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Photo on page 2: Photo on page 74:	Rick Robbins, the special guest of IBRA Gathering 2019 IBRA at Porretta Terme fair

EDITORIAL

by Maurizio Cardamone

Number 19, the autumn-winter issue of the Bamboo Journal is here. It would be nice to have regular issues of the BJ – we will try – and I hope this one will pay back your patient waiting! As you know, I like to begin with a little comment on the fishing season: after all we talk about superlative fishing instruments! Thus we noticed that 2018 is in a climatic trend that brings with it comments like: "the weather is not what it once was!" it was definitely a more "anomalous" year than usual. Autumn arrived after a very uncertain spring with rain showers and high temperatures, followed by unstable weather all of June and beginning of July. Then the conditions became progressively hotter between the middle and the end of summer. The very abundant rains were mainly thunder showers with hail and whirlwinds, particularly in Northern Italy, with very serious damage to the population. This was the year of floods and disasters: many rivers in different parts of Italy were swollen, which could have had devastating effects on the fish. It is a fact many rivers have been subjected to changes in their morphology. Perhaps it is too early to reach any conclusion, we will see the 2019 fishing season.

Fly fishing with bamboo rods or others, is not in excellent conditions, at least according to the news from the forums and PAM friends (unfortunately my sources only cover Northern Italy). They all complain about the reduced activity of our finned friends on the surface, which has a recurrent chorus of recent years. Are the cormorants to blame? Or do we want to justify the hard pressure from the market towards alternative fishing methods that many have difficulty in accepting it as an orthodox variant of fly fishing. I am not only speaking about nymphs, those classically cast with a leader suitable for their small weight (the debate between Halford's followers and Skues's followers will go on forever, I think. See Giorgio Grondona's article "Federico and in this issue), but of the so-called long nymph or European nymph, that technique borrowed from the competitions that has eliminated the line as we knew it in favour of a long, very long nylon or mono leader. There is a fishing line, in accordance with the regulations but it remains well wound on the reel and is not used in casting that is reduced to a simple overturning of the leader. You may say: "what does this have to do with bamboo?" little– I think – but I wonder if the rods that the market proposes nowadays for long line nymphing, 11-12 feet 1-3 wt, will manage to penetrate (or should I say contaminate) the world of bamboo?

The BJ#19 issue comes shortly after the IBRA 2018 building class that was a great success in terms of applications (you will find a report and photos in this issue). Could this be proof that there is a phase of renewed interest for bamboo in fishing. We all hope so, even if the rodmaking numbers in Italy do not allow us to make statistical considerations. We will see at next year's gathering; time will tell …. The BJ#19 come after the European gathering in Waischenfeld, where IBRA participated with a technical presentation by Gabriele Gori ("Rapidity of the rod", which is also published herein). Then a very technically interesting article by Davide Fiorani on his tapered ferrules in bamboo, presented at the IBRA gathering in May; a contribution by Daniel Le Breton on the design of the rod; a very interesting contribution by Alberto Poratelli on the use of epoxy glue and a detailed explanation of spliced ferrules by Massimo Giuliani. As a poetic interlude among all these technical things we have "I know": a new contribution to Alberto Mussati's series.

At this point I'll end with my usual: happy reading to all our Italian and foreign readers. I won't ask you to "like" it as is custom in social networks but I do ask you to contribute to the Bamboo Journal with suggestions or constructive criticism. And above all, with articles.

Write to me at: editor@rodmakers.it.

TAPERED BAMBOO FERRULE

di Davide Fiorani

I have always been fascinated by the concept of using bamboo ferrules in two or more piece rods and among those designed in the past by rodmakers like Calviello and Fries, I personally prefer the one built by Alberto Poratelli and I have often used it to make my rods… after all, with IBRA I had a home court advantage.

The concept is based in the design at the tip of a hexagonal cap without conicity, created by executing a swell at the top by “forcing” the last station of the planing form. This allows you to make an integrated ferrule of a certain length and an average thickness of 2.0 mm more than the male: the dimensions of the walls of this ferrule and its depth are proportioned to the taper of the rod that is to be made. The male is then made at the head of the butt and it has the same dimensions of the cavity inside the female.

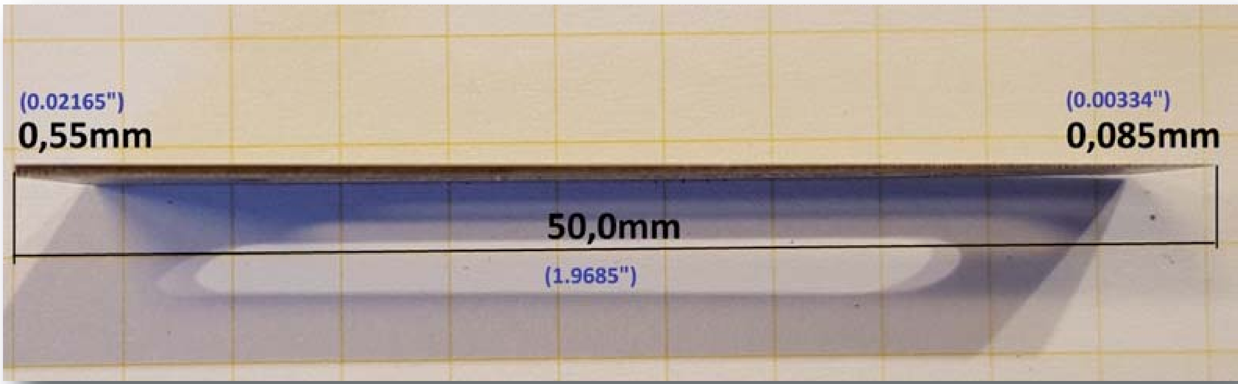
Some time ago, while observing a rod with this type of bamboo ferrule, I was wondering how I could make one with a thinner swell for the female. I also wanted to avoid abrupt changes in the section of the ferrule that could have given rise to potential breakage points with the rod under stress. The objective was to obtain less stiffening in the whole area, to have better continuity in the curve of the rod as well as making it aesthetically more linear. I remembered the machine taper coupling used in mechanics for two cone-shaped pieces, male and female, like the cap insert “sleeve-over ferrule” used also for the carbon rods and I started analysing their characteristics.

Subsequently, I decided to build a 7’0’’ hexagonal rod with the same taper of another rod that I had built with the Poratelli-type ferrule, so that I could compare them. My purpose was to decrease the final thickness of the swell that was 5” long by 1.0mm (0.03937”), to them build a tapered female 50.0mm (1.9685”) long, which would have the difference between the height of the initial hexagonal section and the final one equal to 1.0 mm (0.03937”). Practically making a double swell at the base of the tip: the first one 5” long and the second one 50.0mm (1.9685”). The ferrule had to have a hexagonal and conic hollowing and the thickness of the wall had to be 1.0mm (0.03937”). Consequently, at the head of the butt I needed to make a hexagonal male 50.0mm (1.9685”) long, with the same dimensions and conicity as the cavity of the ferrule. I called this type of insert Tapered Bamboo Ferrule or TBF.

A practical example (see figure below), for the rod with a “linear” ferrule and a male with dimensions 4.90mm (0.1930”) and 50.0mm (1.9685”) length, the swell created at the top to make the female must be 6.90mm (0.2716”), to be able to obtain, once hollowed, a ferrule with a continuous hexagonal hole 4.90mm (0.1930”) high and walls 1.0mm (0.03937”) thick.

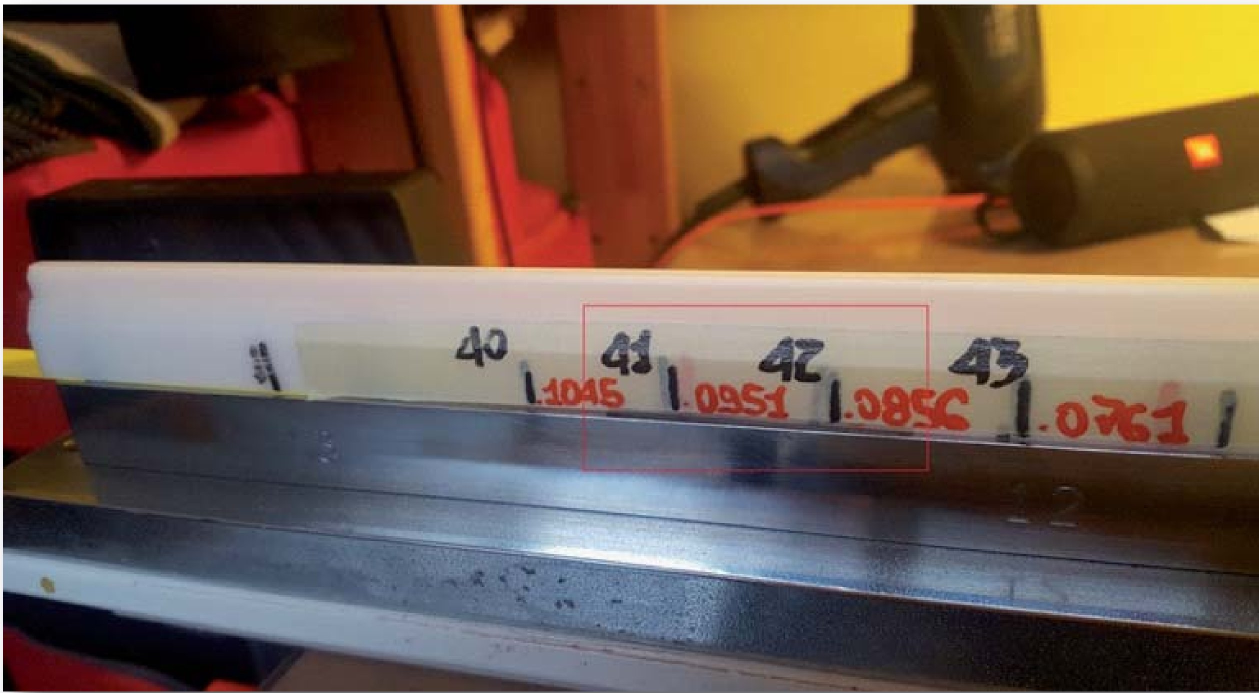
For the same rod with a TBF insert of the same length, the male will have an initial thickness of 3.90mm (0.1535”) and a final one of 4.90mm (0,1930”). This implies that the measurement of the swell in the last 5” of the tip necessary to make the female 1.0mm (0.03937”) thick, must be 5.90mm (0.2323”). The ferrule must then follow the conicity of the male for 50.0mm (1.9685”) to reach the end at 6.90mm (0.2716”). Once hollowed, the hexagonal hole in the female must have the same dimensions and conicity as the male.

Good, but how is it done? I found one way of making it by building an "accessory", a tapered shim that allows you to create the conicity in the insert using the Morgan Hand Mill.



Fixing this spacer on the guide of the MHM between the adjusting bed and the anvil at the height of the positions of the male and the female and with the help of the regulating screws of the MHM, I obtained the conicity of the insert of about 1.15°, necessary for a taper of 1.0mm (0.03937") between the top and the bottom of the ferrule 50.0mm (1.9685") long.

To make the male of the butt, I inserted the tapered spacer with the thinner side between the first inch of the TBF, i.e. between 42'' e 43'', and the other ends beyond the end of the male between 41'' and 40''. I then inserted a series of 0.70mm (0.02756") spacers until the end of the bed, which helped me to maintain the conicity beyond the end of the male.



