

Harpsichord & *fortepiano*

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Musical Instrument Research Catalog
(MIRCAt)

A PRACTICAL GUIDE TO QUILLING

By John Phillips

"Now with subtle insight several makers have discovered that crow quill sounds more like crow quill than Delrin does." – Frank Hubbard, 1975

One of our lingering myths regarding the historical harpsichord has been the notion that plectra made from real bird quill was somehow difficult and unreliable and that modern plastics – Delrin, Celcon, and the like – produced virtually identical results without all the bother. Yet bird quill was the usual plectrum material of choice for 300 years, obviously satisfying some very demanding musicians. Bach is reputed to have been ready to play in 15 minutes, which must have included some tuning. Recently many players and makers are finding that real bird quill turns out to be neither difficult nor unreliable and that it sounds and plays much better than Delrin. Neither is Delrin quite the “stick it in and forget about it” material of legend.

Bird quill is an inherently stiffer material than any of the plastics used as substitutes. Under the finger everything happens more quickly; the point of release of the string comes sooner in the key stroke and the instrument speaks more quickly. The pluck has a harder consonant; more of a “t” than a “d”. The stiffness allows a secure contact with the string and control of the sound. A bigger sound is produced with much less effort. Couperin ornaments and Bach contrapuntal articulations are much easier to achieve with quill plectra than plastic. The differences we observe here are subtle, but not insignificant. Scattering a few bird quill plectra in an instrument voiced in plastic will barely be noticed. The overall effect of an instrument voiced entirely in quill will be that it sounds richer, more articulate, and is easier and more

satisfying to play; in short “better”.

The price for this richer sound and more responsive touch is not great. Our musical ancestors would have found cutting a plectrum for their harpsichord no more onerous than shaping the nib of a writing pen. Unlike plastic, quill is somewhat hygroscopic; meaning that it will be slightly stiffer in dry weather than in wet. Quill does not work harden, though wear and keeping the voicing even can weaken it some. Optimally, well chosen and well cut quill plectra in the middle of the instrument ought to last for a year or more. With attentive maintenance – mostly keeping the tips lubricated – it should be possible to keep a quilling going indefinitely, replacing plectra only as they fail. When a plastic plectrum breaks, the note is gone. When a real quill plectrum fails, it usually splits rather than simply breaks. The note becomes suddenly softer or duller, but is still there. You can still get through the concert or practice session without having to replace the plectrum or switch a jack.

Quill basics

If your instrument has an historical style action with good quality wooden jacks, it is a good candidate for bird quill. The tongues of plastic jacks are much too slippery to hold bird quill plectra. In general, quill plectra need not be as long as has been the practice for plastic. I have found that a good average length for most types of feathers is about 4.5 mm for 8 foot registers and 3.5 mm for the 4 foot, including the overlap past the strings. The stiffness of the available

feathers and the accuracy of the marking out of the nuts will help determine the best plectra lengths for the instrument at hand, so some experimentation will be in order. When the voicing is complete, you may find that the stagger between registers can be closed a bit and the key dip can be reduced.

My own instruments use an overlap of 0.40 mm (0.016") between the "ghost" (where the plectra just touch the strings) and "on" positions for all registers. This is set with a brass shim inserted between the "on" end of the jack slide and the case and cutting the length of the plectra to where they just graze or "ghost" their string.

Tools needed for quill

A good voicing knife (the ubiquitous X-acto #11 blade in a #1 handle works fine), several hard, light coloured (maple or boxwood) voicing blocks, a small cutting board, a pair of flush-cutting nippers, a pair of smooth jawed pliers, and a small (size 00) watercolour brush are essential for working with quill. The voicing blocks will need more frequent dressing than for plastic since cutting quill plectra to length requires more force and does more damage to the block. (See Figure 1.)



Figure 1: Tools for quill.

Selection of feathers

If your harpsichord has been professionally voiced in quill, you were most likely supplied with a stock of extra feathers from the same

species of bird. Otherwise the first issues facing the harpsichordist or maker who wishes to put an instrument in quill from first principles will be the choice of feathers and finding a source for them.

