

What the harpsichordist needs to know about quill plectra

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These notes are intended to provide information about the basic facts of bird quill when used as a plectrum in harpsichords and describe effective preventive maintenance for an even touch. Correction strategies for "hardened" quills are also described. There are several new findings which are published here. These results are based on extensive testing, which has been reported at my website [here](#).

What happens to bird quill when used in a harpsichord?

Bird quill will not "work harden" with age (as does Delrin). The touch may become slightly lighter after extensive use, e.g. after 6 months, as the tip becomes polished.

As is well known, the touch with untreated bird quill often suddenly becomes harder (within 50-700 plucks). Measured with a calibrated voicing weight on the key, the weight will be about 25 mm nearer the player. This is the result of the top surface becoming rougher and creating more resistance to the string sliding along it. The quill material itself has not become "harder", or "stiffer", or dried out. However the *pluck* can be said to be harder or stiffer since more force is required to effect a pluck. Colloquially one may speak of the quill becoming "harder", by which one means the *touch* becoming harder

A cause of accelerated wear: the string

New harpsichord strings will cause an accelerated abrasion of the quill plectrum, i.e. hardening of the pluck occurs within 50-700 plucks. Played strings eventually become smoother and cause much less wear. With a polished string, even after 2000 plucks no wear may be found on an untreated quill. (e.g. Goldberg Variation 1 played with repeats 50 times, i.e. 100 minutes playing = 2000 plucks for g1)

A successful maintenance strategy to reduce wear

The top surface of a new quill absorbs virtually no oil, whereas the underside readily absorbs it.

If bird quill is liberally oiled *only* on the underside with Ballistol and left to soak in for 45 minutes it will be found that the plectrum is considerably more resistant to wear. Even on a new string, after oiling with Ballistol, no wear was observed after 2000 plucks. For example, this strategy has prevented *any* plectra giving a hard touch in a 3-register harpsichord during the first 6 months.

Oiling only the underside also has the effect of significantly reducing wear of the quill.

If a bird quill is repeatedly oiled on the underside until saturation results (i.e. oiled two times over a period of hours) then the quill becomes slightly stiffer (the voicing weight on the key moved 3-6 mm towards the player). This amount of oil in the quill is not required for the benefits of oiling to become apparent. The effects of excessive oiling will eventually be dissipated by playing although this may require 1000 plucks.

Since oiling the underside is more considerably more effective than oiling the top surface, only the underside need be oiled as a maintenance procedure.

Oiling the *top* surface provides a small amount of lubrication which partially removes the advantageous sense of plucking the string, which one has with bird quill, but not with Delrin. This is a further reason to avoid oiling the top surface.

Correcting a "hardened" quill

If an untreated bird quill which gives a hard pluck is liberally oiled on the underside with Ballistol and left to soak in for 45 minutes, it will be found that the plectrum may have regained fully its prior plucking strength.

When the pluck of a quill has become hard, rubbing the tip of the quill (where it touches the string) with the edge of a finger nail (as recommended by Tilman Skowroneck), or polishing it with the stem of a bird quill ten times will often restore the original plucking strength. However this effect will usually only last a short time, perhaps 10-30 plucks, although it might hold for considerably longer. Nevertheless, this may be a useful correction method when immediate results are required, e.g. before or during a concert. This polishing procedure requires a special block to support the quill, a voicing block is almost as good, although it lacks the upward slope; in an emergency use your thumbnail.

Applying skin grease or oil only to the top surface of a bird quill after the pluck has become hard, produces a slight immediate lightening of the touch, but further playing is required in order to reduce the excessive plucking strength. This may not fully restore the prior plucking strength, even after 200 plucks. However, skin grease appears to be a little quicker than oil in restoring a usable playing strength, in perhaps 100 plucks. In some situations the harpsichordist may not have the time or resources to do anything but rub the tip of the plectrum, apply skin grease, and carry on playing.

Less successful maintenance strategies

Oiling the top surface of a quill is only moderately effective in preventing the touch of a quill becoming too hard during the initial period of use with a new string. The plectrum remained playable, although some hardening was evident, e.g. a 5-10 mm difference of the voicing weight position, equivalent to a noticeable difference in voicing strength. However, the type of oil determines the result and it must be applied often. Vogel's Kielöl [quill oil] and Ballistol were found to be the most effective. Emu oil and grease from one's skin were less effective. Olive oil was ineffective in preventing the touch hardening.

Wear of the quill is more pronounced when only the top surface is oiled.

Quills which have been oiled only on the top surface show a "stiffening effect": after leaving the instrument to rest for a few hours the touch of quills can become slightly harder (typically + 8 mm). This effect disappears after a "waking up" period of being played a few times.

Suitable oils

Oil for bird quill should be non-drying, not be subject to biological degradation, not become acidic, and preferably have a long shelf life. Thus, olive oil is not recommended because it may become sticky and hinder the return of the plectrum. Some vegetable oils (almond oil, Vogel's Kielöl) are probably non-drying, but subject to degradation bacterially or with time, as is Emu oil (animal origin). Ballistol (a high grade paraffin oil) qualifies on all counts and is cheaper than most alternatives. Ballistol is readily available in shops selling sporting guns, but can be obtained online from: <http://www.conrad.de>

Other undesirable effects in bird quill

A "creaking" noise of the string on the tip of the quill just before plucking is due to major irregularities of the surface and is usually unavoidable. Creaking is not necessarily accompanied by an excessive plucking strength.

Quills from swan feathers showed no substantial variation in touch with changes in humidity. A rise in temperature gave a slight decrease of plucking strength in 1 in 20 of the quills tested. Swan quills can be considered reliable, turkey quills have a poorer reputation.

Recommended routine maintenance procedure

1. Three to four times in the first year (i.e. with new strings, two times in the second year): Oil liberally only the underside of the quill: a thick film should be visible. Ballistol is known to work and is recommended as non-drying with a virtually indefinite shelf life. A small piece of wire, e.g. straighten out a wire paper clip, (circa 0.8 mm diameter), a toothpick, or a small brush (no.2 watercolour) can be used to apply oil.

2. Place the jack on a horizontal surface with the quill facing down to prevent oil running into the tongue and leave for at least 45 minutes, after which time the quill will appear translucent. Leaving the quill longer will not improve the result, but is permissible. Oiling the quill a second time will increase the plucking strength slightly and is unnecessary for the effectiveness of this method.

3. Wipe off any excess oil with tissue paper or a cotton bud.

What to do if the quill touch hardens

1. Know that the surface of the quill has become slightly rougher.

2. Oil the underside and (if possible) leave for 45 minutes.

3. If you cannot wait (or step 2 was ineffective), polish the tip of the quill x10. If no improvement has taken place, regard the new state of roughness as permanent and re-voice. If there is no time to re-voice, apply skin grease, quickly play 20-50 times then continue playing. When time permits try stage 2.

4. If several quills "harden" at about the same time it is probably an indication that all quills require oiling.

Reference: Tilman Skowroneck. Harpsichord Voicing:
<http://skowroneck.wordpress.com/2008/03/08/voicing-complete-pdf/>