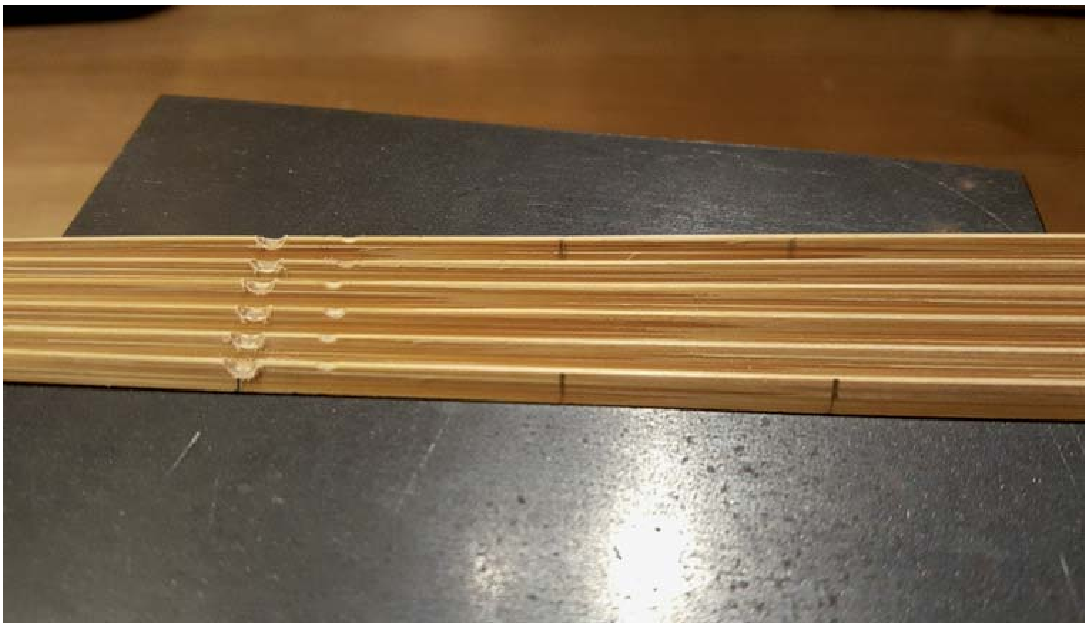
I then set the taper by regulating it an inch further, in this case up to 40" and I made the strips.

I glued them and cleaned the blank. I cut the butt 10.0mm (0.3937") longer on the head, close to 40 1/2", to be able to adapt the length of the male snug into the female, shortening it to get the final coupling and the right tightness. The superficial finishing was done with 800 grain sandpaper.

To make the ferrule on the tip I put the tapered spacer with the thin side (see photo below) in the middle of the first inch of the TBF, between 43'' and 42'', and the other side which ends beyond the head of the female between 41'' and 40''. I then inserted a series of shims of 0.55mm (0.02165") under the entire remaining length between the adjusting bed and the anvil to bring the latter on the same level.

I set the taper using the measurements MHM and made all the strips.

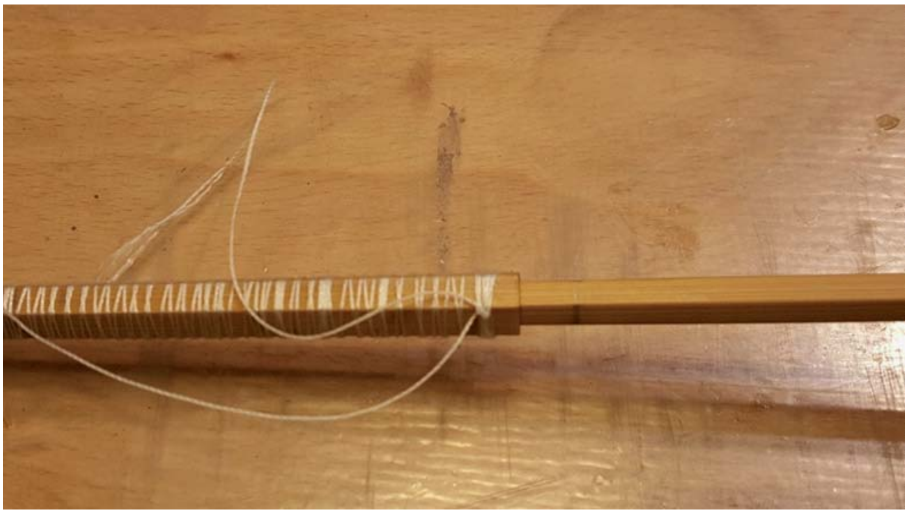
With a pencil I marked the end of the female and I engraved the strips using a small round file to then do the hollowing and carve out the slide of the male.



I then removed the spacers, reset the adjusting bed of the MHM to 0 and worked all the slides of the female on the strips, bringing them to 1.0mm (0.03937") thickness.

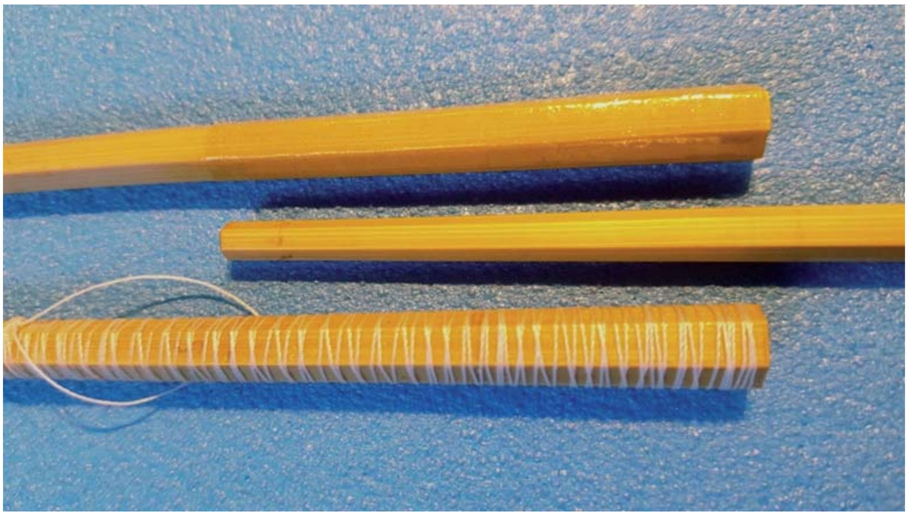
I cut the strips of the tip to measure, smoothed the edges with a fine sandpaper pad.

I tied the tip and tried the ferrule by gradually shortening the head of the male, almost reaching the length necessary to obtain the tightness. The last adjustment if done after the final tying of the ferrule.



I moved the male inside the female several times to clean the inside from glue, using thinner every time I extracted it: it needed to slide well without “sticking”.

Once the epoxy glue had polymerised I untied and sanded the rough piece, found the spine and finally tied the female with 3/0 silk and varnished it with epoxy. The tying of the ferrule must be done taking care not to tighten the female too much to avoid deformities.



After 24 hours I inserted the male which turned out to be a little slack. I began to shorten it with a pad of sandpaper of 0.1 - 0.2mm (one or two thousandths of an inch) at a time, always trying the fitting to reach the exact coupling, keeping the condition that it would be snug against the head of the female ferrule. I then waterproofed the tip of the male with a drop of epoxy.

Here is the finished ferrule...

… and the video https://youtu.be/Bt_2XtUsi7E

Comparing it to the other rod with a bamboo ferrule, it has an aesthetically better line and harmony due to the thinner sell as well as when loaded, the curve has more continuity because it is less rigid in the area above the ferrule.

Another advantage I noticed was a greater ease in separating the pieces of the rod after fishing. Just hold the initial grip between the two sections to divide them easily like the carbon fibre rods that have this type of ferrule.

I think that if a constant use of the rod should cause a slack grip, shortening the male would probably allow it to penetrate a little further.

In conclusion, I do not have the presumption of having "invented" anything or done something better than my predecessors that tried their hand in making bamboo ferrules. All I wish to say is that thinking of the concept of a conic coupling could open another prospective and be a different system, already used in graphite rods, joining two or more sections of a bamboo rod: I felt it deserved a more detailed study which I think is starting.

So, all that is left for me to do is continue my sacrifice and go fishing with this rod to see if my hypothesis, my project and my creation will be proven in practice…a terrible life!


Bjørkum Pool

Federico and... Giorgio

by Giorgio Grondona

June is a special month for the river Federico usually frequents, he loves “dry fly” fishing, he only “dry fly” fishes and in the month of June he spends several days on the river to exploit the hatching of the “May Fly” (Humans are very strange, you call them mayflies but they so willingly hatch in June) and anyway today is not a great day (for fishing) even if the sky is cloudy, the temperature mild, the light breeze blowing from the south warm and humid brings the perfume of freshly cut hay...enough, not a single mayfly flying in the scent of cut grass, the surface of the water looks like a sheet of crystal, still, not a rise, the trout break the surface to seize the insects not to break the silence with their leaps.

Federico watches the two fishermen who had been his dinner guests the evening before, sitting on a wooden bench under the big oak, where the river curves to the left and disappears among the fields, about three metres from his position. Behind him a willow offers shelter to another bench, it was a good idea to place the benches along the fishable part of the river, convenient in several circumstances: eating a sandwich alone or in company, tying flies to the leader or simply enjoying the shade on those hot, bright days.

Federico loves that part of the river, between the willow and the big oak, in moments like these, when trout and grayling seem to have disappeared in thin air, he sits down, leans the rod and the net against the trunk of the willow, he puts the fishing bag next to him, Federico does not use a vest, he takes out a pencil and notebook as if he were at the desk of an open-air office.

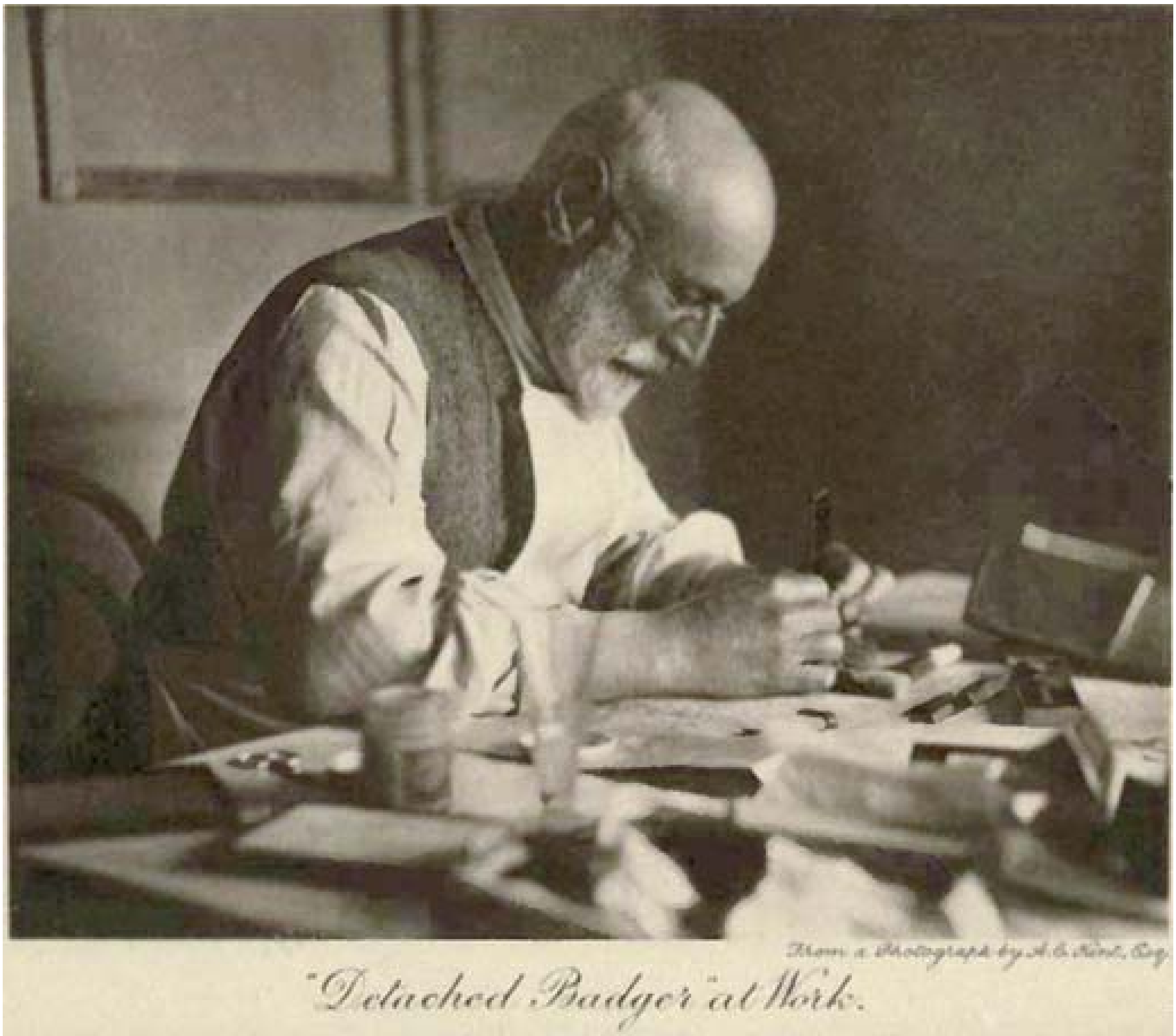
Sitting on the bench in the shade of the willow, Federico takes notes for his next article or book he will write about fishing. From this privileged observatory he notices the various insects that, according to the season, the climate and the time of day capture the interest (appetite) of the trout and the grayling. Sometimes he renounces to fishing regardless of the many rises that would tempt any fisherman to catch these marvellous fish. Federico is not like other fishermen, the insects that he sees, preys of the fish fascinate him more than the fish, but above all, he studies their size and livery, he elaborates “recipes” and thinks of the materials to imitate them. Sometimes Federico talks to other fishermen and listens patiently to their stories, they all treat him with great respect, they recognise great sportsmanship in him, Federico only “dry fly” fishes and casts his imitations only upstream.

