



**Notes**  
for  
**Richard Binder's**  
**Nib Smoothing**  
**Workshop**

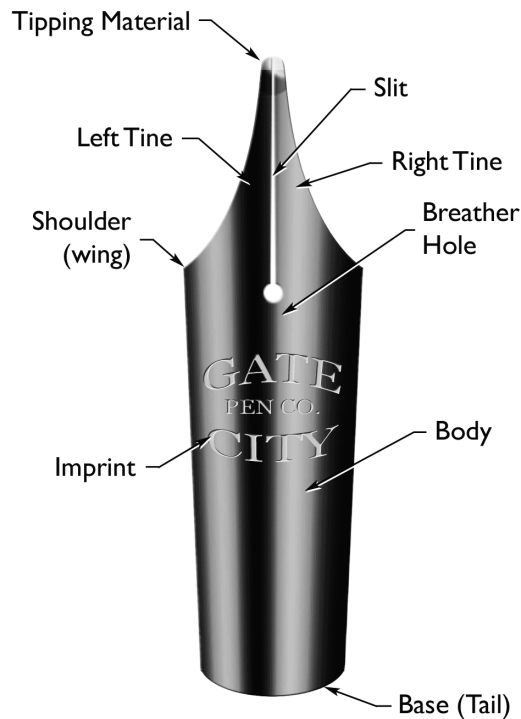
# **Notes for Richard Binder's Nib Smoothing Workshop**

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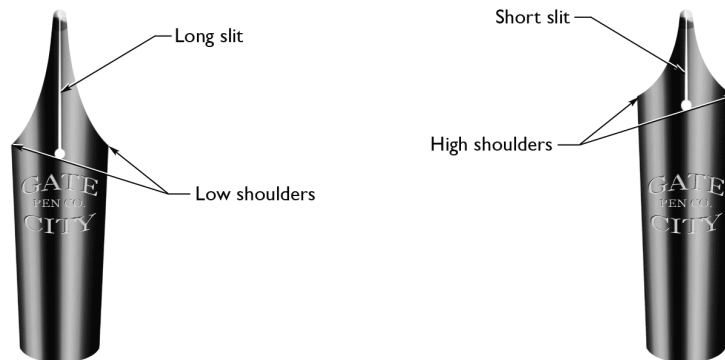
Version 2, revised 7 November 2016

# I. Anatomy of a Nib



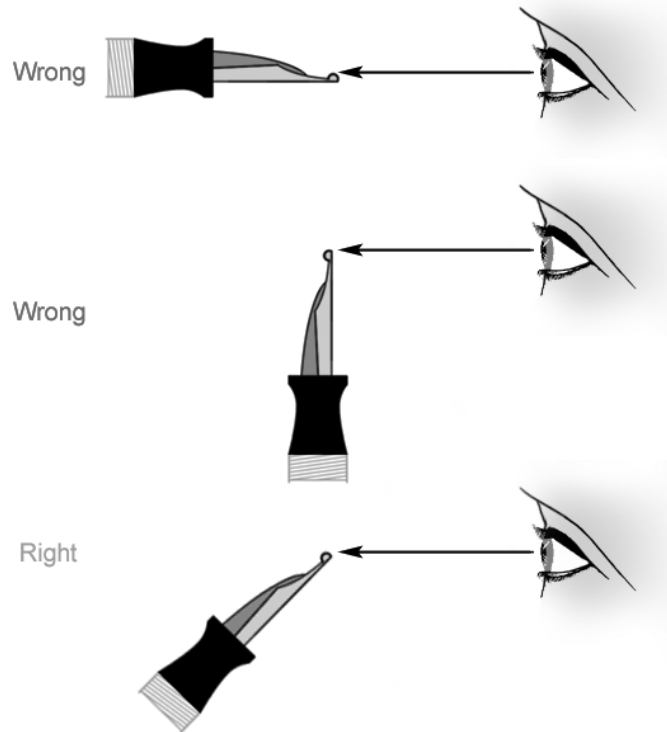
Most nibs are *firm* nibs. Shown above is a typical firm nib, with its parts called out. Learn the right names for the parts of a nib so that everyone will be talking the same language. Most especially, remember that a nib, just like a person, has a left side and a right side. Left and right always refer to the sides of the nib as shown here. (When you are looking at the underside of a nib, its right tine is to your left.)

