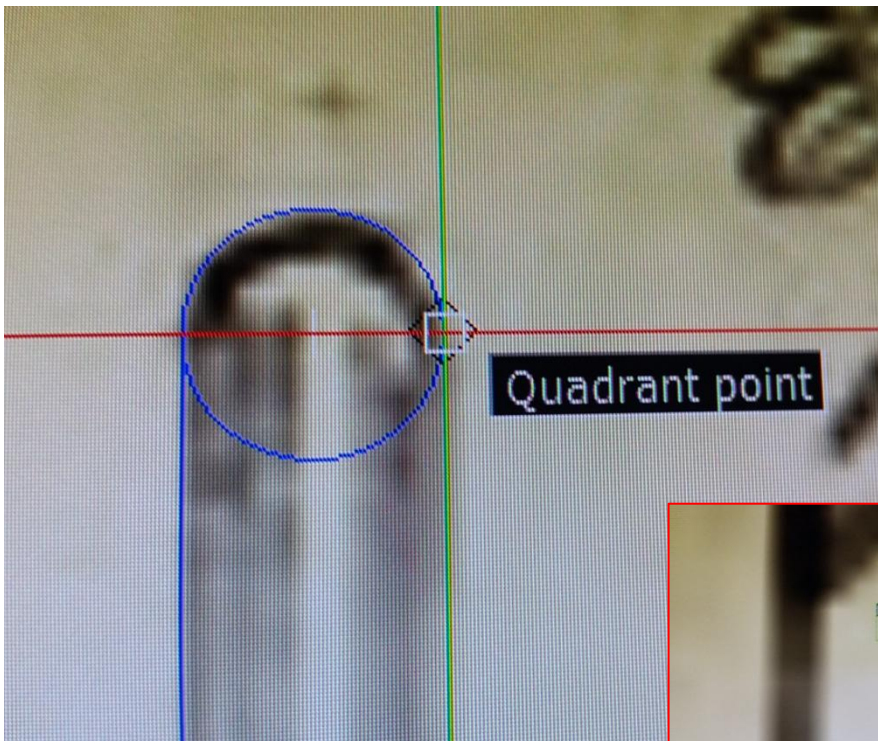
Finally we TRIM away the inner part of the circles by picking the TRIM command, picking the lines to trim <u>from</u> and then the lines to trim <u>away</u>.
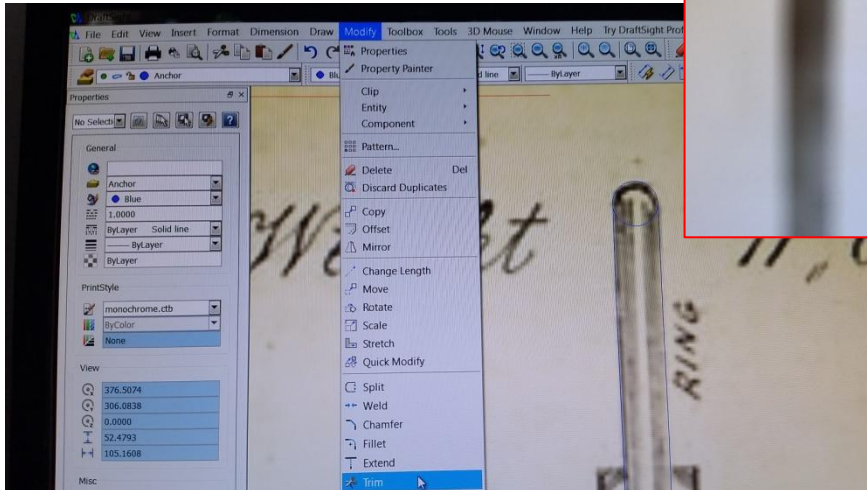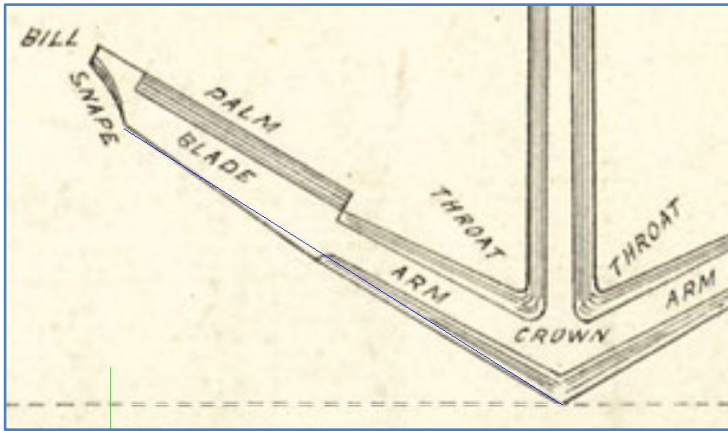
The lower portion of the ARM and BLADE cannot be traced with a straight line as it is curved. I tried an ARC and it did not fit.