...September

Federico prefers fishing weekdays, he is a businessman so he manages his work tasks, we should go fishing when it is the “Moment”, not when we have time. During the week there are few people on the river, on the weekend instead there are many fishermen, even from afar, who stay in the small hotel for the entire weekend. They arrive on Friday night with the train from the big city.

It’s time to leave, Federico can’t wait: he needs to be in place where he has been invited to fish and when the club that manages one of the best stretches of that river invited him for the weekend, he accepted gladly.

Although Federico loves fishing on weekdays, he is happy to make an exception, he can meet!!!



From a Photograph by A.E. Kent, Esq.

“Detached Badger” at Work.

Giorgio is a little younger than Federico, he has a job that keeps him busy the whole week, on Fridays in the late afternoon, he catches the train and goes to the city where the river he has been fishing since he was a student flows. The trip helps Giorgio to go into “fishing mode” and to do so he reads books and magazines that talk about his great passion, that is how Giorgio learnt to appreciate Federico, after reading several articles in the most famous magazines, he bought his first book, Federico is a good “communicator”, in his writings he describes his experiences, he recommends strategies, suggests dressings, all for a more fruitful and sporty fishing with “the dry fly”. Giorgio is interested in what Federico writes, but sometimes the fish just don’t want to rise to the imitations, in fact they are nowhere to be seen on…the surface!!!

What to do?!!!

At the beginning of his fishing career, Giorgio put up with the inactivity of the fish. When he saw no rises, he sat on a bench (there are benches on the river Giorgio fishes too), but he dislikes staying hours with nothing to do. He started walking slowly along the bank, studying the water, he noticed fish hiding among the weeds that waved in the current, others were motionless on the sandy bottom…sometimes. Other times no, they were “mid-water” or a few centimetres under the surface, he could see them making small movements to then come back to their original position, when they moved he could see the white in their mouths. Giorgio thought if they opened their mouths a reason could be that they were eating…but what?!!!!!

Giorgio only has Saturday and part of Sunday to fish, he does not like waiting hours for the fish to start feeding on the insects that are starting to hatch, so he decides to check what the stomach of the fish contains, fish he catches with "the dry fly" and he notices in addition to insects that have completed their metamorphosis, there are also insects that haven't completed the last phase yet: the nymph!!!

Among the various components of fly fishing, flytying has fascinated Giorgio since he approached this hobby, so he has no difficulty in tying some nymph imitations to offer the trout when they ignore his "floating" flies. Giorgio has also decided how to use them, he will tie only one to the leader, yes, only one, as if it were a "dry fly" and as a "dry fly" he will cast upstream offering it to that fish he sees active just under the surface of the water...it works!!!

The nymph cast upstream submerges (it bears no weight, the water it absorbs is enough to sink it), it sinks just enough, the trout sees it and dashes in its wake, catches it, Giorgio reels it in and in no time ... the fish is in the net, then it is joined by another fish and then another. Giorgio is elated: he likes his idea, it enables him to fish consciously even when the "dry fly" is ignored, consciously because the nymph is for a fish blatantly inactive, thus "in sight" as a fish continuously rising, even the "sport" aspect is not open for discussion.

Ooopssss, how careless of me, I ran too much (I forgot I am a donkey, I walk, my cousins the horses, run, some very fast). Federico's train has arrived and he has settled in his hotel room, Giorgio's train will arrive soon and he is staying in the same hotel, they will meet in the bar, they will talk about their visions of fishing with an imitation fly, their meeting will go until late: there are many stories to tell when we share the same passion, even if one looks up and the other down...

Federico had already heard of Giorgio. Federico was excited to meet the man that many fishermen criticise because he “also” used nymph imitations. Federico likes Giorgio’s ideas so much he encourages him to join the club he is representing at this meeting.

Giorgio will continue his studies of the life of water insects and of the feeding habits of trout and grayling, he will write articles that will be published in the most important fishing magazines in the world and he will correspond with some of the most famous people, his peers, in fly fishing.

Federico will always have great respect for Giorgio, but he will never accept to put fishing with the “dry fly” and fishing with the nymph on the same (sports) level. Regarding this, Giorgio will feel obliged to write in one of his books a thought that goes something like this:

“In my opinion “targeting” a fish that is feeding on nymphs under the surface with “dry flies” is not less open to criticism than “annoying a fish feeding “on the surface” with nymph imitations”...

Characters:

Federico: Frederic Michael Halford (1844-1914)

Giorgio: George Edward Mackenzie Skues (1858-1949)

I have read and will read everything I can get my hands on about these two characters, who should I listen to? Both, but ... if it is the “moment” to follow Halford’s instructions all you need is a rod suitable for “dry fly fishing”, but how should a “dry fly rod” rod be? Let’s take a few steps back and exactly to the benches along the river, if it was deemed fit to place them there, let’s not forget that fishing with an imitation fly was born in the quiet rivers of the plain, it means that fishing (as an “extreme” hobby) needs breaks!!! However, there is always “dissatisfaction” and thus someone, demotivated by too much tranquillity in the rivers of the valley, started to cast their own flies (dry) on the fast foamy currents that descend from mountains and hills, if these “gyms” flow in tunnels of vegetation, better, i.e. worse. Why?!!! Because the tranquil waters of the plain we can “dry” fish with a less “dedicated” rod while contrasting fast waters and “hysterical” foliage needs a more specific tool...

And when we are the only “sportsmen” (meaning we only cast floating imitations upstream) on the river, while the fish that do not want to do sport but “play” on, no UNDER another table? Simple: we follow Skues’s advice, we reel in our line, we put the “dry fly” away and we tie a nymph to the leader. Easy, but the rod? We use the same one that until a minute ago cast our floating bait?

The subject is long and complicated, full of prejudices deriving from “bad habits” (in my opinion). What I really wanted to do was …… “open the debate”, which we will calmly discuss in the next issue of the BJ, but if the topic is not interesting, no harm done because as always: “A donkey’s bray does not go to heaven”!!!!!


Sebastian Setélien Calvo

CANE ROD (RE)DESIGN

di Daniel Le Breton

In the world of cane rod building there is a fascination with Garrison's way of designing rods. For me his book was a foundation but events caused me switch my interest to the world of glass and then graphite rods and their fantastic range of possibilities. I consider myself lucky to continue to be involved in these areas. Recently, I helped a cane enthusiast to finalize his rod computing program. Like other aficionados, he swore by the "impact factor" mentioned by Garrison in his book, as a guideline to designing his rods. I know of several programs that are used to calculate a rod profile (Hexrod, Dyna Rod, Flexrod; RodDna) and some of them are close to actual mechanical concepts. Some of them are simple and result in fine cane rod designs, although they are based on Garrison's methodology, which is basically an approximation. I believe that there is no perfect design program and so this leaves freedom for the designer, which I believe is a good thing. What I intend to do is to provide another design approach, based on the underlying mechanics of a cast.

Should I sometimes refer to modern graphite rods for comparative purposes this does not infer that I prefer graphite to cane. For me graphite rods range from 8½ feet long and above; and cane or glass rods are shorter than 8 feet. The intermediate range (8 to 8 ½) relates to all materials, although the results from these may not be truly satisfactory. Scrutiny of the lack of symmetry of a well-defined pattern rolled on a mandrel cannot be compared with a material which varies from one bamboo stem to another, with variable heat treatment from a rod builder to another, with strips arranged in a specific way to maintain symmetry. They just belong to different worlds. Graphite has limited potential for short rods just as cane has limited potential for long ones, and additionally the variety of fibers of different moduli make graphite rod design very flexible nowadays, which is not the case for cane. That being said, let's take a look at the important design parameters for a fly rod.

To get an idea of cane characteristics, there are two excellent documents published by Wolfram Schott, which can be downloaded from the internet or the IBRA website (articles): "Bamboo under the microscope" and "Bamboo in the laboratory". They provide an overview of the range of moduli and density. There is also the demonstration of methodologies to arrange the different strips in a rod section.

E.C. Powell used "parabolic" profiles and there are a couple of interesting paper on these, published by Mike McGuire (I downloaded them from the internet: "Of Powell tapers and parabolics", and "What is a parabolic rod?").

Coming back to Garrison, the "impact factor" is supposed to be representation of the dynamic behavior of the rod, so instead of using just gravity for calculations, one uses 4 times the gravity. In actual casting conditions, the fly line can be accelerated typically by more than 10 times gravity when the line is aerialised, like the one used by Garrison (50 feet), and not 4. The multiplication factor extends beyond that for distance casting (above 25). This casts some doubt over the validity of calculations, especially if they are made as if the rod was straight with the load acting in a particular direction but such conditions do not mean that the results from such simple calculations are not valid because some good rods have been enhanced by using this methodology.

The choice of hardware is important it influences the behavior of the rod, which can be estimated quite precisely: the guides and wraps, the line in the guides, the ferrule and finally the varnish. We will review the effect of hardware later one in this article.

Stress curves are the cornerstone of Garrison's calculations but consider for a moment that there is little chance of reaching the limit for plasticity (to avoid putting a set into the rod), which incidentally is around 300 MPa: from what basis would you start your design? I did not find an explanation about the choice of the level of stress, for various rods, in Garrison's book, and much later after buying the book, I tested a mechanical concept that was surprisingly applicable to these rods. Then I understood the significance of these stress curves. It was the way to define some specific character of the rods as the length and line sizes are changed but nowhere in the book can be found the actual clues for defining the stress curves. One cannot refer to the "action" without knowing what is hidden behind the stress curve.

In the past rod designers had to build their rods for checking if they met expectations. Few of them (e.g. Garrison) had the technical knowledge to link design techniques with results. They had no computers, although they could make a few relevant tests for characterizing their creation. Without the requisite mechanical knowledge, most of them had nothing more than trial and error to rely on; their continued efforts not being reflected by the number of rejected (but measurable) rod profiles. It is amazing to see that although starting from a specific view, which could be disputed (the whip analogy), Garrison did end up by designing a series of rods having nearly perfect consistency. This should make us feel humble, when confronting such a challenge, especially today, since we have the means to draw and check a rod before it is built.

Let's start from scratch and ask ourselves: "how does a fly rod work"? The answer is in the various mechanisms involved:

•The lever: clearly, the lever is a speed amplifier for the line. A long rod (e.g. a two handed one) can easily deliver speed to a fly line. The drawback is that we need to move the rod and to stop its rotation at some time with a corresponding energy loss.