As shown by the two drawings below, *flexible* nibs (left) have longer slits and lower shoulders than firm nibs, and hence longer tines that can flex. *Rigid* nibs (right) have very short slits and high shoulders, making their tines very short and stiff; these nibs are sometimes jokingly called “nails.”



## II. How to Examine a Nib for Tip Alignment

The first thing to do when you're smoothing a nib is to make sure the tines are aligned. With that done, you have to make sure the two sides of the tip are aligned. (Sometimes they won't be.) This diagram shows the correct way to examine a nib to see whether its tip is aligned.



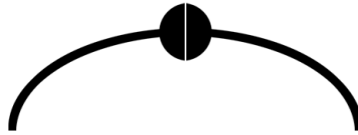
Why the odd angle? Sometimes, the two tips were not finished to the same shape, and sometimes they're worn. When this happens, the tines can be perfectly aligned, but the tips won't touch the paper together. You need to see whether the tips are aligned *where they will touch the paper*, so that they will touch it together. They don't touch the paper right at the very end or all the way around on the underside. "Become one with the paper, Grasshopper." By placing your eye as shown in the third view, you are in effect placing it so that it is right on the surface of the paper, and this way you can really tell whether the tips are aligned as they should be.

If you are tuning a nib for yourself, you can get someone to observe how steep an angle above the paper you hold the pen, and then you can tune the nib specifically for that angle. When you do this, adjust the angle at which you look to see whether the tips are aligned; for example, if you have a steep hold, then hold the pen more nearly vertical when checking alignment.

The alternative is to reshape one of the tips so that the tips will touch the paper together when the tines are aligned, but that's beyond the scope of this workshop.

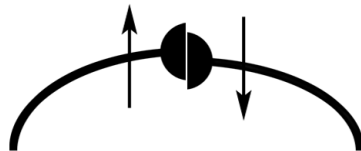
### III. Tine Alignment Issues

The first thing to look at when you're smoothing a nib is its tine alignment. For this, look at the nib straight-on from the end, as if you were going to poke yourself in the eye with it. This is what a properly aligned nib looks like:

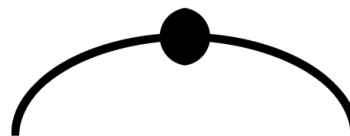


The tine tips are very slightly separated (approximately 0.001"/0.025 mm). They are not touching because if they were touching *and perfectly aligned*, there would be no place for the ink to pass between them and get to the paper. Varying the separation varies the nib's flow; simply by adjusting the tine gap you can produce a nib that flows very dryly, very wetly, or anywhere in between. *There is one exception to the no-touching rule, and that is flexible nibs. Their tip must be touching gently.*

Out of the box, nibs are often misaligned. You will see all of the following four types of misalignment:



One tine up or down



Slit tightly closed



Grand Canyon slit



Inverted Grand Canyon slit

As you are looking at the first of these nibs, the right tine is up—or the left tine is down. It really does not matter which way you identify it, the nib still won't work properly. I always call these misalignments "right tine down" or "left tine down" problems, just for the sake of consistency.

The second nib shows the slit tightly closed. The only type of nib that will work properly with the slit like this is a flexible nib, which needs to start capillary flow before the tines begin to spread. The solution to the “no ink to the paper” problem is a little extra rounding of the slit edge where the nib touches the paper.