We need to use a POLYLINE to follow this curve. The PolyLine is a series of connected straight lines.
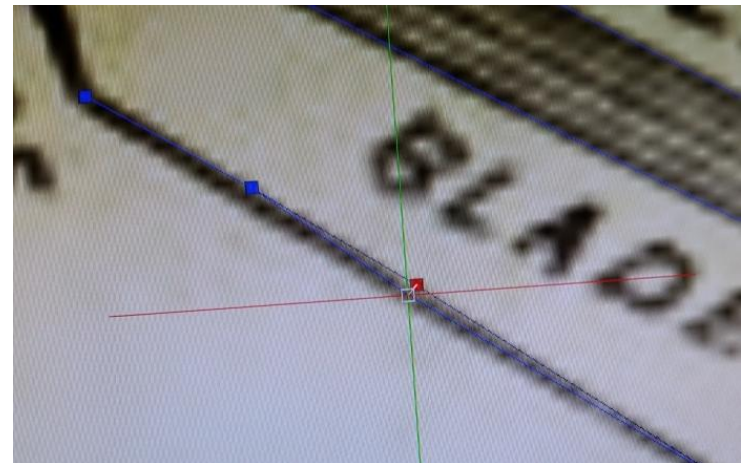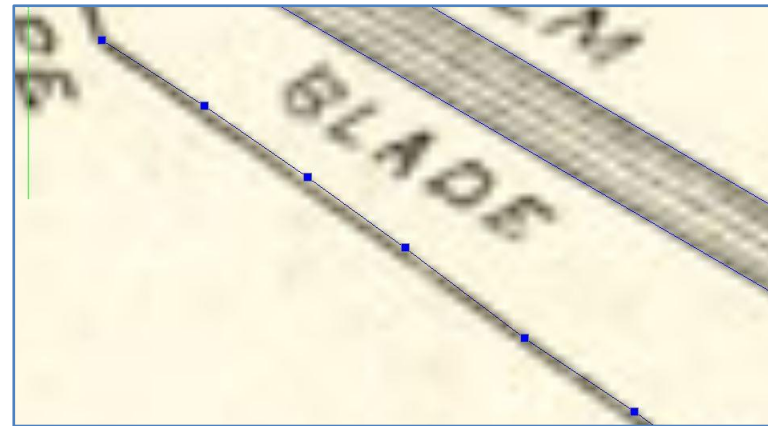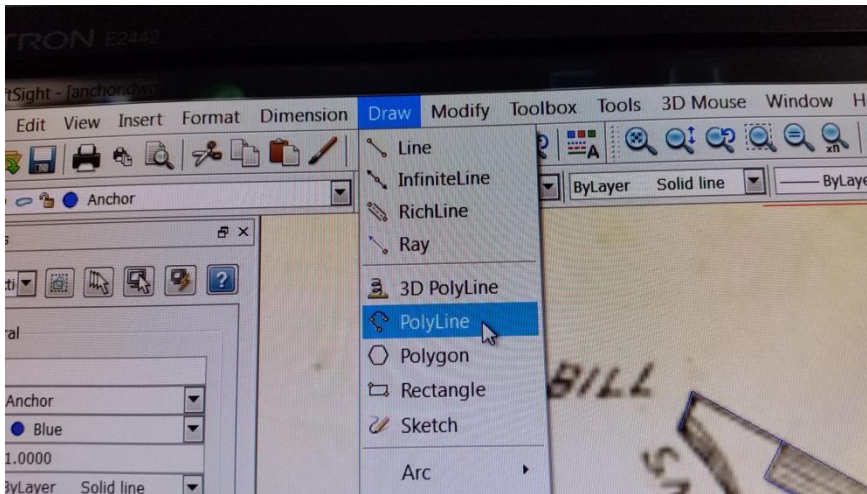
The individual PICK points (nodes) are displayed as dots and they can be picked (colour changes from blue to red) and dragged to a new location for better alignment.
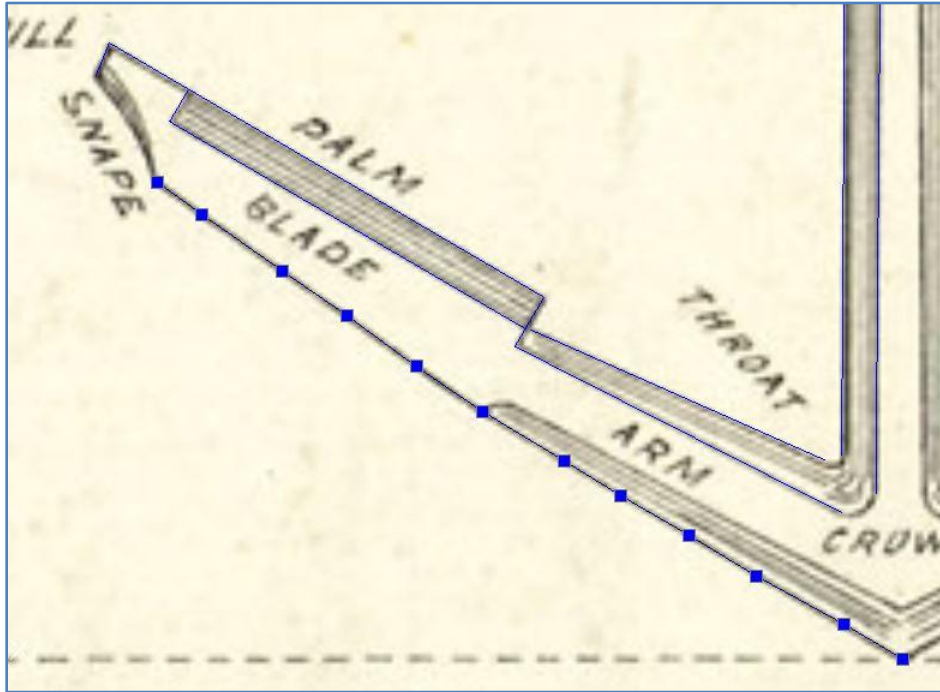
To the left is the completed PolyLine.

PolyLines can be joined, made wider, and splined. Splined means to changed the continuous series of straight lines into one smooth curved line.

