

# Rethinking Rehairing

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**Benoît Rolland:** My goal today is to open a forum about rehairing. It would make everybody's life easier if we could simplify rehairing, which is a difficult operation; bows can suffer badly during the process.

The traditional method requires good hand training. Rehairing slowly became a problem as long apprenticeships disappeared. Competent rehairing is now no longer widely available. We can resolve this problem in two ways:

- Carefully training competent artisans who will preserve the patrimony of historical bows; and
- Modifying the setting of the hair in the new bows that we make in order to simplify future rehairs.

Obviously, we shall not modify the rehairing settings in existing bows, but there is no reason to perpetuate a problem, potentially threatening the longevity of all bows to come.

We need to define a good technique. I looked into it and believe it will require only minor changes. We also need to agree on a standard procedure. Clearly, we do not want to start a mystery game, uncovering a different hairing system each time we open a bow!

Musicians would not see any difference in their bows if we slightly modify the shape of the mortise in the frog and the wedge; they will be happy if they can have a good hair each time without fearing for their bows.

Why don't we pool together ideas and experiences? If we collaborate, we could launch a new norm for rehairing at our next Convention in two years.

I will analyze the current typical rehairing technique in order to define the specifications for a new system. I will then review the main alterna-

tive models that were tried in the past, and look more closely into one or two devices that seem promising.

I will focus on the frog today. We can greatly improve rehairing without changing the head mortise, which is relatively easy to handle as it is, given some precautions.

## THE CURRENT METHOD

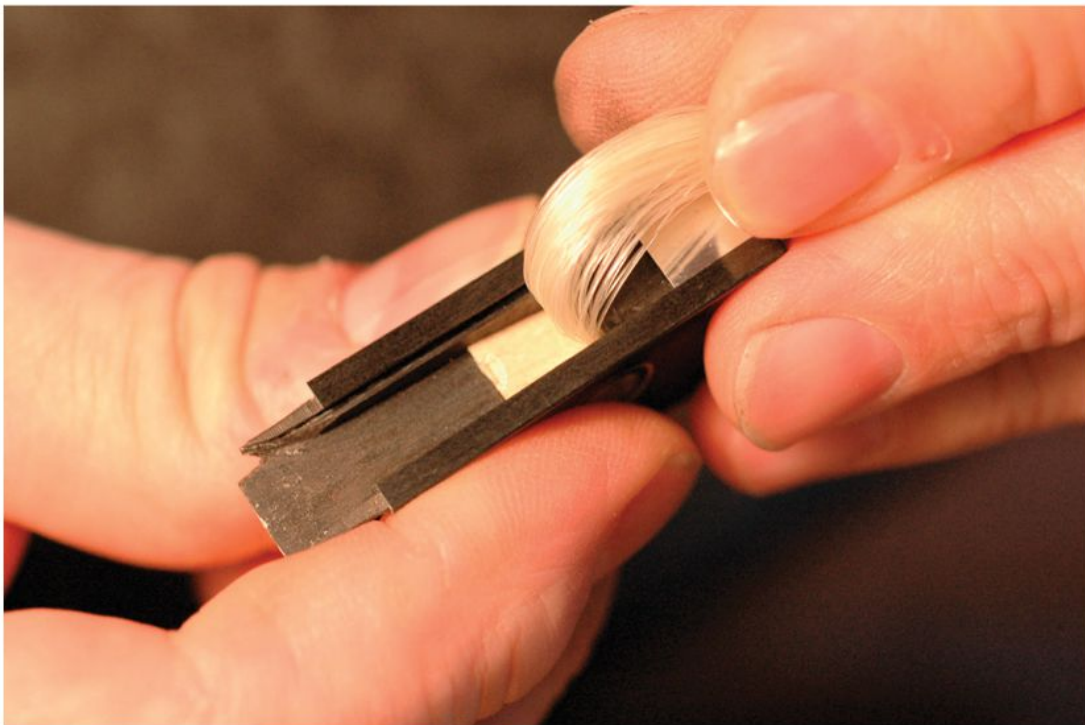
The typical procedure for rehairing a bow consists of inserting a tied bundle of hair in the frog mortise and fastening it by pressing with a plug (Figs. 1, 2). The hair is then spread into a wide and even ribbon and squeezed between a wood wedge and the base of the metal ferrule (Fig. 3). It will later be combed and fitted into the head.