The third nib shows what can happen when the tines are bent downward a little to close the slit, as is done during manufacture. As the tines are bent down, they tend to move inward as well because of the curve across the nib’s body. I call this problem a Grand Canyon slit. Especially on broad nibs, a Grand Canyon slit is often accompanied by a slight cupping of the under surface that can lift the slit clear of the paper and make the nib a hard starter.



The fourth nib illustrates a problem most often found on cheap nibs, but any nib can have it. You can reduce the slit spacing by squeezing the tines together a little. This reduces the flow; but if you go too far, you need to spread the slit again. You do this by spreading the shoulders. When you spread the shoulders, they tend to rise, and when they do this, the tip can end up with an inverted Grand Canyon slit.

What makes the situation potentially worse is that you can encounter a nib that has three of the four problems at the same time.

To correct the tine-up situation, start by forcing the high tine downward on the feed. Use a finger under the feed to support it, and push downward over the feed, not past its end. Pushing down past the feed’s end can bend the tine sharply downward right at the end of the feed, and when you try to bend back up you’ll end up raising the tine farther off the feed near the breather hole. This produces a “knee,” and correcting it once it’s there is painful.

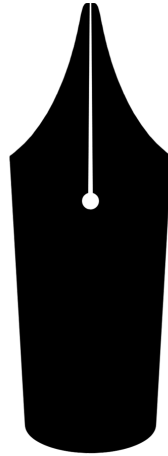
Correct the tine-down situation by gently pushing up on the offending tine alongside the feed, not past its end, using a thumbnail. Hold the body of the nib down on the feed with a finger.

Spread jammed-together tines by spreading the shoulders a little. Be careful not to go too far, or you can end up with an inverted Grand Canyon slit.

Grand Canyon slits, in either direction, are more difficult. Sometimes you can solve a minor one by squeezing or spreading the tines, but these problems often require the use of pliers to twist the tines into position, and there is a significant risk of marring the surface of the nib (more with gold or palladium than with steel or titanium).

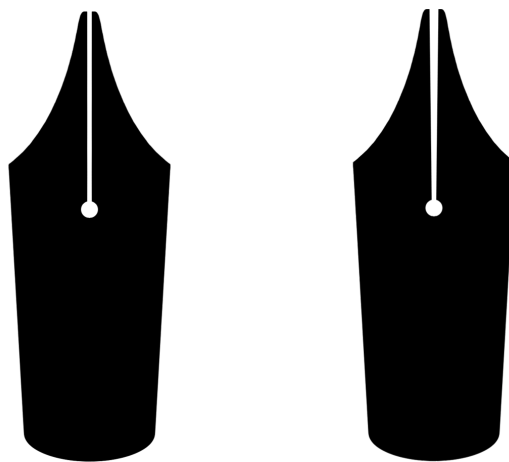
## IV. Slit Alignment Issues

Fountain pens rely on capillary action to draw ink to the tip of the nib, and from there onto the paper. Capillary action draws a liquid to the narrowest part of the slit. An ideal slit is tapered from the breather hole to the tip:



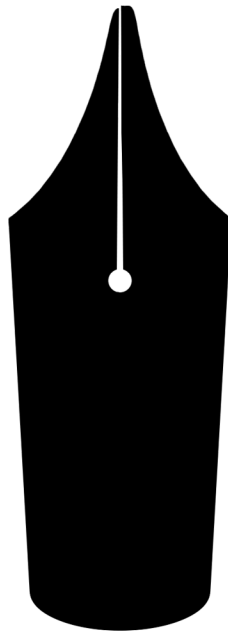
Cheap nibs sometimes have a slit that isn't tapered (left, below). Capillary action has a hard time deciding where it wants to pull the ink, and flow can be unreliable. The slit may be too wide; flow will be very wet, but the nib can lose prime when the pen is held nib upward.

When a nib has been sprung, even if the tines aren't off the feed, the slit can be countertapered, widening from the breather hole to the tip (right, below). A nib with a slit like this won't flow at all.