This is done by typing PEDIT (PolyLine Edit), picking the single PolyLine or M for Multiple and then picking them, and then on the prompt typing S for Spline. Pick ENTER and the line will be Splined.


```
Command window
: pedit
EDITPOLYLINE
Options: Multiple or
Specify polyline»
Options: Close, Decurve, Edit vertex, Fit, Join, Linegen, Spline, Undo, Width or eXit
Specify option» s
Options: Close, Decurve, Edit vertex, Fit, Join, Linegen, Spline, Undo, Width or eXit
Specify option»
: ._MAINSELECT
```
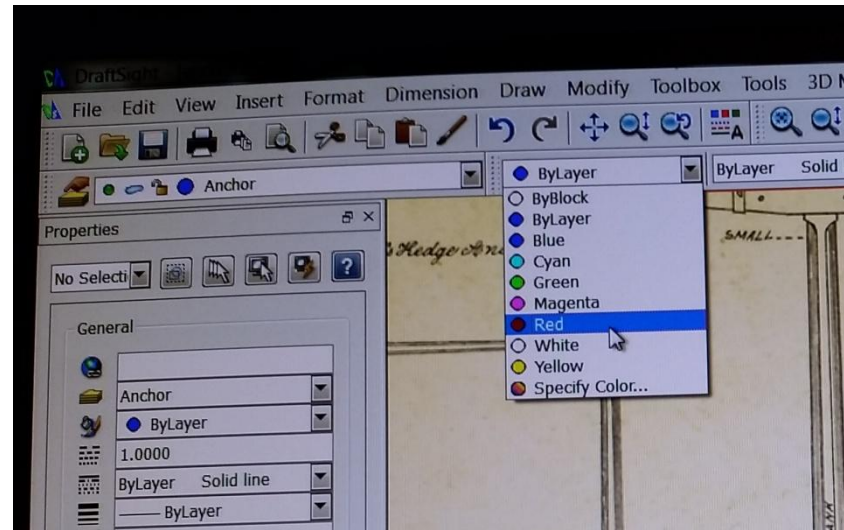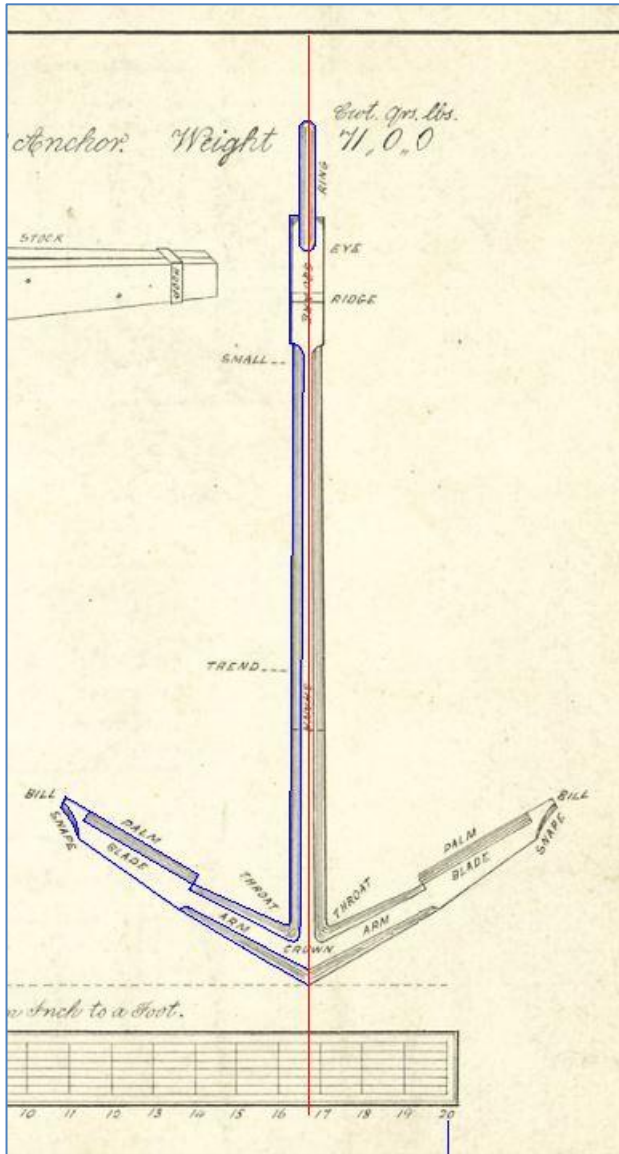
Now that we have half the anchor traced we can duplicate it to the other half with the MIRROR command.

Draw a straight vertical line on centre.