In the frog area, fitting the hair covers two operations that have different functions: locking the hair in place so that it fits tightly in the frog, and turning the bundle into a ribbon. This concept is good for several reasons:

1. It fulfills its goal:
  - It is light and strong;
  - It spreads the hair into a wide, even ribbon of equal thickness and equal tension across the ferrule base;
  - It locks the hair in place; and
  - It preserves the beauty of the frog as it keeps the fittings invisible under the pearl slide.
2. In well-trained hands, it is basic and straightforward to execute.
3. Everybody knows the process.
4. Supplies are rustic and cheap: any bow can be rehired using the same items (no standards of measurements or pre-manufactured parts).



*Figure 1. Horsehair.*



*Figure 2. Fitting the wedge.*



Figure 3. Spreading the hair evenly.

This gives us the specifications list: we want to keep the same quality for any new system. Simple is beautiful.

Here is the drawback: this method became problematic because it involved great dexterity and years of practice. It definitely *is* a work of precision. Bernard Millant often says that one needs to rehair a thousand bows to know how to rehair a bow. I must add to his sentence, “One needs to rehair *competently* one thousand bows ...”

Even though I have myself rehaired about 20,000 bows, it still gives me some stress. Removing the wedge is a delicate operation, as much as putting a new wedge in. The ferrule is a soft metal part and can easily warp; inside it, the ebony tongue is fragile (Fig. 4); never pull on the ferrule with pliers (Fig. 5); chip the wedge off patiently with the right tool (Fig. 6).

The new wedge should be inserted tightly but not forcefully (Fig. 7) and the hair should be spread evenly and pulled on (Fig. 8). Considering that we have only two hands for operating and the materials respond with different elasticity, the procedure is not easy.

The difficulty is of a different nature for the

head and frog plugs: inserting and removing a plug in the frog mortise is easier, but it again calls for care and precision not to damage the edges of the slide or the inside of the frog.

#### MAIN ALTERNATIVE MODELS USED IN THE PAST AND SOME RECENT INNOVATIVE SYSTEMS

Some primitive bows show no mortise or plug, but a hook that holds the knot. The ferrule was not known. This device was musically limiting because it did not allow one to widen the hair into a ribbon. Yet, it might be interesting to keep something from it.

In the Baroque period we see frogs without a pearl slide or with half slides. Early in the 20th century some manufactured modern bows used a half slide. They had no wedge and no ferrule, saving on labor: the hair was channeled along the frog and held with a simple plug. In this setting the hair is too narrow, too loose, not resilient enough, and not very elegant. This pattern has been rightly abandoned.

I should, of course, mention Pajeot’s self-rehairing system. J.B. Vuillaume appropriated