•The spring: this is a complex mechanism. It also allows the speed delivered to the line to be amplified: the rod starts by storing some energy under elastic form and delivers it to the line at the end of the cast. This is not the "bow and arrow" concept but something called the "harmonic oscillator". The way the spring is driven defines its response. The caster's input must match the speed characteristic of the spring (its frequency), to optimize its output, although the system is rather tolerant to this action. This is where some gifted people with an "immaculate sense of timing" outperform others in mastering their casting. To improve one's casting capability there are just three solutions: training, training and training.

•Additionally, the spring can decelerate itself at the end of the motion. This "self deceleration mechanism" is the smart secondary effect which helps the caster to decelerate the butt of the rod. The more the line that is carried, the larger this effect is (see Bamboo Journal #15). This is also what makes one perceive that the rod starts to "work" by itself with a given amount (mass) of line (you know, the line which is supposed to match your rod). It is also linked to the inertial characteristics of the rod, in the same way as the speed of recovery, which is the term used for the natural trend of a rod to unload by itself.

•The inertia, which can be represented by the "swing weight" of the rod, can generate a counter-reaction to a motion. If the rod butt is accelerated, the swing weight effect tends to move the tip backwards at start of the cast (the tip kicks back briefly) and if the rod butt is decelerated it drives the tip forward and this provides a boost to line speed, especially for short distances. This "inertial" effect creates the perception that one merely "throws" energy into the line as one neatly stops the rotation of the rod. The amplification of line speed due to this boosting effect can be of the same order as that provided by the harmonic oscillator, under some conditions (very soft rods). It is relatively small for a long carry, and this is where the harmonic oscillator works best. Luckily, these two mechanisms are in fact complementary.

• The haul: this is an independent voluntary acceleration of the line by using the hand, which can add speed to that generated by the rod tip, if properly tuned but it can also cause a dip in the trajectory of the tip and generate a "tailing loop" if it is made too soon. Timing is critical for maximizing the benefit of the haul, which is not so obvious to define and requires some training. The haul speed should peak just after the rod starts unloading; in other words, one should haul "late" in the cast. A tail in the loop indicates that the haul is too early. I use to rely on the tension in the line, and haul harder when I feel that the tension in the line is close to maximum.

Wow: There are 4 mechanisms involved, and they are all linked together! How can we handle this? To make life easier, we can skip the haul; it does not impact on rod design. For the lever, if we choose the rod length, there is nothing to worry about but it is important for the overall magnitude of speed of the rod. Incidentally don't assume that tip action rods provide a larger lever versus butt action ones, it is the opposite situation.

So, we are left with two main mechanisms; the swing weight and the spring of the rod. Although both exist in a rod, there is a tendency to have a more important inertial effect with soft/slow rods and a greater spring effect with a stiff/fast rod. A deeply bending soft rod comes closer (but just a little bit) to a kind of whip action, but a stiff one minimizes such inertial effect. It is important to be aware of this if one wants to get a general view of one's design. As can be imagined, if there was a simple methodology and a unique choice for designing a rod, it would have been found a long time ago and rod designers would be out of business. This is not the case, fortunately.

What we are going to see now is that there are a few basic concepts, which are related to both spring and swing weight effects. If we could manage mass distribution and stiffness distribution, independently, along a rod shaft, then the design of a rod would be more straightforward. For the time being we concentrate on the main parameters of the rod which are directly related to the cast, but not yet to rod design. To establish criteria, I use models which have been challenged by actual records and professional software; although they remain a simplification of reality, they do give good representation of the way things are happening (the hidden mechanical details). Today I can simulate a cast in two dimensions, to provide an example, but that requires a precise description of the rod.

The harmonic oscillator system works with the speed of the tackle (its cycles per minute if you like), which is influenced by load (the mass of line cast). More mass at the tip means a slower tackle. A higher motion speed and the correct casting arc gives high line speed (therefore we use approximately the same timing but we change the casting arc). So speed is the first parameter to consider. Since we must choose a line corresponding to our fishing practice, we need a line parameter, and this is rod stiffness. This link has been checked with smart casters (Al Kyte) and academics (California Poly University), and is in use by renowned designers. Although each one can have his own scale, in principle, there is the possibility to use a basic one and to adapt it to our own preferences afterwards.

The simplest rule is to define the stiffness of the rod (measured horizontally for a rod clamped at the handle level, I use 17.5 cm for the rods taken in example) as K (N/m) = 0.093 M (reference mass of line in grams). For example, a #5 line corresponds to 9.1 grams * 0.093 = 0.846 N/m (Newtons per meter). Practical conversion: if I put 10 grams at the tip level, the rod will deflect by an extra 11.6 cm vertically (0.01*9.81/0.846= 0.116 m). The scale can be modified, if required, to introduce a compensation for speed trend with length (short rods are faster) and non-linearity (large deflection). The stiffness can be estimated by simple means but it is also possible to calculate it just as stresses are calculated.

Now we must introduce an element, which is a part of the swing weight, called the "equivalent mass at tip" of the rod (see Bamboo Journal # 8). It is measurable too, calculable, and it contributes to the speed of the rod:

$$\text{Unloaded freq (UF)} = 1/2\pi\sqrt{\text{(equivalent stiffness)}/\text{(equivalent mass at tip)}}$$

Equivalent mass at the tip is measured in grams, and mainly varies with rod length. It is sometimes called the "mass in motion" for an embedded beam but in fact everything is in motion in a fly cast. Starting from a known rod, the equivalent mass to another rod of the same type and different characteristics (line, length) can be extrapolated. For "equivalent stiffness", we can take a calculated one to have a good idea of the speed of the rod, and in fact the equivalent stiffness is higher than the measured one, just because static conditions and dynamic conditions are different. For most cane rods the difference is about 12%, so we shall use the calculated stiffness and add 12% to get a fair estimate of the equivalent stiffness, which will give a realistic value for the first natural frequency of the rod if we cannot measure it. Using N/m for stiffness and kg for the equivalent mass, then the frequency is in Hertz (multiply Hertz by 60 to find cpm). From this the variation of speed with load can be calculated, which indicates how fast the rod will be for the anticipated casting mass.

$$\text{Freq loaded(LF)} = \text{Freq unloaded(UF)} / \sqrt{1 + \text{(mass of line outside guides)}/\text{(equivalent mass at tip)}}$$

Stiffness varies with load and the actual pull angle, in a non-linear manner (the rod stiffens as it deflects) but this can be estimated too, providing there is access to a slightly more sophisticated program file. Non-linearity is important, since the higher it is, the longer the carry can be (length of line cast). I did this for a few rods so you have some reference for comparison.

The second interesting parameter is the cherished "speed of recovery", the speed at which the rod (tip) unloads. Its intensity can be estimated through calculation, using the swing weight parameters. The butt self-deceleration speed is complementary information and depends on the same parameters. They both depend of the amount of bending of the rod: the larger the bend, the higher the intensity of both parameters, and the numbers that will be seen in the table corresponding to a given bend in a rod, don't overlook this point. To be able to calculate an index for speed of recovery and self-deceleration, we require the components of the swing weight. You have to trust the methodology that I developed for this; since I am not going to explain the details of the mathematics but it is possible and pretty interesting to get an idea of what your future rod can be. During my scholarship I never saw a reference to this technical issue, there was a lack of information about an obvious contradiction in spring modeling (equivalent mass at tip was the only parameter mentioned), but once the problem is tackled, then consistency returns and things are clarified. I do not know why this was never explained, and I do not think it is explained to students today.

Swing weight is made of three equivalent masses:

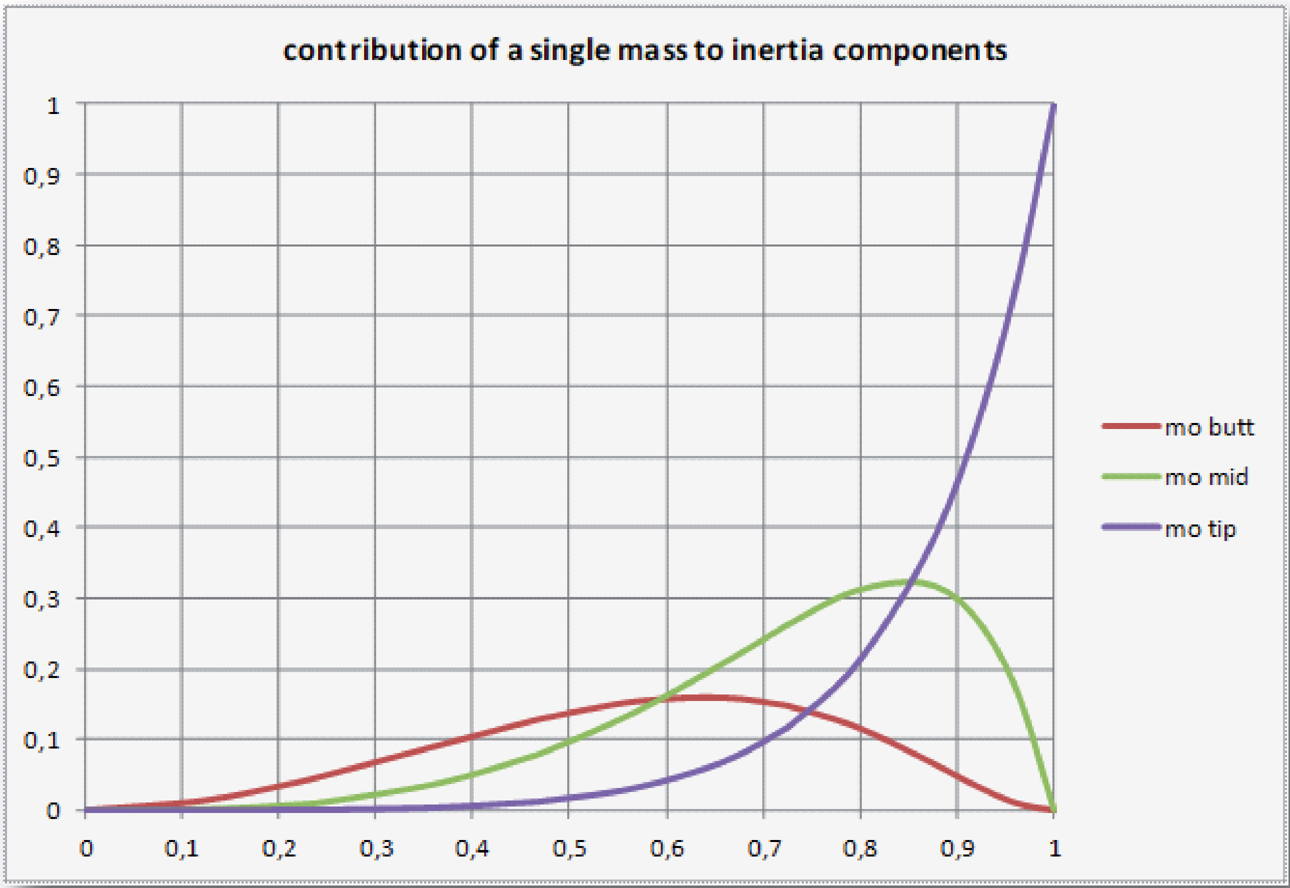
• Equivalent mass at tip designated motip. This is related to the main frequencies of the rod when gripped at the handle level and is responsible for the amount of energy remaining in the rod (counterflex) as the line is launched.

• Equivalent mass at butt, designated mobutt, which influences the butt behavior as the rod unloads.

• Equivalent mass in transfer, designated momid; responsible for the inertial effects of both tip and butt as the rod loads and unloads. It is just as if some mass was transferred from one end of the rod to the other; hence why I name it "transfer".