The colour of this line can be changed (red?) to make it stand out from the others as sometimes the tracings can be very full and confusing. The quick cheat method is to pick the line and change the colour with the pull down menu above or the Properties Menu to the left.
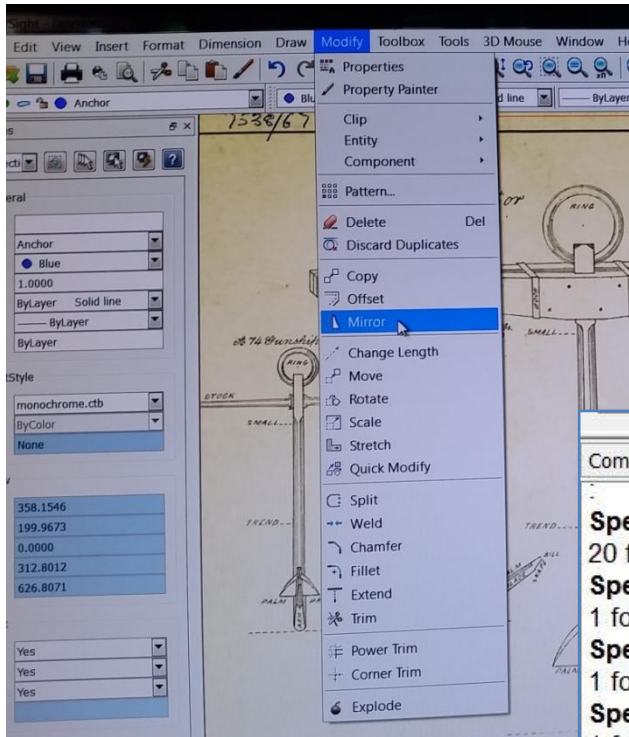
To mirror lines pick the MIRROR command from the MODIFY pull down menu. Pick the lines you wish to mirror and the line you want them mirrored about (the red centre line!)
You will be asked if you want the original lines deleted. Pick N for NO and pick ENTER.
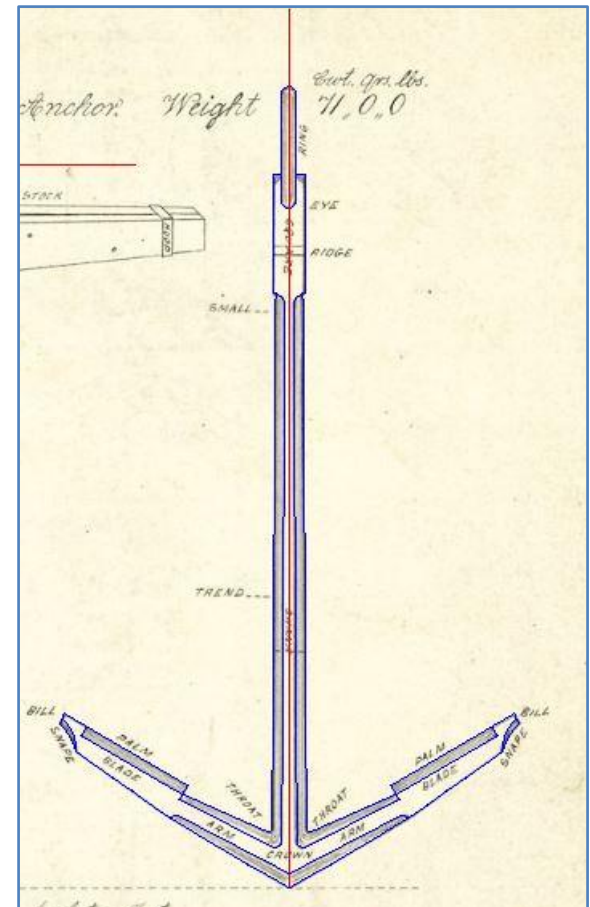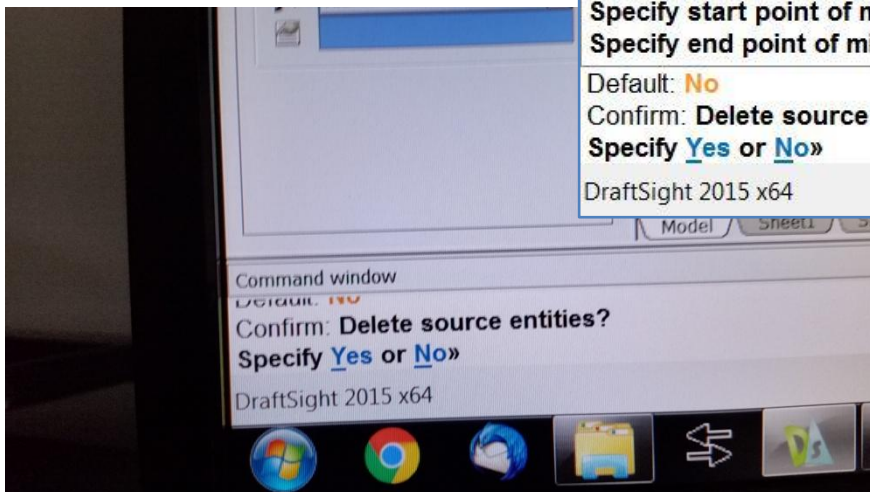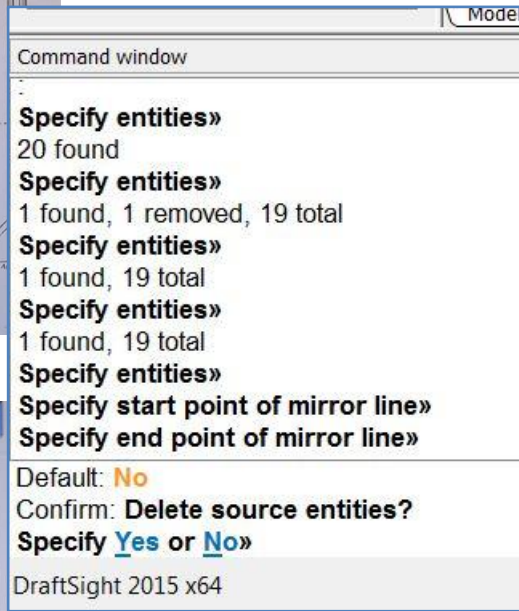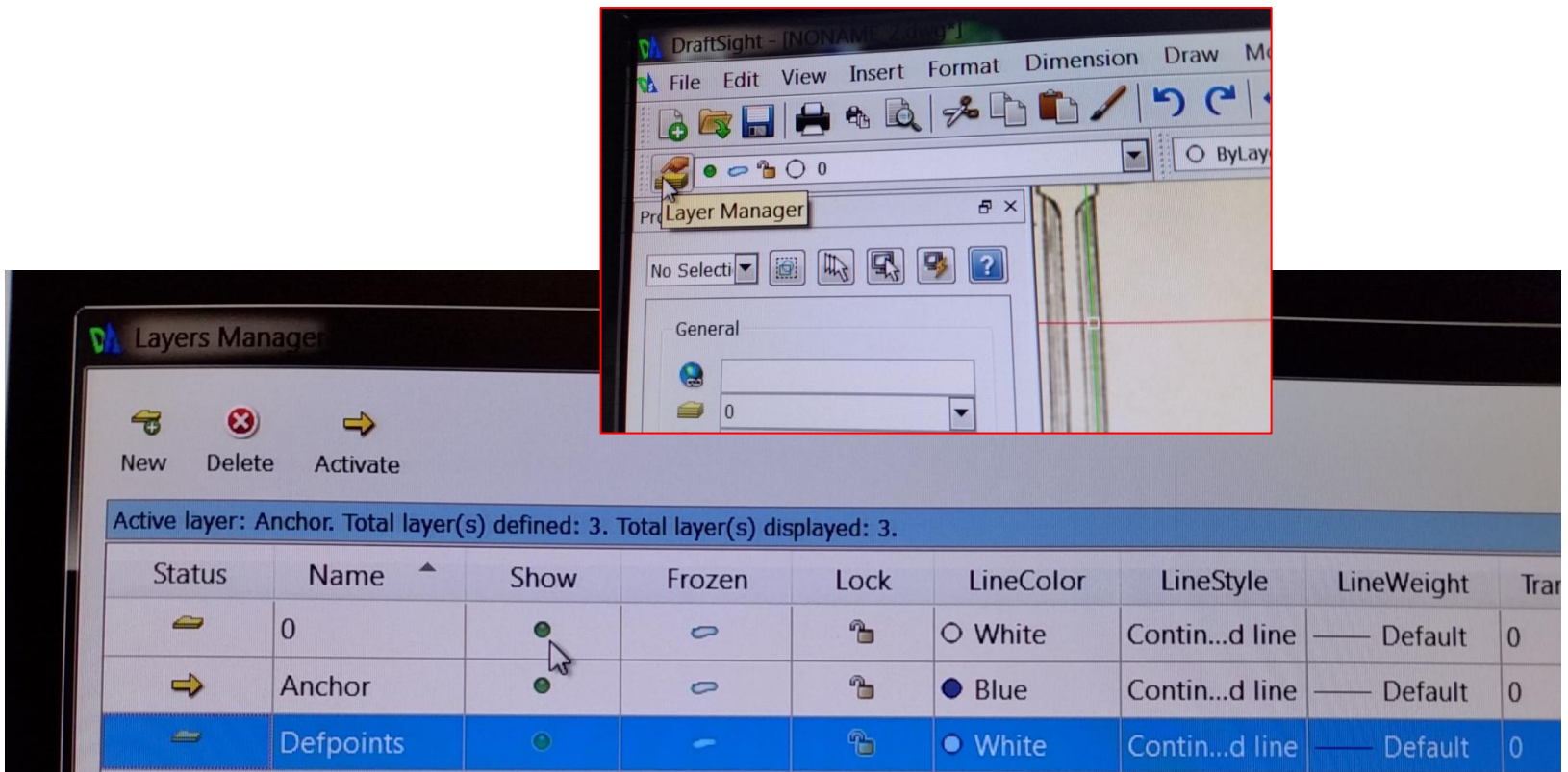
Now that the image has been traced (at full scale) you can turn the image off by going into the Layer Manager and picking the SHOW button for the layer the image was imported into (Layer 0) and this will reveal your tracing standing alone on the screen.