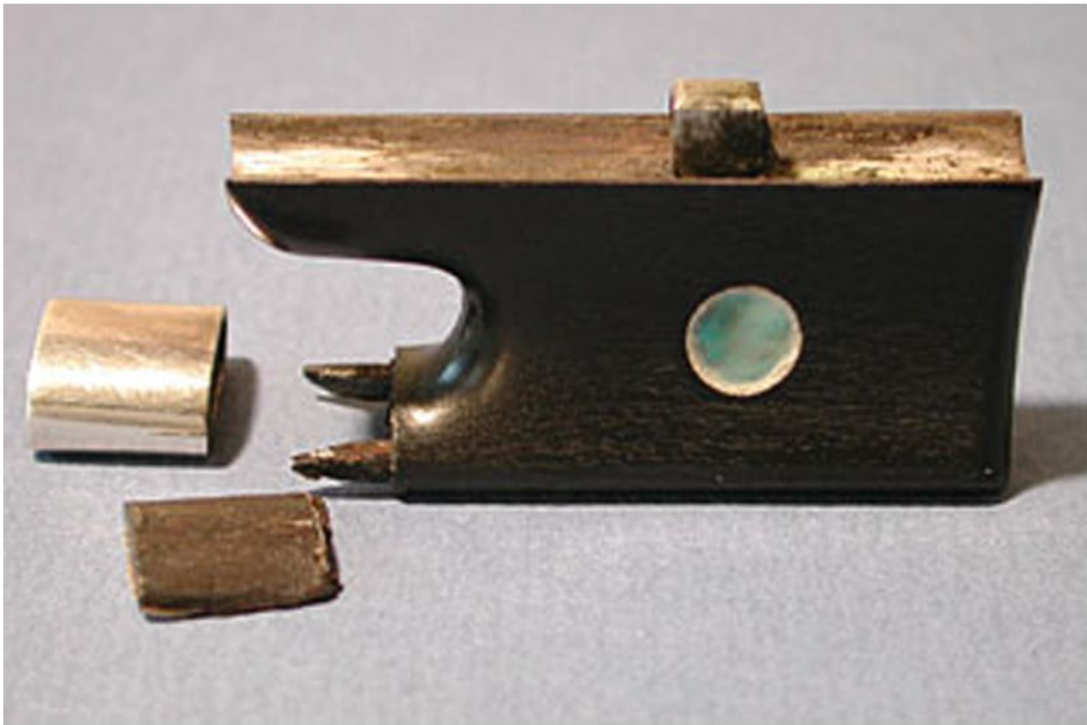


Figure 4. A broken ebony tongue.



Figure 5. Do not use pliers!



*Figure 6. Chipping off the wedge.*



*Figure 7. Inserting a new wedge.*

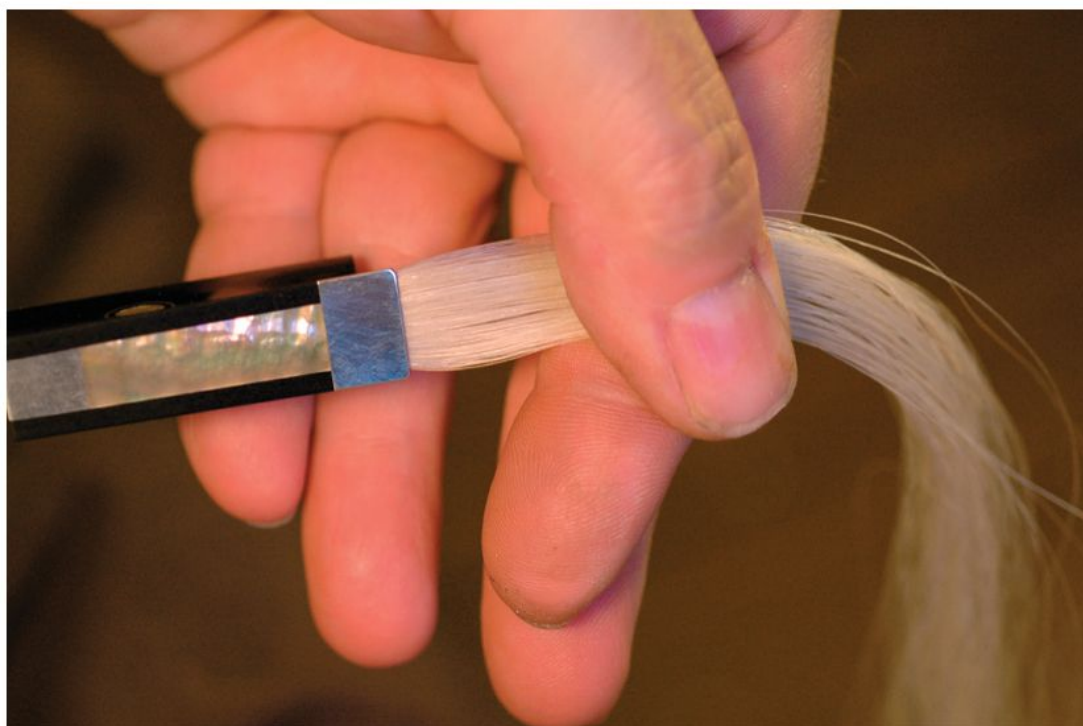


Figure 8. Stretching the hair.

and patented the invention, but we recognize the real inventor, particularly today in this *Innovation* meeting! Self-rehairing was in theory ideal: a musician could change his bow hair anywhere in a matter of minutes. The hair was crimped in a small metal bar inserted into a notch in the frog (Fig. 9). Dominique Peccatte also used the device at a time when it was fashionable.