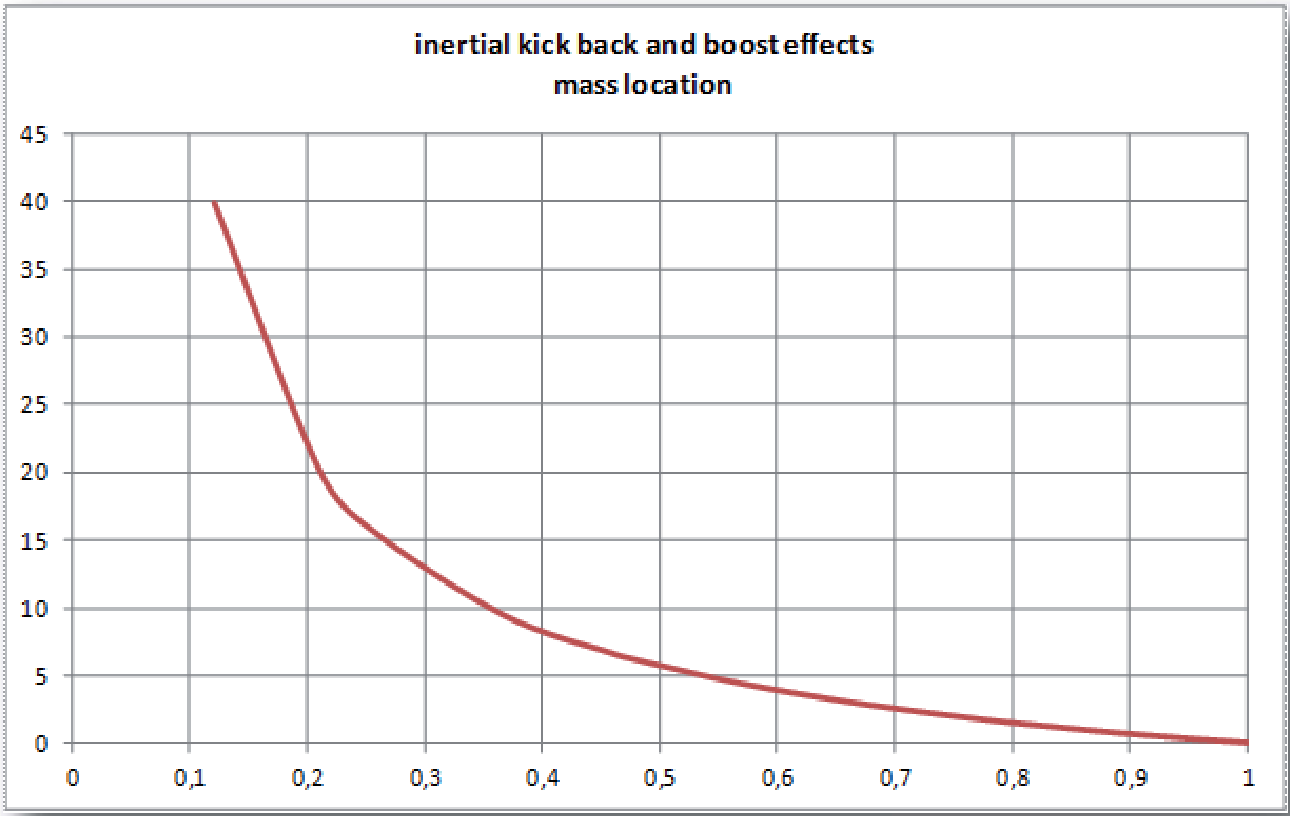
Below you can be found an example of the contribution of a single mass to equivalent masses as it is moved along the shaft. Zero is the butt end and 1 is the tip end on the horizontal scale. In the vertical scale, "1" means that the mass you consider provides an equivalent mass of 100%.

The diagram below corresponds to a specific rod (Para 14), but it does not vary very much if the rod is changed.



Now it is possible to visualize the position where mass contributes the most to each individual equivalent mass. Then one can understand the importance of the tip design, which greatly influences all equivalent masses. As my good friend Harry Wilson (founder of Scott Fly Rods), used to say "we design a tip and then a butt to support that tip". A ferrule in the middle of the rod contributes little to equivalent mass at the tip, whilst the tip ferrule of a three piece rod has a noticeable influence (abscissa 0.67) on all equivalent masses. As a rod designer, you have to concentrate on tip design first.

Below is an illustration of the effect of mass location on kick back and boost effect. All the mass at the butt improves the boost effect (and therefore cane rods are better in this respect). The kick back is the price that is paid for getting the boost, and therefore the cane rod must be accelerated progressively, otherwise the fly line will tail.



The sum of these equivalent masses is the total equivalent mass of the rod and its swing weight is equal to that total mass multiplied by the square of the effective length of the rod (the length minus the clamped portion of the handle).

$$SW\ at\ handle\ level=(m\_otip+m\_omid+m\_obutt\ )*[\![L\_effective]\!]\hat{}2$$

Swing weight determines if the rod "feels" heavy or light. We can estimate the contribution of the blank, the guides & wraps, the ferrule(s), the line in the guides, and the varnish for all these three equivalent masses, it is slightly more complicated than obtaining the stresses in a rod but the result is interesting. Here is an example for a 2 piece rod (Payne 101), the figures are in grams:

	all (w/o line)	g&w	ferrule	blank	varnish	line
mo (butt)	5,85	0,27	1,12	4,26	0,20	0,03
mo (mid)	5,43	0,32	0,95	3,93	0,23	0,10
mo (tip)	4,03	0,77	0,19	2,84	0,24	0,36

I did not include the line in the left hand column, because we can estimate the equivalent mass at the rod tip by suspending mass from the top ring with the rod clamped at its handle. All that is required are a few masses (measured precisely on a small jeweler's scale) and either a stopwatch or a high-speed camera to record the frequency of rod vibrations for each mass. From this, the equivalent mass at rod tip can be derived through simple calculation.

The fact that we clamp the rod for most measurements and calculations introduces a bias which is represented by the clamped zone, which we exclude from some calculations, but we can consider that this as some "dead weight", which can be collated with the weight of the reel. This is a simplifying assumption that makes the designer's life easier without changing the characteristics of the rod.

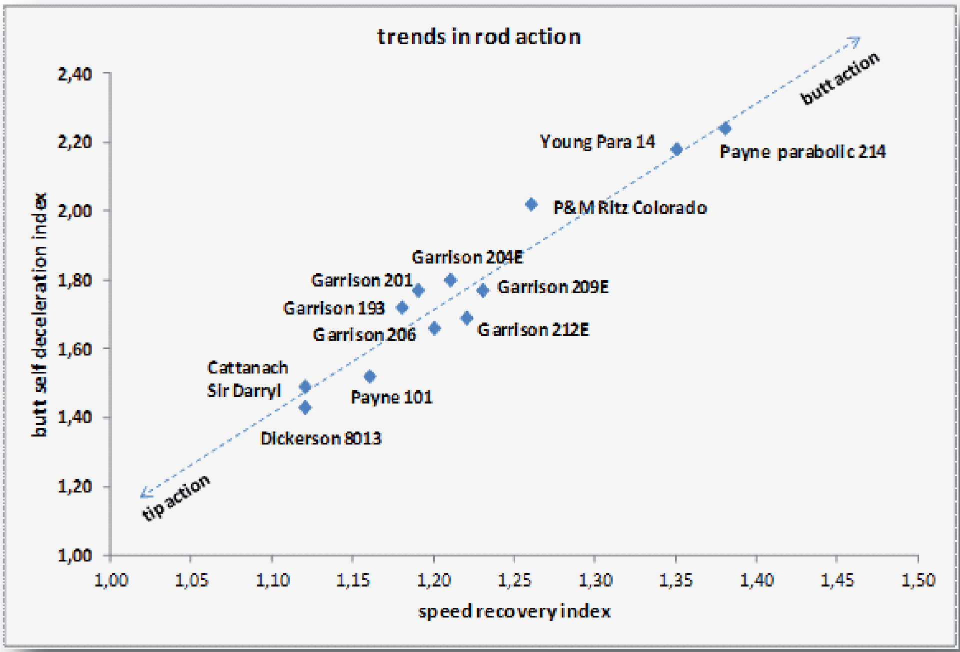
Here is an overview of the characteristics of a fly rod:

parameter	comments
Driven deceleration tip boost	*Refers to the relative amplitude of the boost effect for low loads (close fishing) as the rod is stopped neatly*
Speed of recovery index *(Hz)*	*Refers to the natural recovering capability of your rod from bending (the higher the better) with 30 feet of line*
Butt self deceleration index	*Refers to the rod's natural capability to stop its butt rotation by itself (for comfort, the higher the better) with 30 feet of line*
Calculated stiffness *N/m*	*Calculated from deflection and limited mass (the mass of the first 30 feet of line)*
Equivalent mass at tip	*Allows the loaded frequency of the rod to be estimated, usually the line in guides is not taken into account since the value can then be checked on a test bench*
Line mass	*Just taken from the basic rule, mass (grams) = stiffness (N/m) divided by 0.093 and then refer to the standard line table.*
Non linearity	*Refers to the casting/carry range of the rod.*
Unloaded Frequency *(Hz)*	*Overall speed of the rod, older rods are in the 2 Hz to 2.5 Hz range, current ones (graphite) are in the 2.5 Hz to 3Hz range*
Loaded Frequency for the line (30 feet of line)	*The tackle speed that that is encountered in an average cast: 1.25 Hz slow; 1.35 Hz average; 1.45 Hz fast, etc.*
Swing weight at handle gm^2	*Gives an idea of how difficult it is to put the rod into rotation*

Below can be found some figures for short cane rods (7'9 and 7'7) pertaining to the "parabolic" and "semi parabolic" side (Young Para 14, Garrison 209 E; Payne parabolic 214 and Pezon & Michel Ritz PPP Colorado):

	209E	Para14	Colorado	214
driven deceleration tip boost	1,32	1,39	1,12	0,95
speed of recovery index	1,23	1,35	1,26	1,38
butt self deceleration index	1,77	2,18	2,02	2,24
stiffness N/m	0,85	0,84	0,98	0,96
equiv mass at tip	4,82	4,86	5,91	8,04
line mass (grams)	9,16	9,08	10,49	10,32
non linearity	1,44	1,51	1,40	0,95
unloaded frequency Hz	2,22	2,24	2,01	1,85
loaded frequency Hz	1,29	1,27	1,25	1,17
swing weight at handle	78,3	82,3	77,3	97,4

Boost from inertial effect as a rod is stopped abruptly for a short cast: modern graphite rods are below 1; and you can see why cane rods are much better than synthetic ones for short casting, generally speaking. This effect can let you think that the rod is adapted to a lower line number by comparison to what its stiffness is telling.



The graphic above illustrates the trend in “rod action” for various rods. You can see the typical “butt action” behavior of the Payne parabolic 214 (a true parabolic). Garrison referred to it as having a “simultaneous” action. Such rod act a little bit like a catapult: it stores energy and releases it late and abruptly, which may have led to the reference to the “bow and arrow” mechanism for fly rods (a misconception). Such rod also has a better propensity to self decelerate its butt. Here you see the typical characteristic of butt action rods and their ability to lift line easily from water, thanks to their speed of recovery and the self-deceleration capability of their butt (big bend on top of larger indexes): they load first and then throw the line, quickly, like a catapult while their butt stops mainly by itself. I have added other rods including several Garrisons which have a similar behavior; they do belong to a series of rods.

Non-linearity figures are relatively modest for most cane rods. Modern graphite rods can be much more non-linear (e.g. 2.50), which allow longer line carry and it will be observed that the Payne parabolic rod is very linear (0.95), because of its relatively flat profile. This trend corresponds to Garrison reference to rods with little taper (the apple and a stick story), which correspond to a more limited range of mass variation for the carry (hence the reference made in Garrison’s book to a line having its weight up on the front). Viewed from the other side of the spectrum, the Dickerson 8013 is highly non linear (2.27) and in itself, non linearity is also a representation of rod action.