18th-century authorities typically recommend crow or raven feathers and less often turkey, goose, or even more exotic birds for harpsichord plectra. Crow and raven are still excellent choices. Raven plectra give the quickest response under the fingers but these feathers can be difficult to obtain. Crow is similar but the relatively small size of the feathers means you need many more of them. Other good choices include certain seagulls, vultures, condor, and Canada goose (Figure 2). The feathers from all of these large birds share the characteristic of having dark brown to black coloured shafts. Apparently the melanin pigment makes these feathers hard and tough – ideal for their reuse as harpsichord plectra. Feathers with white shafts – even those with dark barbs like pelican or eagle – wear out very quickly and should be avoided.

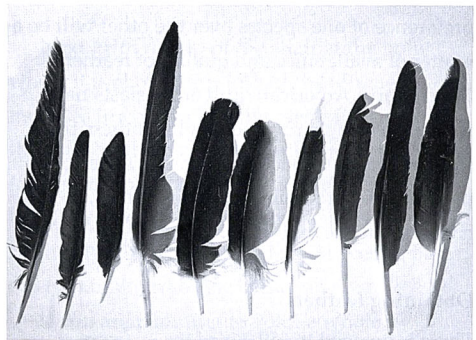


Figure 2: Suitable feathers. From left to right: raven primary, two crow primaries, turkey vulture primary, two turkey vulture secondaries, seagull, Canada goose secondary, and two Canada goose primaries

The most significant difference between the various suitable species is their cross sectional shapes. Crow and raven feathers are distinctly arched while vulture and goose are relatively flat. The arched shaped plectra are

slightly more difficult to voice and are best held in narrow curved jack tongue mortises. The flatter plectra will more easily fit in the rectangular mortises originally prepared for Delrin (Figure 3).

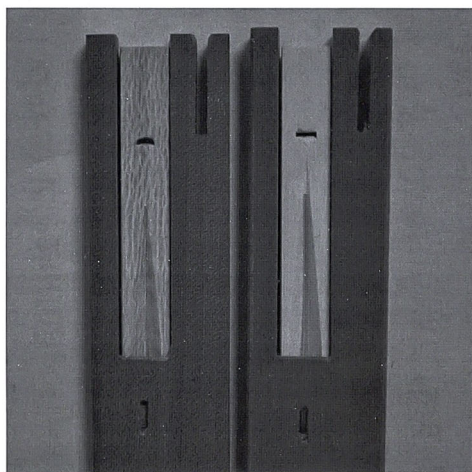


Figure 3: Tongues punched for raven quill (left) and Delrin or Canada goose (right).

Although there are subtle but perceivable differences in touch and sound between the various suitable species, in practice the preference of one species over the other will be a matter of availability and quality of feathers. Many North American quill enthusiasts have found that the sturdy back flight feathers from the ubiquitous Canada goose make superb plectra. They are tough and long lasting, rivalling plastic in durability.

Obtaining feathers

There is no need to kill a bird for its feathers. All birds moult every year, usually from late spring to autumn, depending on species. Freshly moulted feathers can be gathered and saved. Only the primary flight feathers are useful as harpsichord plectra, though vulture tail and secondary flight feathers are as large and as stiff as crow primaries and can be used as well. It is possible to buy feathers from harpsichord parts suppliers, including Zuckermann, The

Instrument Workshop, and Marc Vogel. It is worth noting that most of the recommended species here are protected and it may be illegal to gather, sell, or even own their feathers. That said, Canada geese seem to have settled permanently into parks and lawns everywhere in North America and are not unknown in Europe. In the late spring, once the goslings have hatched, these parks and lawns are covered with moulted feathers. Do not wear your best shoes when gathering these feathers. In July and August crows and ravens roost and preen in urban trees, leaving their feathers on the ground. Broken or crushed feathers and feathers which have stood in water are useless. It is a recommended practice to strip gathered feathers immediately of their barbs, as described below, and to store them with mothballs in a sealable container.

Preparing Feathers

Harpsichord plectra are fashioned from the spine (back or top) of the shaft of the feather. The first step is to remove the barbs. Begin by holding the tip of the feather with one hand, grasping the barbs with the other, and pulling down and away from the top of the shaft. This is a little like shucking corn¹ and is the messiest part of the process (Figure 4). The shaft will be left with the pith exposed on both sides and with some barbs at the tip (Figure 5).