However, by doing this you may forget the image is there. I like to copy the image over so my original tracing does not get tampered with accidentally.
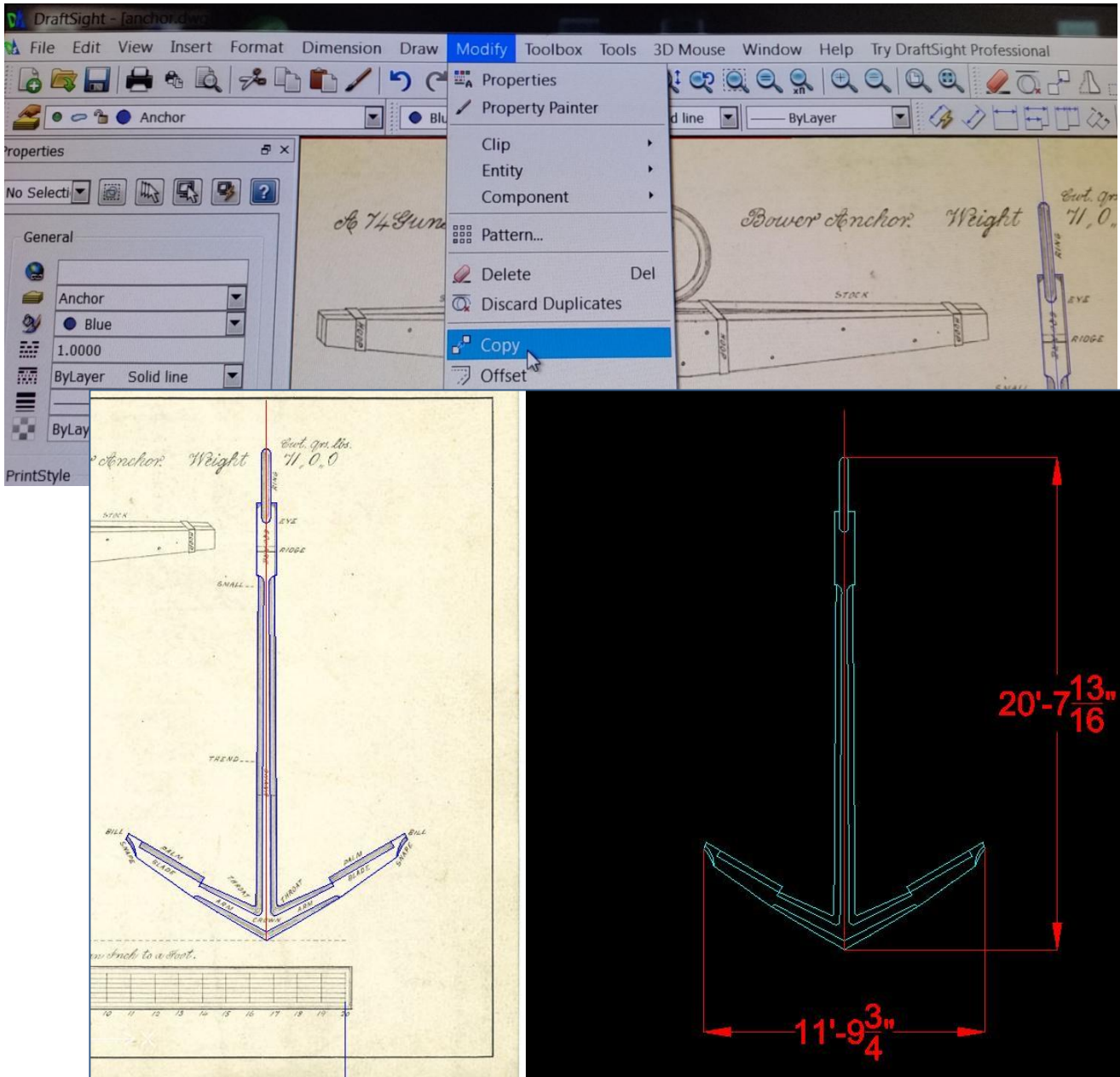
Here I've copied the tracing to the right side of the original and tracing. I've changed the object lines from blue to cyan and the dimensions from blue to red as they are more clearly visible and distinguishable on the black background.

scaled up 64 times
1:64 scale
ready to print
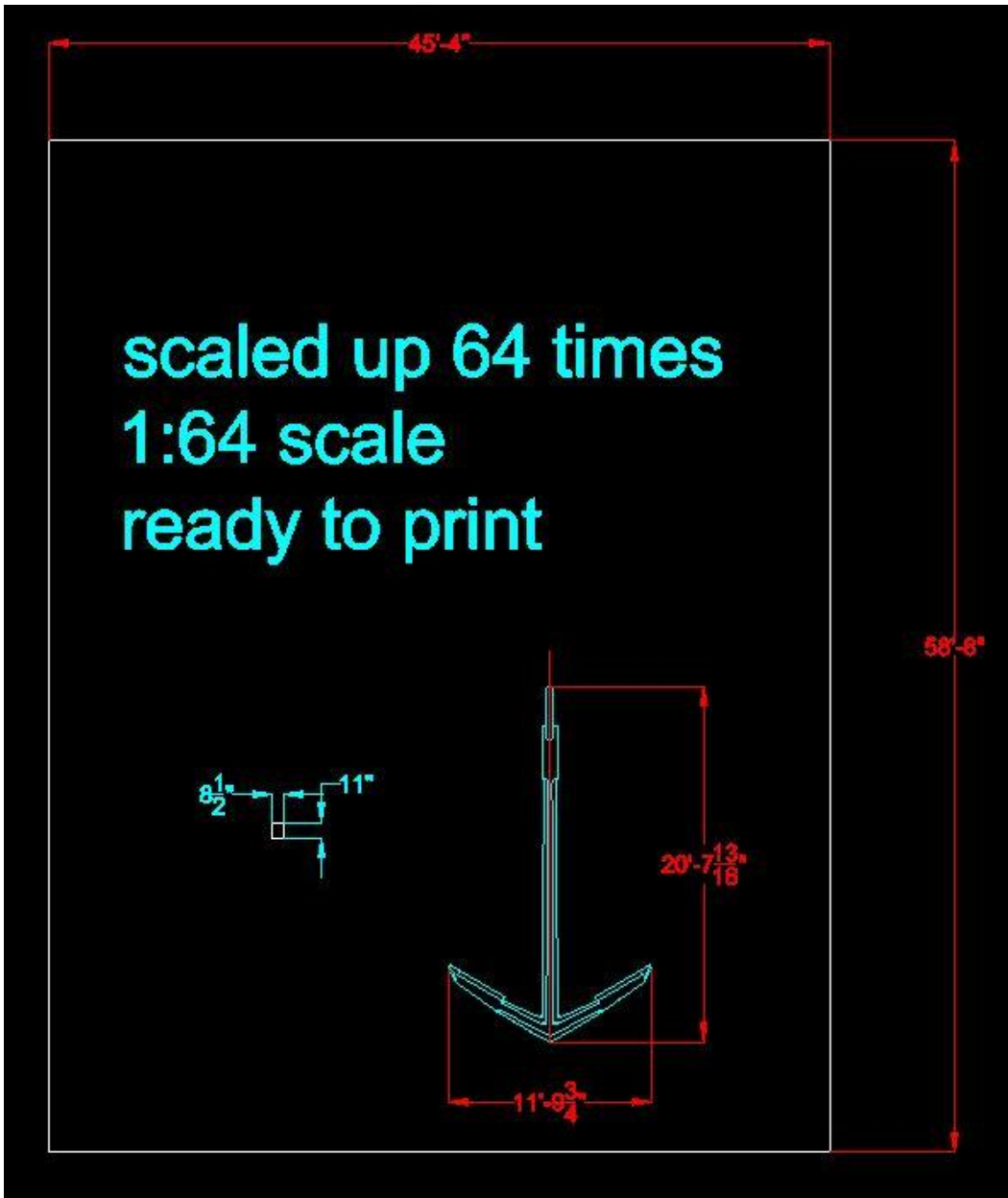
To print the tracing we need to create the paper sheet size.