Although these rods may appear slow when they are not loaded, they are in the lower range but not far off from some graphite rods with 30 feet of line. Today the range is above 1.4 Hz for modern rods. A “regular” rod would have a 1.35 Hz loaded frequency today, so these designs are somehow outdated in terms of consumer’s taste.

Swing weight is not very large given the length of the selected rods, although it is above that for modern graphite rods, with some going as low as 60 grams*square meter for a 9 footer! By comparison, the Payne parabolic is certainly “tip heavy”.

Now how do we get that? For nearly all characteristics, this is no more complicated than calculating the stress curves, but it makes sense in terms of casting. These numbers can tell you how your rod behaves. I will take examples to show what can be obtained from calculations (I will not go into the details of the spreadsheet). You need to know the rod profile, the location of guides and ferrules, and the number of coats of varnish if you wish but first you need to give the best possible estimate of the material characteristics: Young’s modulus and density, and literature are not completely reassuring on this point.

Starting with these characteristics of a rod, I can use another program which designs a rod having similar characteristics but for another line number, more or less faster, with adjustments like hollowing the rod for example, or changing the length. Have you noticed that for range of cane rods line number and rod length are linked? There is a good mechanical reason for this. Here is an example where I have matched the loaded frequency for given range of rods. The starting point is the #5 rods.

2	3	4	5	6
6' 7	6' 11	7' 3	7' 6	7 '9
6' 10	7' 2	7' 6	7' 9	8'
7'	7' 5	7' 9	8'	8' 3

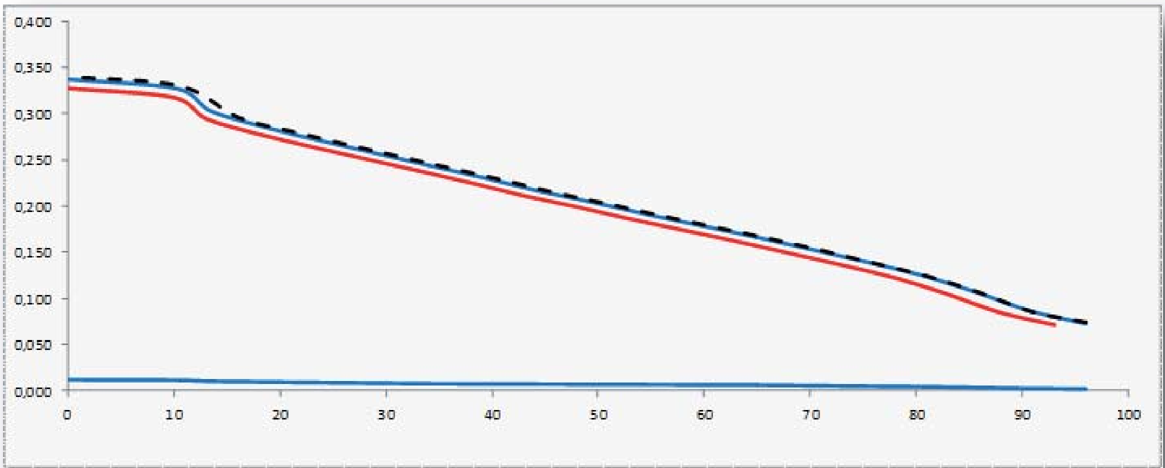
A lighter line means a shorter rod - interesting isn't it? It is easy to obtain the dimensions of these rods when there is a starting point. Considering a given length for a rod, changing the length impacts on both unloaded and loaded frequencies:

	2	3	4	5	6
UF	13,1%	8,1%	3,8%	-	-3,4%
LF	5,4%	3,2%	1,4%	-	-1,2%

This means that if you want to compensate for the change in frequency due to line size, you have no solution for lighter lines (here the reference is the #5) and the only option is to hollow out the rod for heavier lines. At first sight, the differences remain small but good casters can detect them.

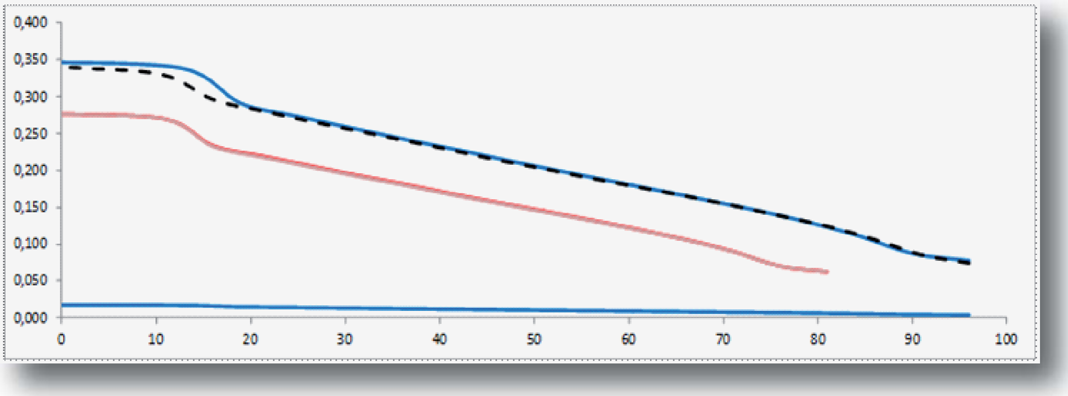
Now let's review the other characteristics. Since all masses relate to the extension of length of rod, the equivalent masses of the final product can be predicted. The non-linearity does not change for a series of rods, which is nice to know, and the indexes (speed of recovery, butt self-deceleration) are almost the same (small changes). The swing weight increases with length and it is also easy to calculate (thanks to the spreadsheet). The flexibility for cane is limited to a partial hollowing and tuning of the length of the rod if necessary. For graphite one can play with wall thickness, material modulus, fiber orientation, combination of fibers, which is just great until reaching the practical limit of building (e.g. there is a minimum number of turns that can be used for rolling the prepreg on the mandrel). There is no real length limit issue, providing this is above 8 feet long. I built a specific Excel spreadsheet file for this, which is not user friendly, but you can request the calculations from me (provided free of charge). Once a new rod design is available, its performance is checked with other specific calculation files.

Let me give you an example with Garrison's rods since they inspired the methodology. This is interesting since the exact tapers are known, and we compare calculations with original data. Starting with the dimensions of the 209E and then designing the equivalent of a 212E, by setting the rod length and the line number that we require. Here is the result: the 209E is in red (solid), the calculated 212E is in blue. It appears to be very slightly hollowed out for calculation reasons. The black dotted line is the actual 212E profile, and it is difficult to differentiate it from the blue line apart from the upper butt and swell levels.



212E estimated from the 209E design

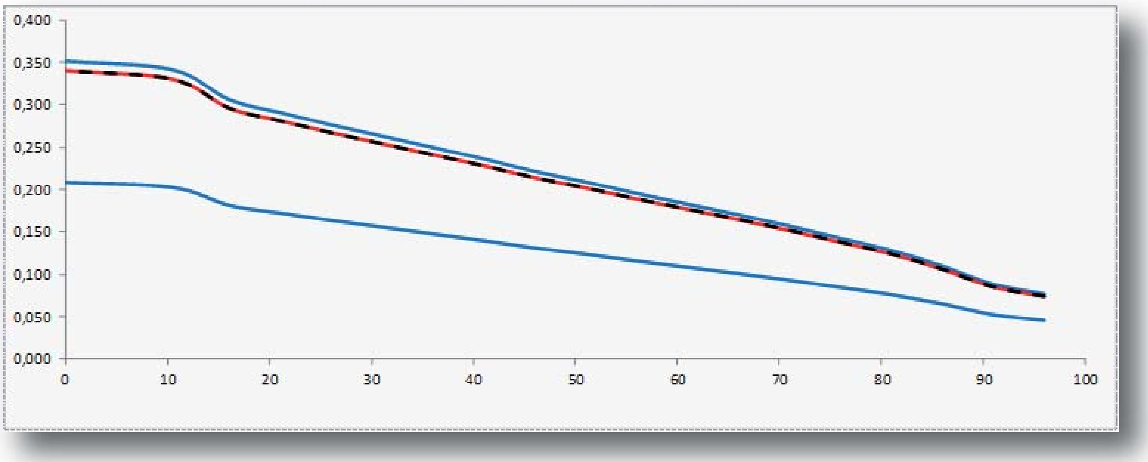
Another example starting with the 193 (6'9 foot for # 3 line) this time:



212E estimated from the 193 design

This second test is more difficult, given the large differences between rods (one foot and three inches, and two line numbers) but it is not bad at all and within the margin of error, knowing the swell length is a decision of the designer. It shows you how accurate the stress curves definition of Garrison's rods is. I was surprised when I saw the correlation between rods for the first time. I was wondering how someone working without a computer could have derived a designing process for stress curves, which could reproduce an "action" so precisely.

Now another example starting from the 212E but looking after a faster 212E:



Fast 212E (blue) from original 212E (red and black dots)

One can visualize the amount of weight reduction of the rod shaft that is required to obtain a rod which is as stiff as the original but as fast as “normal”, synthetic, modern rods. The mass of the rod blank is reduced by 30% in this example. In comparison with the original rod dimensions, the rod is larger overall, which is important for speed, and the inertial characteristics of the rod are slightly changed. If you ignore the size increase of the rod and just go back to the original design, the speed increase is lost. I know that this is theoretical, especially for reducing the weight of the tip of the rod by such an amount, but the trend is still evident. Below can be seen the general trend due to the design change:

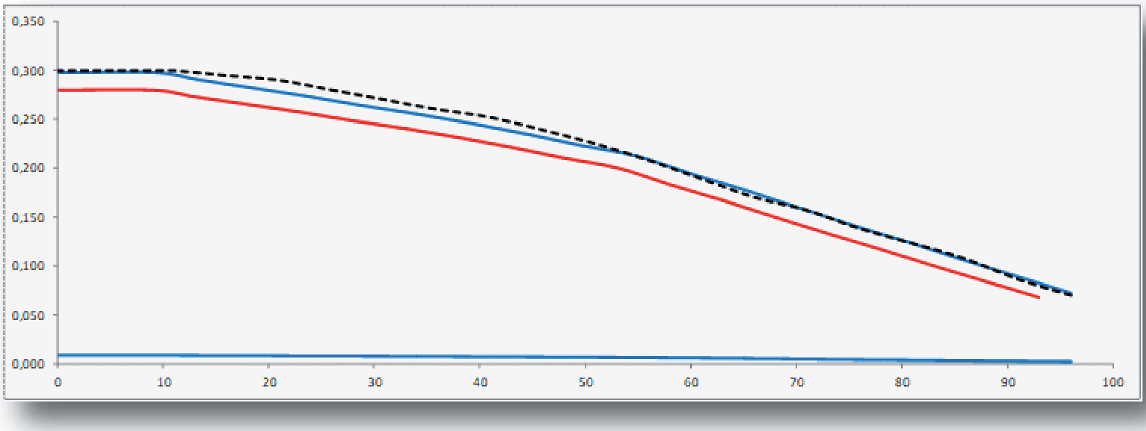
	212E	212E fast
driven deceleration tip boost	1,32	1,25
speed of recovery index	1,22	1,20
butt self deceleration index	1,69	1,78
stiffness N/m	0,85	0,85
equiv mass at tip	5,25	4,15
line mass (grams)	9,10	9,10
non linearity	1,52	1,46
unloaded frequency Hz	2,14	2,41
loaded frequency Hz	1,27	1,32
swing weight at hande	86,7	72,5

Lightening a rod, decreases the equivalent mass at rod tip, which raises the unloaded frequency, but at the same time, this increases the change of the loaded frequency. In other words, you do not get a rod as fast as what you would expect when it is loaded with line. Hence the reason why it is pretty difficult to design competition rods with enough speed for a given stiffness (a nightmare); asymptotic values are soon reached.