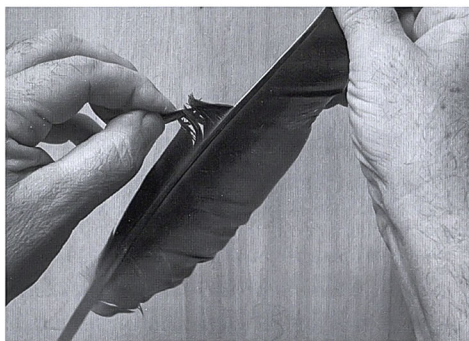


Figure 4: Removing the barbs.

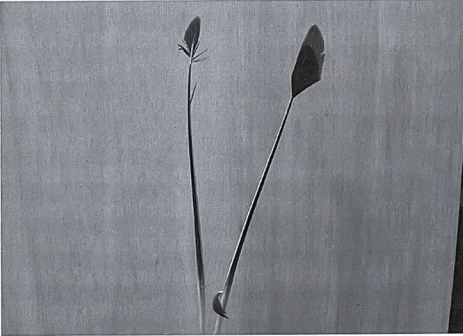


Figure 5: Canada goose shafts with the barbs removed.

The pith has the consistency of Styrofoam and is covered by a hard thin membrane on the underside of the shaft. It can be removed by laying the shaft on a cutting board and first scoring one side with the tip of a voicing knife (Figure 6), then turning the shaft over and cutting through all the way from the opposite side (Figure 7). The idea is to remove about half the thickness of the pith and the lower hard membrane. The waste pith can then be peeled away (Figure 8). The remaining pith will be useful for holding the plectrum in the tongue mortise. Expect to ruin several feathers learning to prepare them for plectra, so practise on less valuable ones. Resist the temptation to cut the barbs off with scissors; the stubs will get in the way.

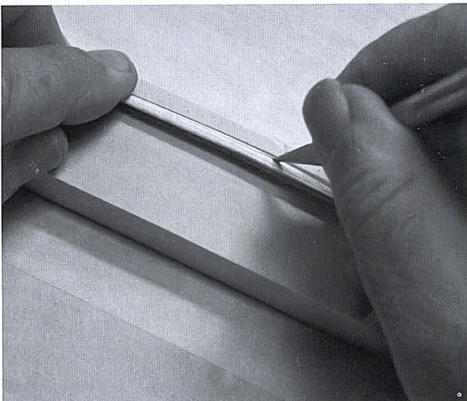


Figure 6: Making the initial cut in the pith.

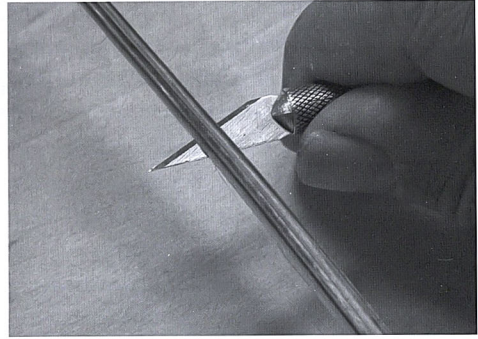


Figure 7: Cutting through the pith from the opposite side.

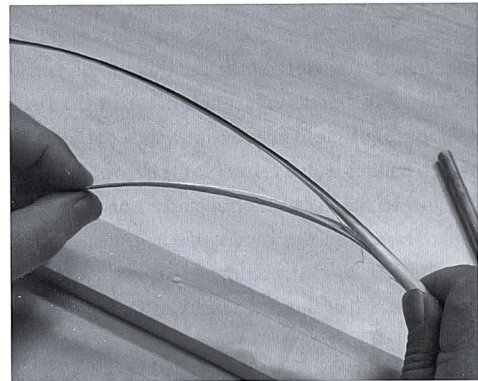


Figure 8: Peeling away the pith.

Next, trim the tip of the shaft at the point where it is about the width of the tongue mortises in your jacks. Any plectra narrower than this will fall out. The quill end of the feather (the part that goes into the bird) can also be trimmed off, though it can be useful as a handle; it is in any case useless for plectra past the coloured part of the spine.

If you are planning to voice a whole instrument in quill, prepare 6 to 15 feathers per register in this manner, depending on how large they are. It is possible to get 15 plectra out of a large vulture primary. A small crow primary might only yield four plectra. For the incidental replacement of failed quills it will be useful to keep half a dozen prepared feathers of various sizes and strengths on hand to best match the originals.