Remember the tracing is full size, so an 8-1/2" x 11" sheet of paper will be very tiny in comparison.

If we are building our anchor at 1:64 scale we need to enlarge our sheet 64 times.

From the Modify pull down menu pick SCALE.

Pick the drawing we made of the 8-1/2" x 11" sheet and enter a new scale of 64.

Our sheet will be exactly 64 time larger. Locate the anchor onto the sheet to print it.
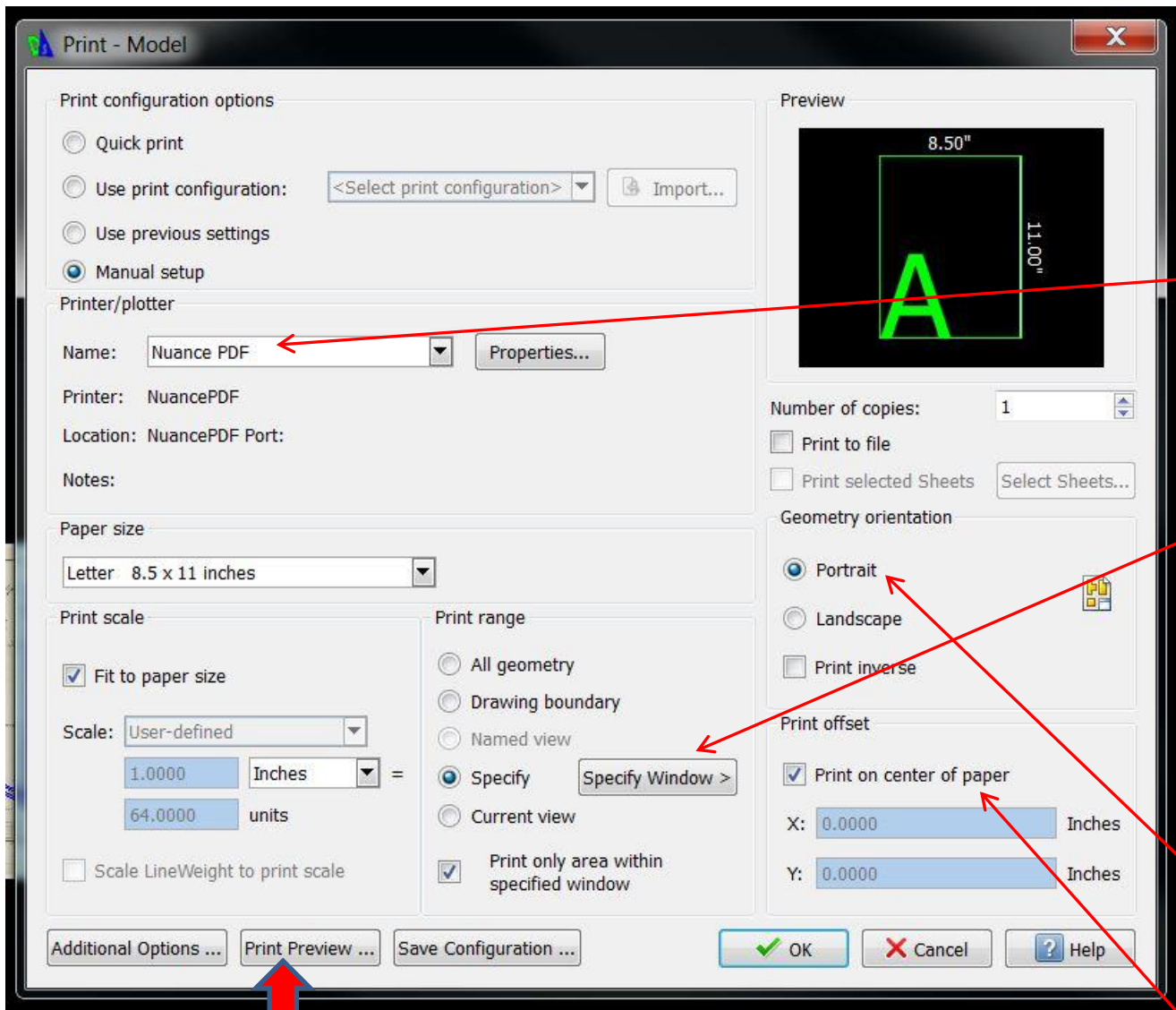
Picking Print opens the print option pallet.

I always print to a PDF to keep a copy. Choose the paper size.

Pick the Specify Window button and follow the prompts, picking the lower left and upper right corners of your sheet. Pick Portrait or Landscape layout and Print on the Center of Paper.