212E	all (w/o line)	g&w	ferrule	blank	varnish	line
mo (butt)	6,06	0,28	1,20	4,38	0,20	0,04
mo (mid)	6,85	0,37	1,21	4,99	0,28	0,12
mo (tip)	5,24	0,94	0,31	3,71	0,29	0,43

212E fast	all (w/o line)	g&w	ferrule	blank	varnish	line
mo (butt)	4,67	0,27	1,19	3,01	0,20	0,04
mo (mid)	5,33	0,37	1,21	3,46	0,28	0,12
mo (tip)	4,15	0,94	0,31	2,59	0,30	0,43

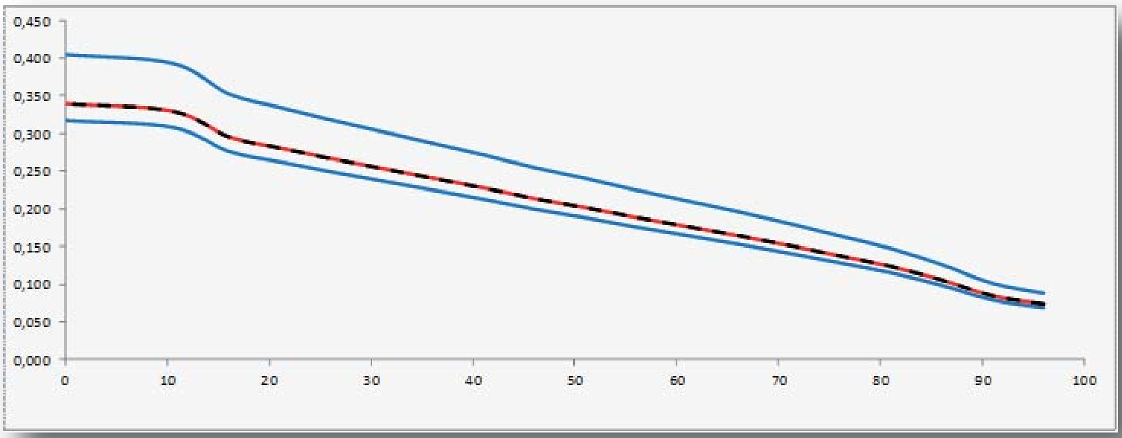
In the next example, I have chosen a Para 14 as a starting point and I am looking for a Para 15. I found several descriptions of the Para 15, and I kept the most consistent one, since for the others; one could suspect troubles with measurements themselves or from rod building process. The Para 14 data looks good (all comes from Hexrod web site; I just polished the tip at the very end for consistency). The Para 15 is sometimes quoted as a #5 or a #6 rod in the databases, but to me it is intended to cast a #6 given the results. You can see that the butt of the Para 15 is stronger than expected from calculations, but that may be due to the Para14 data, or to a choice of the designer, who knows? By the way, the Para 17 (not illustrated here) looks even more different, meaning that technically speaking these rods do not exactly belong to the same series.



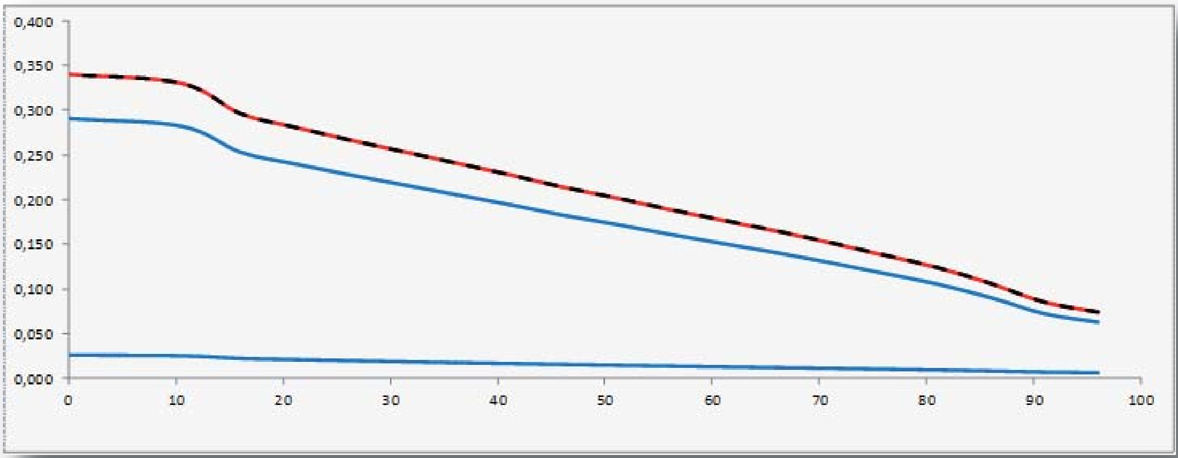
Para 15 (blue) estimated from a Para 14 (red), black dotted line is a Para15 profile

If you are familiar with RodDna, you realize that there is a similarity, since it provides the same type of result: you start from a Garrison rod profile to find another one. But there is a big difference here: the methodology I am using is based on exact mechanical equations and is valid for any type of design. And this is also why I can swap from one material to another. This methodology was used a few years ago to extend a series of commercial graphite rods. I do not consider it as absolutely perfect but it defines a draft design very close to expectations, which one can work on. In the case of the graphite rod, (a 9 foot for a #3 line), only two prototypes were required. A check for a rod of different length allowed to find the same tip design than the one already defined by the chief rod designer, impressive, isn't it?

I recall an advertisement about making a synthetic rod with the Garrison stiffness profile but it does not give a Garrison design; you need the weight pattern as well. What you can hope is to make a 212E made of unidirectional E glass, for example but there is an (solvable) issue with the mandrels at the ends, let's have a look:



It means that one could mimic cane rods with glass to get the same "action" (or mix cane and glass like for the "Variopower") but for a much more forgiving rod, able to withstand hard conditions. It would be potentially sensible to ovalization for large deflection, but this can be controlled through a proper design process (expensive unfortunately). Anyway it would be much less expensive than a cane rod. I know, it would deeply lack the poetry of the handcrafted rod. Now if I want my copy of a Garrison 212E to be made from softer graphite fibers, I cannot use only unidirectional fibers anymore and the rod is nearly solid, as you can see below:



So in practice it is not possible to reproduce a cane rod with hollow graphite. This is why the small rods domain is restricted to glass and cane for sweet rods.

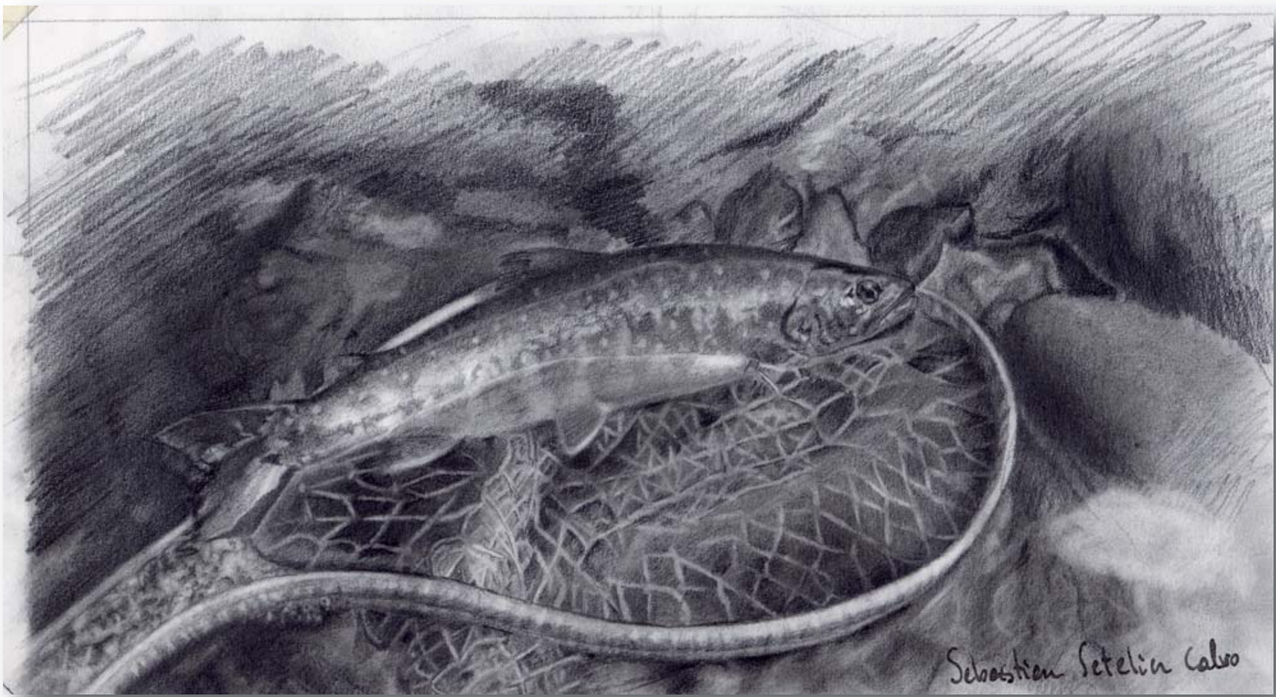
For those who use the "impact factor" concept, you have to be careful if you decide to change it since there is a direct link with stress levels in the rod shaft. And if you define your own stress curve at the same time, then it is not easy to predict the stiffness and speed of the new design. You might then lack vision of what you are going to obtain if you build the rod. Tendentiously, if you raise the stress levels for the same impact factor then the rod will be softer, and if you raise the impact factor for the same stress levels, then the rod will be stiffer and the rod will require a heavier line.

The new methodology which I describe is focused on the characteristics of the new rod, and the design can be tuned for any purpose to check the influence of changes on the overall rod "action". It does not need to refer to stress, they can be checked with another program, but they are not at the basis of this way of designing rods.

I hope that you find this approach interesting, and I am happy to provide any kind of help that you might need to redesign a new rod from an existing one. A starting point is needed; a rod that you want to replicate for another line number and another length, and then by computing we can see what is viable in terms of technical characteristics and if necessary by adjusting the design accordingly. Initially, a few measurements of the static and dynamic characteristics of the rod that you would like to base your new creation on would be required.

§§§§

The author wishes to thank John Symonds, who checked the article for english.


Sebastian Setelin Calvo

GLUING WITH RESINS AND EPOXY

by Alberto Poratelli

The gluing of the strips is a phase in bamboo rodmaking that if it is not done well will thwart all the work done or in the best hypothesis drastically reduce the rod's life.

There are many glues we can use and each rodmaker has their preference, personally during the years I have tried almost all types of glues (various types of epoxy, vinyl, resorcinol, animal glues) and I have come to the (very personal) conclusion that the one that has more advantages than disadvantages is the C-Systems 10 10 CFS, a two-component epoxy resin by Cecchi of Viareggio.

However, to fully exploit the qualities of this resin it needs to be used correctly and I would like to briefly write about this without presumption, but simply talking about my personal experience and the recommendations of the producer.

Characteristics of the resin

The C-Systems 10 10 CFS is an epoxy resin that has the peculiarity of not containing solvents (CFS Completely Free Solvent) and for this it does not shrink in the catalysing stage. No shrinking means there is no tension which, especially in the tips, makes anomalous curves in the drying phase less likely.

Like all epoxy resins it is sensitive to low temperatures so do not use it in temperatures below 15°C because the chemical catalysing process will be activated in this case.

Once the resin is catalysed it is neutral in colour so it will not be visible along the edges of the rod unlike the other glues like resorcinol that is dark red.

Although there are no dangerous vapours, remember:

- To use protective gloves and goggles
- Do not empty glue residues in drains to respect the aquatic environment; I suggest wiping it up with rags and waste paper and then dispose of them in a waste disposal site.

As a mere reminder, here are the hazard identification I found on the producer's site:

hazards of component A

- Skin irritation, Category 2 H315: Provokes skin irritation.
- Serious damage to eyes, Category 1 H318: Provokes serious damage to eyes.
- Skin sensitization, Category 1 H317: May provoke allergic skin reaction.
- Chronic toxicity for aquatic environment, Category 2 H411: Long-term toxicity for aquatic organisms.