Making a plectrum

It is best to start making plectra from the tip end of the prepared feather, taking advantage of the natural taper of the shaft. The plectra taken from the tip are the weakest and can be used for the 4-foot or treble of the 8-foot registers. The middle of the feather will work for the bulk of the 8-foot registers. The thickest part of the feather near the quill end can be used in the bass of the 8-foot registers. In quilling a whole instrument, it will be useful to pre-sort the feathers by size and stiffness. Begin quilling at the top of the 4-foot with your weakest feathers, or the tips of the stronger ones, and progress to the 8-foot registers as you work your way down the curve with bird quill will be judging which part of which feather is most suitable for a given note. For incidental replacement you may need to take a plectrum from the middle of a feather.

The first step in making a plectrum is to trim away the pith at the end of the shaft using your voicing knife. Imagine a plectrum 10-12 mm long. Gradually taper it in thickness leaving some pith at the base of the plectrum and none at the tip (Figure 9). Try the trimmed tip in the tongue from the rear, being careful to brace the tongue from the front with your finger or voicing block. If it is too wide, lightly taper it from each side (Figure 10). The idea is to make the plectrum just thin and narrow enough to fit snugly into the mortise in the tongue with as little taper in width as possible. Keep trimming the sides and the bottom until it will fit in the mortise and be more than long enough to reach the string (Figure 11). Once the quill is securely inserted in the tongue, cut off the remaining shaft with a pair of nippers leaving about 2 mm or so projecting beyond the rear of the tongue (Figure 12).

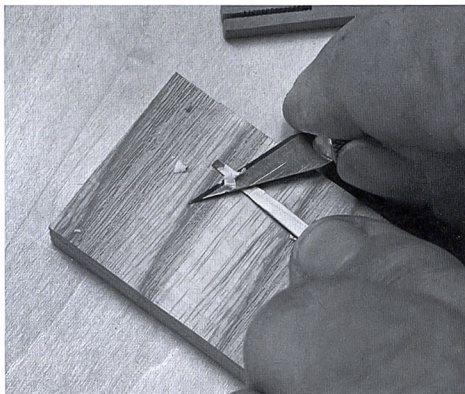


Figure 9: Thinning the underside of the tip of the shaft.

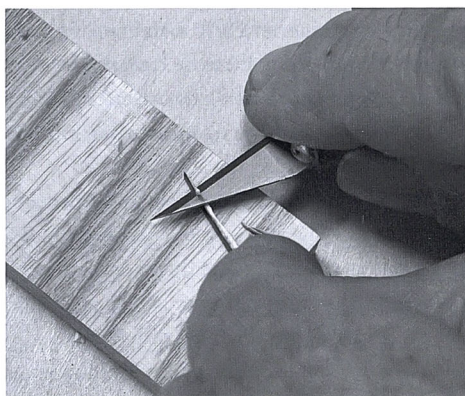


Figure 10: Trimming a side of the end of the shaft.

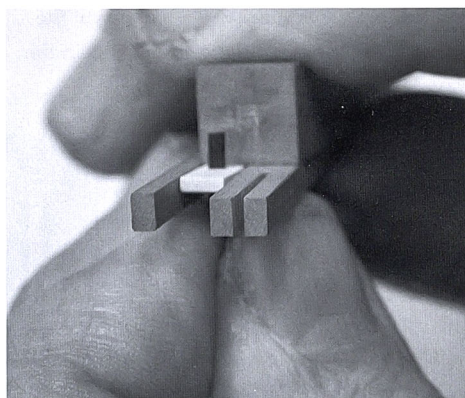


Figure 11: Inserting plectrum into the tongue. Note that the front of the tongue is braced with the voicing block.

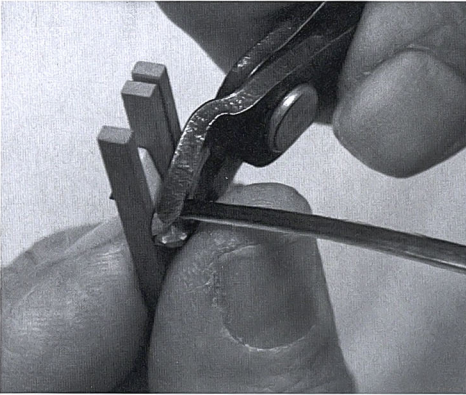


Figure 12: Cutting off the shaft with side nippers.