Print - Model

Print configuration options
- Quick print
- Use print configuration: `<Select print configuration>` Import...
- Use previous settings
- Manual setup

Printer/plotter

Name: Nuance PDF Properties...
Printer: NuancePDF
Location: NuancePDF Port:
Notes:

Paper size
Letter 8.5 x 11 inches

Print scale
- Fit to paper size
Scale: User-defined
1.0000 Inches =
64.0000 units
- Scale LineWeight to print scale

Print range
- All geometry
- Drawing boundary
- Named view
- Specify Specify Window >
- Current view
- Print only area within specified window

Preview
8.50"
11.00"
A

Number of copies: 1
- Print to file
- Print selected Sheets Select Sheets...

Geometry orientation
- Portrait
- Landscape
- Print inverse

Print offset
- Print on center of paper
X: 0.0000 Inches
Y: 0.0000 Inches

Additional Options ... Print Preview ... Save Configuration ... OK Cancel Help

Finally pick Print Preview to check it is what you expected.

scaled up 64 times
1:64 scale
ready to print

$8\frac{1}{2}$" — 11"

20'-7$\frac{13}{16}$"
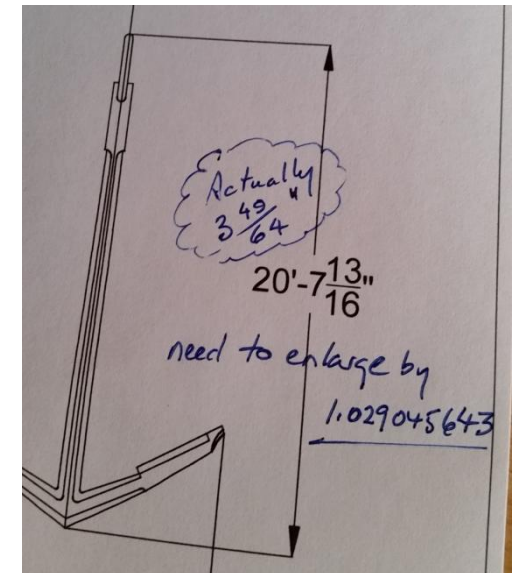
11'-9$\frac{3}{4}$"
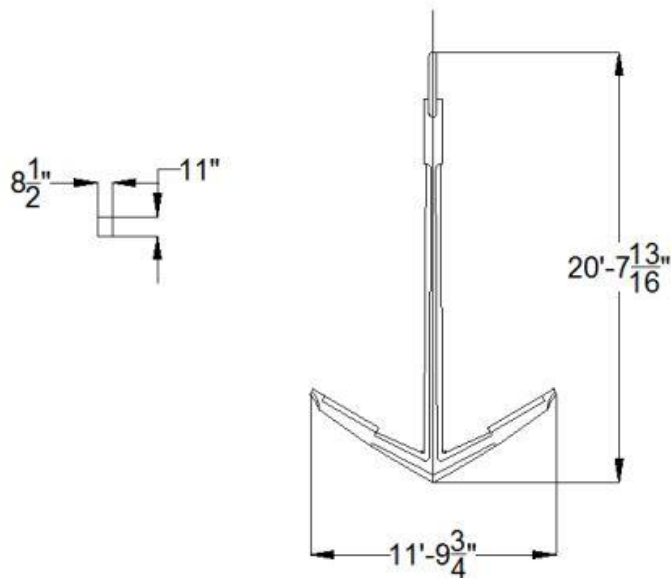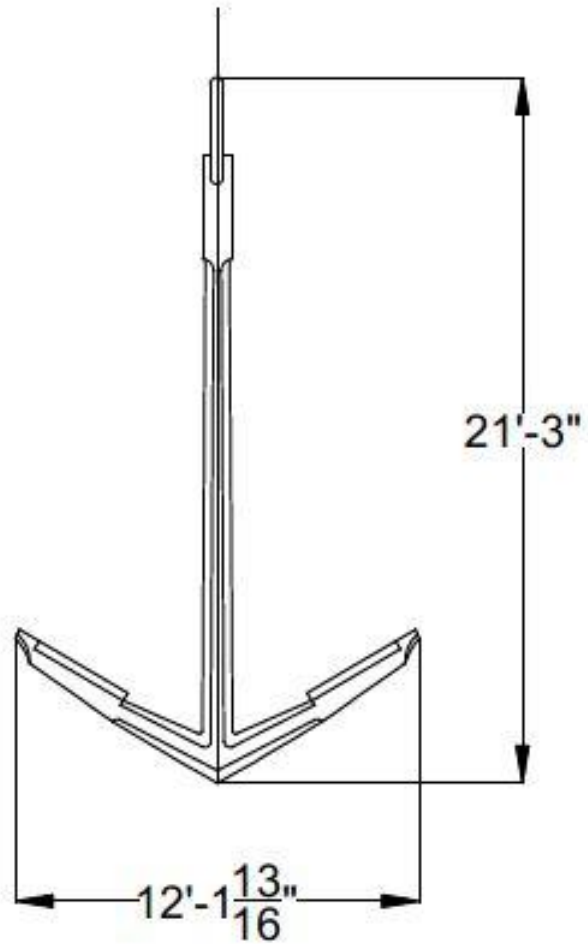
Print Preview displays what the print will look like.

If you are happy with this pick PRINT.