## V. Tip Shaping Issues

Tip shaping can be a serious issue, even when a nib is just out of the box. One of the most common problems is an asymmetrically slit nib. Sometimes, the tipping material was welded onto the nib off center and the slitting machine (or person) has accounted for this by centering the slitting saw on the tipping material. A nib like this may look a little less than perfect, but it will work well when it's properly tuned. But sometimes the machine or person doing the slitting will miss the center of either the tipping material or the nib body, and this is what results:



Looking closely at the tip, you can see that the left tine is shorter than the right tine. It is also smaller from top to bottom, and it will be relatively difficult—but not impossible—to make this nib write properly. What is required is to remove material from the right tine's tipping material until it's as small as that on the left tine. Then you can smooth the tip. The nib will be finer than advertised (XF instead of M, perhaps), but it will not be wasted.

Even with a symmetrical tip, there can be problems. Here are three possibilities:





The first nib shows what you get right off the slitting saw—and in a surprising number of inexpensive nibs. The edges of the slit are sharp, and the nib is scratchy even though it is perfectly aligned. The solution to this problem is to round the edges of the slit *very slightly*, just enough to break the sharp edges. (Flexible nibs need a tiny bit more rounding than firm or rigid nibs, so that the ink can sneak along the edge to get to the paper before the tines spread.) The most important area to round is where the tip contacts the paper (the writing pad). However, you also need to go down under the tip to handle low-angle holds and around the tip, all the way to just a little past the very end, to handle high-angle holds and also to prevent the nib from feeling draggy (“pushy”) on push strokes. This last aspect is something every nib manufacturer today misses.

The second nib shows what you will often see out of the box with an expensive pen. Makers of expensive pens want their nibs to be extra smooth, and to this end they round the slit edges too far, creating a shape that’s called “baby’s bottom.” A nib with baby’s bottom tends to skip on starting, and it often requires excessive pressure to make it write at all. What is happening is that capillary action draws the ink into the tightest part of the slit, and because of the overly rounded edges, that’s too far from the paper.



The third nib shows what happens when the tip has been shaped by techniques such as writing figure-eights on an abrasive surface. If the worker does not roll the pen from side to side as well as up and down, the underside of the nib can become flattened, and this leaves both the inside and the outside edges sharp and scratchy. In the very worst cases, the nib can be worn completely flat, like this:



You will also see this shape on pens that have been well used (but not necessarily used well). Excessive pressure accelerates wear, even of the hard tipping material, and a flattened tip can result. The problem with a nib like this is that it might feel perfect for the person who has used it for many years because that person always holds it exactly the same way—but it will feel horrible for anyone else.

Solving a shaping issue such as square edges or a flattened tip requires sanding the edges round again. (See Section VII for a list of abrasive materials.) If the tip is flattened, you need to create a new rounded contour that flows smoothly all the way from the bottom around to the very tip. Inexperienced workers tend to forget the very tip, and their shaping ends up like this:



As described at the top of the previous page, this pointy shape will result in a pushy nib, and if the tip is really sharp, the nib can dig into the paper on push strokes. The remedy is to round the tip:



It's not necessary to round the tip so that it looks circular from the front:

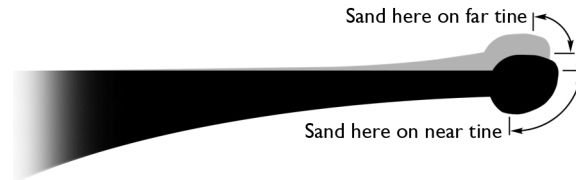


Leaving some semi-flattened area there creates a pad that will provide more surface area for the nib to ride on (and for the ink to lubricate), giving a much smoother feel. High-quality nibs are made this way. I refer to leaving this flatter area as “padding” the nib.