Because of the inherent stiffness of quill, the amount of overlap past the string is crucial. A replacement should match the overlap of the rest of the register, whether by formally “ghosting”, described above, or estimating by eye. Because quill is much tougher than plastic and you are cutting across its fibres, you will need to press harder with the knife than you might expect. Brace the voicing block on something stable (a table, your knee, but not your harpsichord) when cutting. Try to make the cut parallel to the front of the jack and angled up about 30° when viewed from the side (Figure 13). The first cut will be the most difficult because you are removing the most material. Successive trimming will be easier. Once the correct length has been achieved, check that the width is the same as the surrounding plectra.

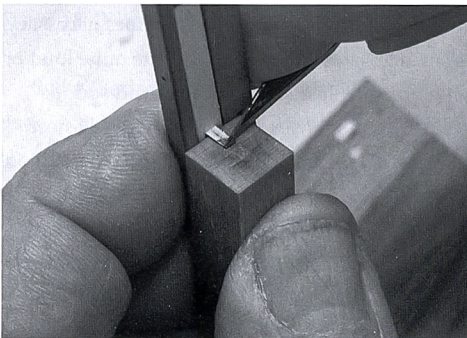


Figure 13: Cutting a plectrum to length.

Voicing

Test the new plectrum without further cutting. If you have chosen the feather well and have shaped the plectrum correctly, it should be only somewhat louder than its neighbours. If it is softer, carefully back it out of the tongue with smooth jawed pliers and save it for a different spot on the instrument. If it is much too loud, remove it and save it for the deep bass. If your experience has been that this will be too loud even for the bass of the lower manual 8-foot, remove the plectrum and discard the rest of the feather as useless.

I find carving to be the best approach to thinning quill, especially for the initial cuts, since the material peels off naturally in layers (Figure 14). Scraping will work as well, especially as you approach the desired volume (See Figure 15, overleaf.). It is a good idea to finish the underside of the very tip with a light skewed cut to remove any fibres which will catch on the string when the note is released and cause the jack to hang.

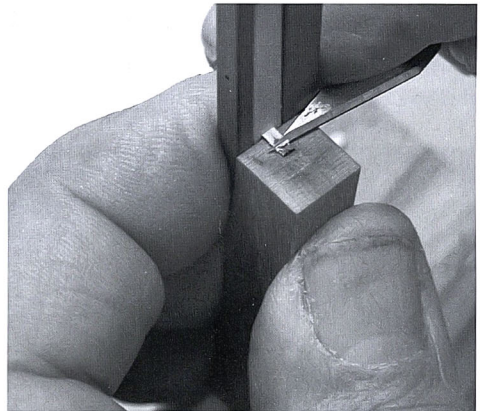


Figure 14: Carving the underside of a Canada goose plectrum.

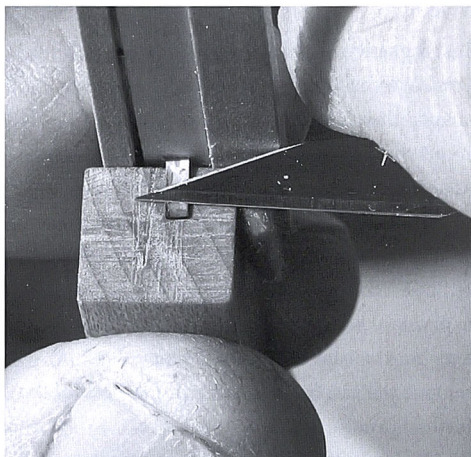


Figure 15: Scraping the underside of a raven plectrum.

As a rule, the less cutting necessary, the better. Ideally there should be some pith present for about half the plectrum's length and the cutting at the tip before the end bevelled cut should not go past the ribbing which connects the pith with the hard back of the feather. Further cutting will make the plectrum more susceptible to splitting, especially on the 4-foot (Figure 16). With thicker quills, an unpleasant clicking sound added to the ictus of the attack will inform you that you have cut this quill too far.