As I print to a PDF it would open the PDF and then I would print it again to an actual sheet of paper.
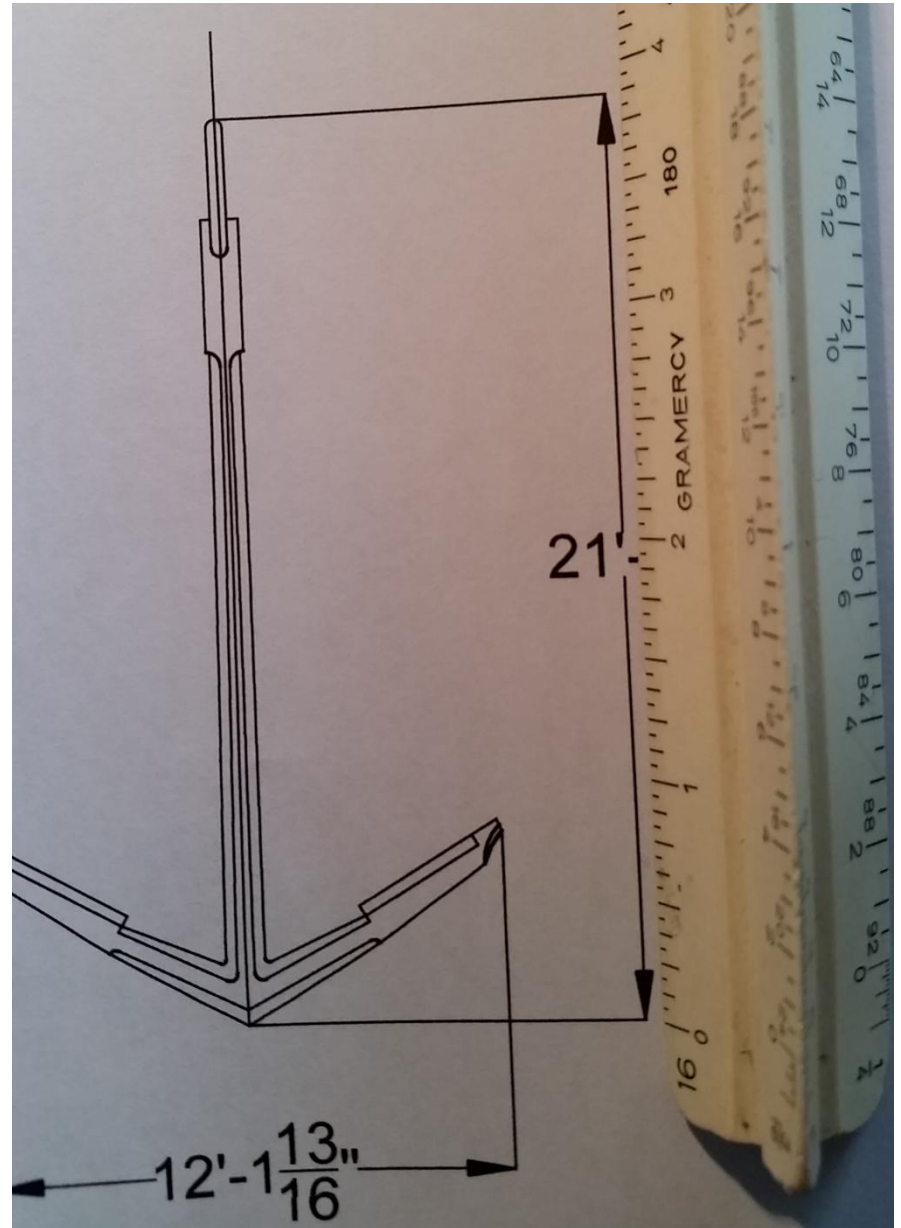
I would then double check the scale with a ruler.

20'- 7-13/16" = 3-7/8" at a scale of 1:64

Actually 3$\frac{49}{64}$"

20'-7$\frac{13}{16}$"

need to enlarge by 1.0290456643

21'-3"

$12'-1\frac{13}{16}"$

With the final scale correction to the
image of the anchor the
8-1/2" x 11" sheet prints the image
to the proper scale of 3-7/8"

21'-

$12'-1\frac{13}{16}"$
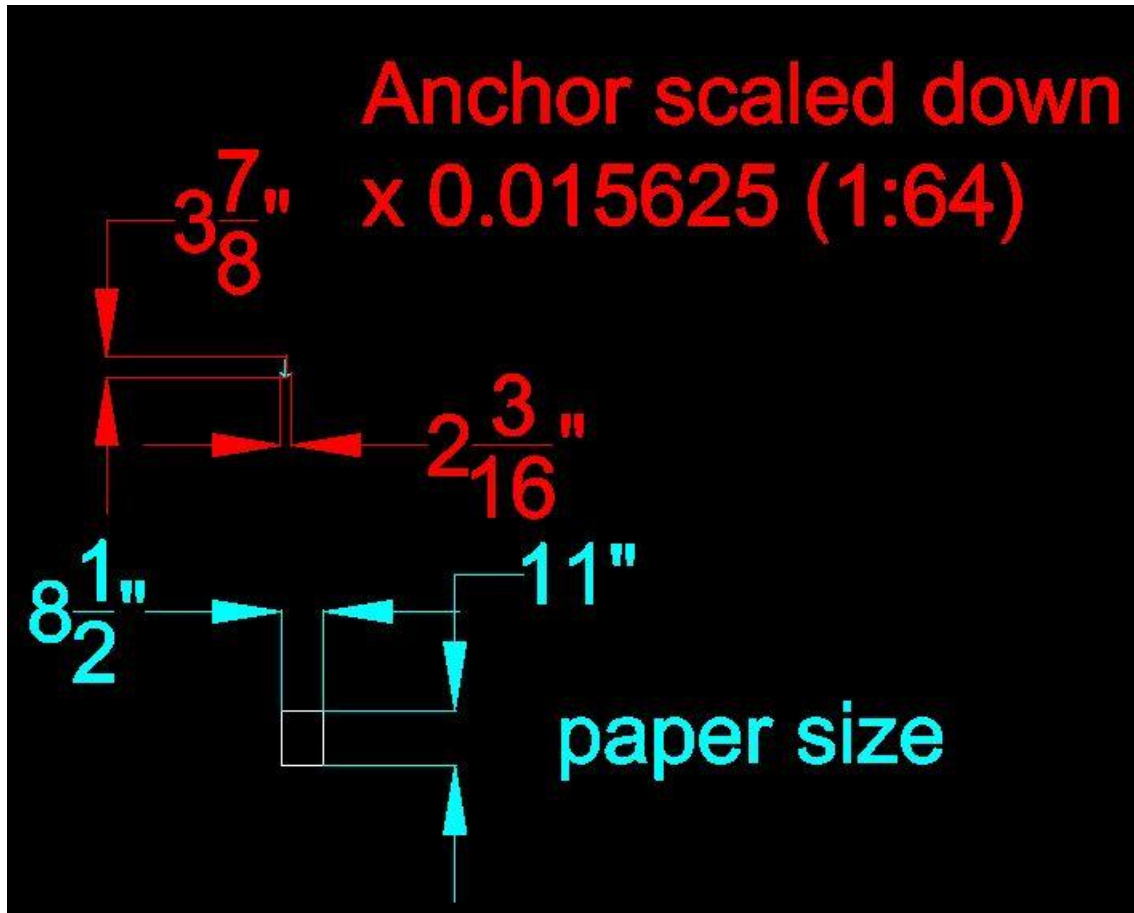
There is also the option of taking the full scale tracing and scaling it down in size to suit the 8-1/2" x 11" paper.

The anchor is very small and details cannot be seen without zooming in.

I would recommend against this option. CAD allows you to draw full life size.

If you pick items to scale them down you might miss something and you cannot see any detail to actually notice something missing!