In fact, the whole thing is very impractical: the hair length must be pre-standardized, the dimensions of the head and frog mortises must be precisely identical, and the holes in the head and frog are not attractive (Fig. 10).

Let's now look at a very interesting idea from James Tubbs: the ferrule without a wedge. Some of Tubbs's bows simply pinched the hair in a very narrow space between the ferrule and the ebony tongue. It is simple and it works. The main advantage is it suppresses the wedge, but there are two problems: the ferrule is soon out of shape and the compression rapidly wears off the ebony tongue. Altogether, the bow does not allow for more than three or four rehairings.

In recent years I have seen a couple of clever new devices. I shall not say more about Gilles Nehr's *Tête-Bêche* bow and its innovative hair fitting, as we just heard about it in detail. Another

good example is the design that Gilles Duhaut (Fig. 11), an inventive colleague, uses for a transparent frog. Such a device was first invented and used by Johannes Finkel. Gilles could not be here, but he sent us some photographs. He locks the hair inside the ferrule, getting rid of the head mortise and plug (Fig. 12). Looking for pure transparency in the frog, he uses this simple method: he clamps the hair in a synthetic barrette (Fig. 13). The hair ribbon is pre-shaped to the exact width of the ferrule. The drawbacks are the ones encountered in any system relying on the ferrule shape and requiring precision fitting as well as a specific preparation of the hair.

## A PROMISING OPTION

Ultimately, mass production led to the most practical and interesting ideas (Fig. 14). About 30 years ago in Asia, engineers imagined this device for very cheap bows: in place of a mortise was a cavity constricting into a channel shaped between two claws. The model might be patented; we should verify its status. The hair was tied first in the usual manner, inserted in the hole, and then flipped back over the claws that constrain it (Fig. 15). The knot itself locked the hair in place.



Figure 9. The head of a self-rehairing bow made by Dominique Peccatte.



Figure 10. The frog of a self-rehairing bow made by Dominique Peccatte.