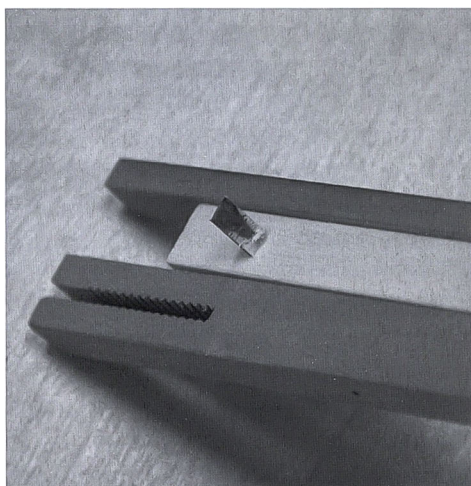


Figure 16: Finished 4-foot plectrum in Canada goose.

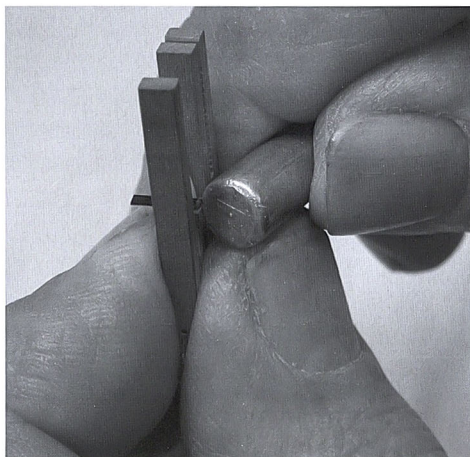


Figure 17: Pushing plectra further into the tongue to increase volume using the handle of a voicing knife. Note that the front of the tongue is braced with my left forefinger.

As with plastic, it is usually possible to make a quill plectrum louder by pushing it further into the tongue and re-cutting it to the correct length. In this process always brace the front of the tongue (Figure 17). Pressure against the back of the plectrum will cause it to move forward in a convenient series of clicks. One click is often just enough to account for one or two cuts too far in thinning. This technique, as well as moving plectra, is crucial to maintaining evenness of voicing.

Living with quill

The main maintenance requirement for quill is to keep the tips lubricated with oil. This is a bit like tuning; you do it when it becomes necessary, when a few notes suddenly become quite loud or when the whole instrument feels and sounds scratchy and uneven. How often you will need to oil will depend on how much you play and on humidity conditions. Every three or four months is about average. A recently replaced quill will need a second oiling after a few days. Necessary lubrication should not be put off for long as irreversible damage to the quilling will result.

Olive oil has been the traditional choice for lubricating and “toughening” quill, but it tends to gum up and go rancid and its slight acidity cannot be good for the strings. Other oils have also been recommended, including emu oil and Ballistol. We have found that a very light lubricating oil (sewing machine oil) is an excellent choice for lubricating quill.

The process is quite simple. You use a small (00 size) artist’s watercolour brush. The oil goes on the tips of the plectra at the point of contact with the strings and nowhere else. Until you gain confidence in applying oil, take out each jack for this. Eventually it will be easy enough to just play the note to gain easy access to the quills. The amount of oil necessary is infinitesimal; one half depth charge of the brush should do a whole register. Many of the little instances of unevenness which may have crept into the voicing will vanish with oiling (Figure 18).

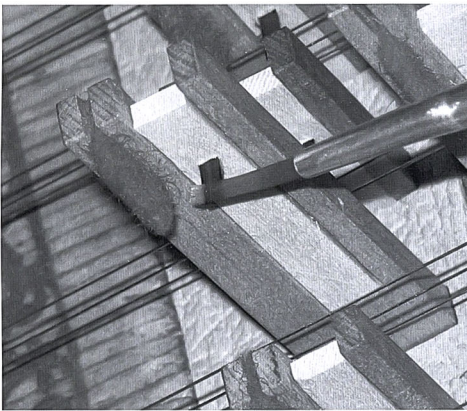


Figure 18: Oiling a quill in place. The plectra are raven.

Some plectra are bound to fail eventually. A suddenly dull note means a lengthwise vertical split. A note growing softer every day is usually a horizontal split. Eventually they will need to be replaced. Inevitable unevenness in voicing can be corrected easily with a scrape or two of a voicing knife. With practice, these become trivial tasks. Remember that Bach could be ready to play in 15 minutes. Meanwhile you will be

enjoying all the advantages of the musically superior and historically correct material. There will be no turning back.

- 1 for the benefit of British readers “shucking corn” means peeling away the outer skin/leaves from a fresh corn on the cob