## VI. Smoothing

With the nib properly aligned, you need to smooth it. The first step is to round the slit edges ever so slightly with sandpaper. (See Section VII for a list of abrasive materials.) Raise one tine slightly off the feed, exposing the under edge of the opposite tine's tip. Sand that edge, all the way around to the tip of the nib. Also sand the exposed upper edge on the tine you raised.



Reverse the tines to get the other two parts of the edges. If you have done this right, you will have sanded all the way from the very bottom of the tip, around to at least past the tip and a little onto the top side. Recheck the alignment when finished.

Give the tip a good sanding all over (top, sides, and bottom), applying the sandpaper *very gently!* The more firmly you sand, the more likely you are to leave scratches that will not respond to finer abrasives.

Fill the pen with ink, and apply the nib vigorously to the 12000-grit side of the buff stick. Start with the pen nearly flat to the table. As you move it side to side, roll it back and forth through 180° so that you are smoothing not only the underside of the tips, but also the sides. Raise the pen a little and repeat. Do this several times, until the pen is vertical. As it passes through 45° on its way to vertical, sway it from side to side (like an upside-down pendulum) instead of rolling it.

Test the nib on good paper. Most nibs will feel surprisingly smooth at this point. Some will feel pushy. These should receive a treatment on the 1.0 $\mu$  lapping film like that on the buff stick except that you don't press down much at all on the lapping film. Repeat the buff stick treatment. All but the most recalcitrant nibs will feel good if you've done this right.

Move to the 0.3 $\mu$  lapping film. With the pen in a normal writing position, rotate or sway it slightly to one side, just enough to raise the middle of the writing pad off the paper. Push downward gently, and flick the pen upward and to the side, allowing it to come off the film. If you hear a tick, you have knocked off a micro-mountain. Continue in this vein until there are no more obvious micro-mountains.

Test the nib. If it's perfect, stop. If you think you can get it a little better, go back to the buff stick, and try the 0.3 $\mu$  lapping film again. It may take a while to get the hang of "ticking" the nib.

Some nibs will need more serious work on the 0.3 $\mu$  film. For these nibs, you will need to smooth them all over, as you did on the buff stick and the 1.0 $\mu$  film. Typically, finer nibs are more likely to need this than are medium or broad nibs.

In the end, when there's a problem, it comes down to trying any and all of the various abrasives. Examine the nib carefully, looking at it all over, to see if you can find rough spots, corners, misalignments, or anything else that would make the nib not work as it should. Keep going back over it as long as necessary. Sometimes, you will find a single small corner that's keeping the nib from being silky smooth. Get rid of that one little problem, and you're off to the races.

## **VII. Abrasive Materials**

The abrasives you use will have a profound effect on your results. If they are too coarse, you'll never achieve the smoothness you want. These are the materials I use.

### **Sandpaper**

Sandpaper is for rough shaping and for initial prep before final smoothing.

The coarsest abrasive I use for nib work is 2000-grit wet/dry sandpaper. I buy it from a jeweler's supply house, but you can also get it at an automotive parts store, in the body repair and finishing section. I cut the paper into 1" (about 25 mm) squares for convenience.

### **Buff Sticks**

Buff sticks are for intermediate and final smoothing.

My buff sticks are a Micro-Mesh product. I use the kind with three grits (2400, 4000, and 12000). These come in two sizes; I use the smaller ones because they are easier to handle than the big ones. They also come in two color versions: pink, white, and gray; and black, white, and gray. Other than color, the two versions are the same.

Micro-Mesh grit grades are not the same as sandpaper grit grades. I use only the 4000 and 12000 grits for nib smoothing.

### **Lapping Films**

Lapping films are for intermediate and final smoothing.

Lapping films are used in industries where an extremely smooth surface is required; I get mine from a company that sells tools and supplies for the fiber-optics industry, where they are used to polish the ends of fiber-optic cables to minimize light loss at joints between lengths of cable.

I use 1.0 $\mu$  (micron) film for intermediate work and 0.3 $\mu$  film for final work.