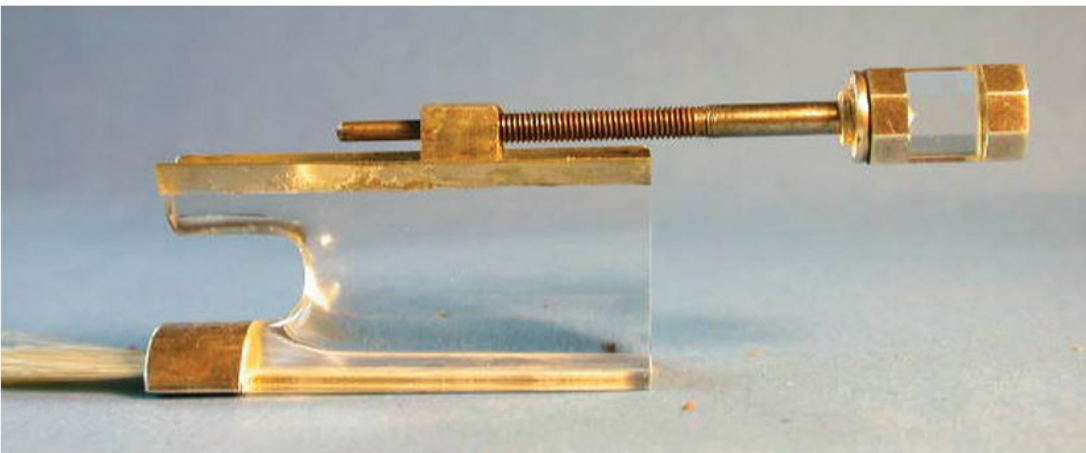


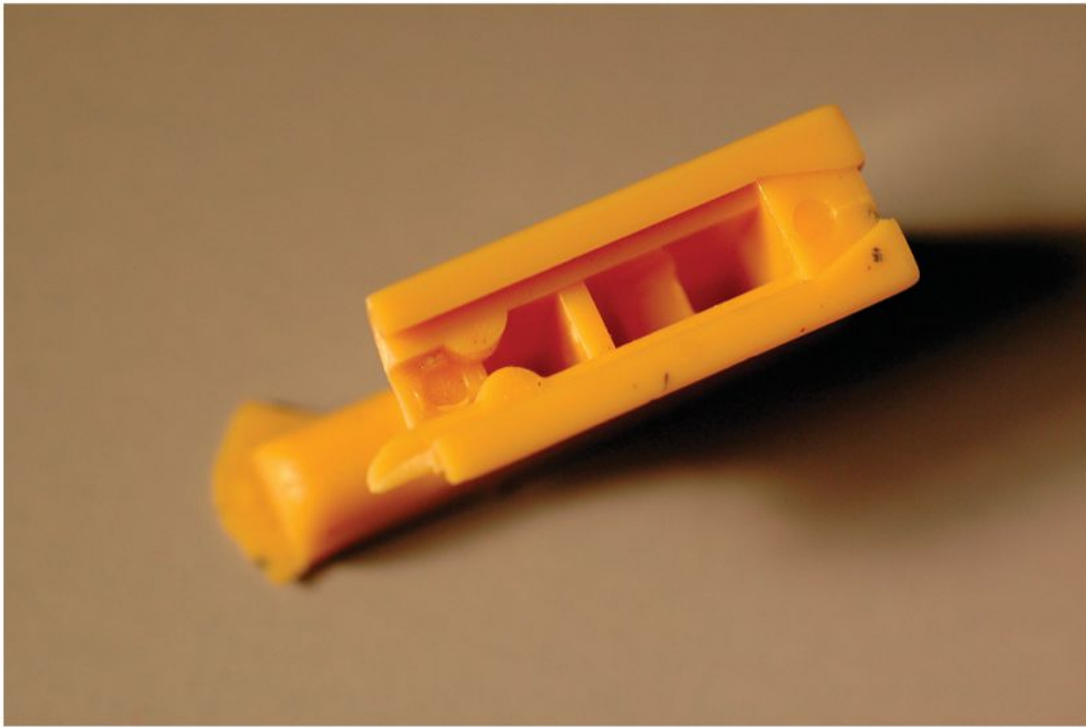
Figure 11. A frog made by Gilles Duhaut, after Johannes Finkel's invention.



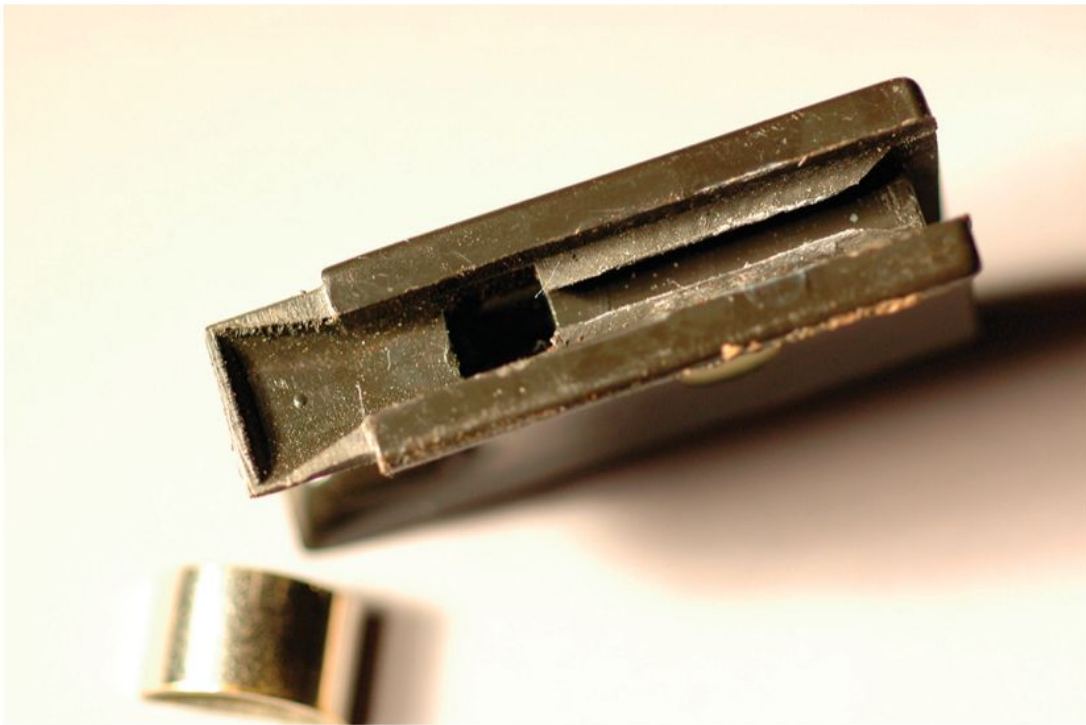
Figure 12. No mortise, no plug (frog made by Duhaut).



Figure 13. The synthetic barrette in the frog by Gilles Duhaut.



*Figure 14. Molding of an Asian industrial frog.*



*Figure 15. Inside structure of the industrial frog.*

Table 1. Specifications for a new rehairing concept towards a new norm.

|   |   |
|---|---|
| 1 | A strong and light device.  |
| 2 | The hair spread into a wide and even ribbon of equal thickness and tension across the ferrule base. |
| 3 | The hair locked in place.   |
| 4 | Preservation of the aesthetics of the frog: invisible fitting under the pearl slide.                |
| 5 | A process basic and straightforward to execute.   |
| 6 | A process that can sustain hundreds of rehairings before repairs are needed.                        |
| 7 | Simple and versatile supplies (no measurement standards or pre-manufactured parts).                 |

We have here a variation of the same idea, used in the Golden Strad bows. The device eliminated the plug and its adjusting time, and the Tubbs system was taken over to avoid the making of the wedge. It allowed us to keep the pearl slide and the ferrule remained traditional.

This clever design presents three difficulties:

1. The knot must be perfect and very strong as it holds everything;
2. The frog will be too heavy if the cavity carved for hosting the knot alone does not remove as much weight as a traditional mortise does; and
3. Shaping the channel implies some extra work for the bowmaker.

## HINTS FOR DEFINING A NEW NORM

I suggest that we keep in mind the specifications listed earlier as requirements to be met in any new system (see Table 1). Otherwise, we risk innovating while downgrading the quality. This said, we can start by suppressing the wedge. Tubbs's idea can be improved on, for instance, if we simply:

- Use a stronger grade of silver that keeps the ferrule in shape; and

- Reinforce the ebony tongue by inserting between the ferrule and the ebony a thin piece of high-grade carbon fiber or metal.

As for designing a frog mortise shape and hair device that would allow us to get rid of the plug, I call on your imagination. This is an exciting project and we should try our neurons on it!

But remember, "simple is beautiful," and Christopher Columbus's clever method of making an egg stand up straight remains as famous as his discovery of America! <sup>1</sup>

## CONCLUSION

I hope that we can continue sharing ideas as I am sure that many of you have already thought of new ways of fitting hair. The goal is to define a new norm and keep it accessible to everyone. The VSA gathers enough makers from around the world to have the capacity of promoting a concerted norm in making, but we must coordinate our forum. There are various ways of doing this and I am willing to centralize our ideas and suggestions, if you like.

<sup>1</sup> Referring to a challenge at a court dinner in which the guests were asked to make an egg stand up straight. Columbus asked for a hard-boiled egg and then tapped it lightly on the table to make it stand.