Hazards of component B

- Acute toxicity, Category 4 H302: Harmful if swallowed.
- Skin corrosion, Category 1B H314: Provokes serious skin burns and damage to eyes.
- Skin sensitization, Category 1 H317: May provoke allergic skin reaction.
- Serious damage to eyes, Category 1 H318: Provokes serious damage to eyes.
- Chronic toxicity for aquatic environment, Category 2 H411: Long-term toxicity for aquatic organisms.

Hazards of the thickener

- According to ordinance n° 1272/2008 (EC) – no hazardous substance.

In case of contact with the eyes, rinse well with cold running water and if necessary, consult a doctor and show them the label on the box.

Do not wash your hands with a thinner….it is wrong to do so at the end as well as during your work. The reason is part of the product comes off, but a diluted, very thin part goes under the nail and skin where it will remain for many days. Warm water and soap work much better.

Avoid smoking during the use of the resin because it is flammable.

Gluing

To use the resin for gluing it needs to be thickened because the resin and catalyser components are too liquid. Microfibers or the appropriate thickener supplied by the producer may be used as a thickener.

Mixing

Mixing the resin and the catalyser is in the proportion 2:1 in weight, not volume, I suggest using an electronic scale to dose the two components correctly.

Use a wide glass container for the mixing so that the heat that develops is dispersed correctly, if a tall, narrow container is used, the heat that is developed rises considerably to 100° C and the resin catalyses in tens of seconds.

Application

The application of the resin can be done with a small brush or a small foam roller. I personally use a brush because it is easier to find than the foam rollers, do not try to clean the brush after using it because you will never eliminate all the resin residues.

Correct procedure for gluing

1. Set out the strips to glue on the table. They must be cleaned thoroughly because any impurities could create thickness in the assembling phase
2. Pour the right quantity of resin and catalyser using a scale in the glass container.
3. Mix the two components and let them rest for a few minutes
4. Spread a first layer on the strips so that they are “wet” with resin
5. Add the thickener to get a mixture of the desired density (like yoghurt)
6. After 10 minutes spread the thickened resin
7. Put the strips in position and tie them with a slight pressure. The pressure of the binding must not be too tight to influence the gluing

Cleaning the rough piece

After gluing it is recommended to clean the rough piece so that it is easier to remove the binding thread. This can be done with a small rag soaked in rubbing alcohol.

Drying

The drying of the resin can be done at a natural room temperature (obviously more than 15°C); in this case I suggest waiting at least 12 hours before removing the binding thread and then cleaning.

If you want to shorten the time you can use and oven for 15 minutes at 70°C. Theoretically one could increase the temperature to shorten the time but our ovens do not guarantee a constant temperature on the whole length, thus the risk is that the glue could catalyse unevenly creating unsightly deformations which are very difficult to correct.

Happy gluing!


OUZEL
Sebastián Letelier '12

I know

by Alberto Mussati

"I know"

This is a phrase that I have deliberately stolen, it is not my own... definitely it is not mine.

It belongs to an author whom I respect, I 'm speaking about Pier Paolo Pasolini.

He was a poet, a writer, a film director, a screenwriter and often much more.

His lack of logic represents a universe in which it is worth trying to penetrate and trying to comprehend ... to understand.

The years he lived in were stern, strict and corrupt. He was pointing to the rebirth of a country where everything had to happen without too many scruples.

He never submitted to a ready-made culture, he never agreed to discuss his emotions but he invited everyone to try to know them ... specially to try to find out how the human soul is a splinter of infinity inside which everything must be explored and discovered and it cannot be judged.

But what have these words to do with bamboo?

Apparently nothing, actually everything.

I'm versing again in the world of emotions, where you do not need to explain, rather it serves hear and perceive. Pasolini said that it was important to "understand" ... less important to "prove". It is clear that this statement is rooted in a context devoid of awareness, as far as possible from taxation and cultural tampering, "clean" from any inner intrusion .... short it declared him its "simplicity" ... their lack of protection, his courage to represent himself. All this has been understood by many ...... from the most has been exploited.

Here is "I know" how did the idea of building a bamboo rod is born.

Giovanni made me realize what precedes the construction, which ideas are developed, that action will have to have dreams that object ... and hopes that swarm into the unknown to want to shape a wooden "special absurdly" called "bamboo". It all starts with an idea, it all starts from the desire to prove himself without the slightest cultural and historical conditioning, although known. It welcomes the past and you challenge it with tenacity, perseverance and with a good amount of unconsciousness. A drafting table, a pencil that traces lines, exasperated tapers and the idea of being on the right track. A test of courage in the draw, in the lull to show an idea, to prove.

And all this happens in a solitude that I feel brave but devastating. I think it is a loneliness that falls on you, as you and protects you like a shield; it is cold and isolates you and not perceive immediately that can protect you and give space to your lightness, your freedom. It is however, always an armor that presses and can also take your breath away.

But I think that the initial discomfort after a while evaporates and leaves you and your idea on the swing, trying to care for and maturing every detail, every assumption and every chance. I also believe that the disappointments when they arrive they have the speed of a shot and look like cuts in a glass that will not shatter. And you seek to "paste" in your mind every detail that you think it's worth it; and put in the memory of crumpled paper, reasoning a little hamstrung, that for the moment does not go short. And start again a bit tried, a little more mature. And then resume the trial and an idea becomes space, perhaps the definitive ... maybe.

The hive of that wood, yellow ocher, its unspoiled hardness and a planer judged by a "severe" micrometer, the nodes to be polished and "tame", all in silence that is muffled by the wonder. And what can we say more, where we want to push us and why. Just listen to Giovanni while talking, really is all there ... it is all there. Francesca, his mother, looks at me and smiles, definitely intrigued by my absurd attention.

And that's why "I know" and I do not ask questions... what I feel is enough for me. I always wanted to tell, I have chosen sometimes with imprudence people to whom to say, to whom to transmit. I was not prepared to find that my words were often not attractive, but intrigued. I deceived, but I did not lose courage, I accepted the irony of people who wanted not only to understand, I built relationships without awareness of their fragility. I've always wanted to transfer an emotion as Giovanni did with me. But it is not easy because an emotion actually must already inside you, others can only help her to get out, to be herself ...

I could mention the perfect taper, the adhesives that join them, paints them that ennoble, ligatures that adorn them and molded cork and guides and agate. Indeed, it is the idea that overwhelms me is the emotion that is enough for me.

And they are simple men who give birth to all this.

Perhaps the secret is here ... nature has always graciously accepted to be shaped by the idea of purity.

SPLICED FERRULES

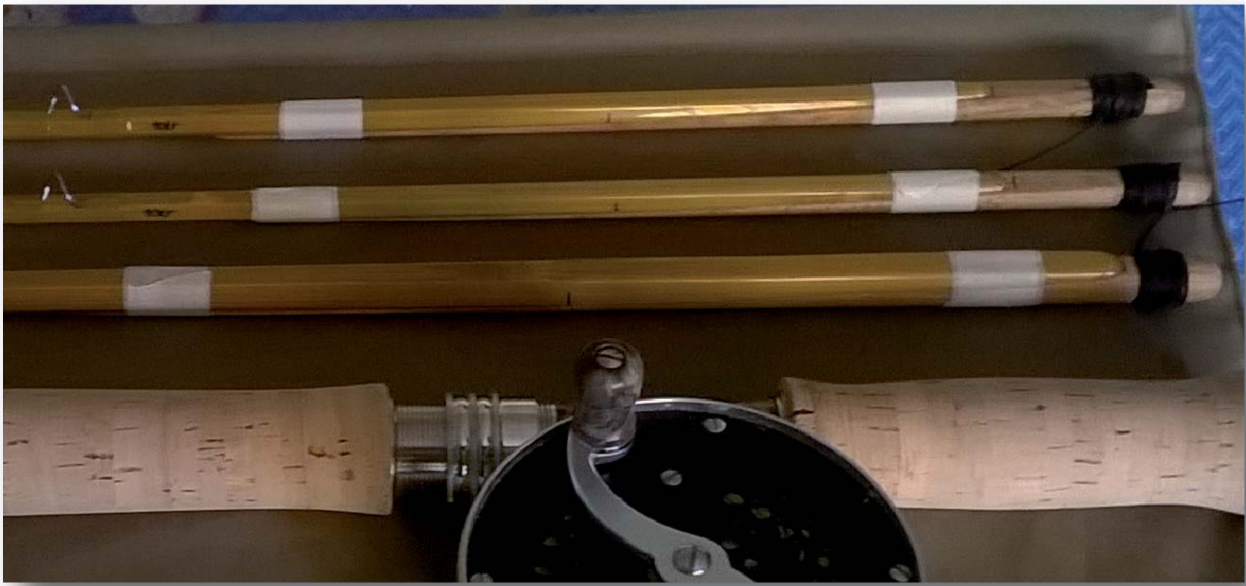
by Massimo Giuliani

(*) from the IBRA Workshop in Sansepolcro, 25 – 26 November 2017

Introduction

The first time I was faced with the problem of spliced connections was when I decided to try to build a Double Hand (DH) for salmon fishing.

Considering the thickness of this rod, I immediately rejected metal ferrules due to their size, weight, difficulty to find them and their cost. Another aspect, but not less important, having seen a tip of a two hand rod with relative ferrule attached fly away into the water (breaking of the mid-section at the base of the ferrule).



For those approaching it for the first time, it is easier said than done. Obviously nothing is impossible, it is not launching a missile into space, but before starting this endeavour, it is compulsory to think of different factors.

Preliminary considerations

The main problems I thought of initially were:

1. What is the correct angle of the splice? And hence its length?
2. And how/where are they positioned on the hollowed part of the rod?
3. How are they made?
4. How much greater is the taper in the spliced section?

It is necessary to answer these questions (particularly the first and the fourth) because then there is another series of considerations to think of:

- The cutting of the culm
- The thickness of the strip at the moment of splitting
- Effects on the cutting of the blank and on the final result (rod the same length as the design and all equal pieces)

Angle / Length of the spliced ferrule

The first thing I did was consult the rodmakers' "Bible".

In the third chapter of the book "A Master's Guide To Building A Bamboo Fly Rod" by Garrison – Carmichael there is a series of precious information to do this: from the angle of the spliced ferrule (4 degrees) to the measurements of the splicing block to make them, but the measurements of Garrison's splicing block were too small for a salmon rod…so I took some time.

In the meantime, I came across a Sharpe 13' DH with spliced ferrules. I studied it and decided that considering it was my first experience and Sharpe rods were used for salmon fishing by hundreds or thousands of fishermen in the past, I would use it as a reference point for my spliced ferrules regardless of their angle.

Thus, to make my spliced ferrules I started from their size in proportion to the length of the rod and not to the degrees of the spliced angle.

Perhaps in the end the two could coincide, but at this point I didn't care about the latter.

The length of my spliced ferrules on the measurements of the rod made are:

Rods	*Splice Butt/Mid*	*Upper Splice*
13' DH – #9 3 pcs	280mm	205mm
11'6'' DH - #7 3 pcs	248mm	182mm

Splicing Block

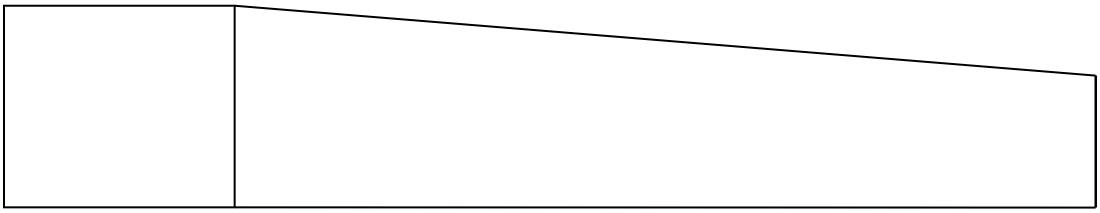
To make the ferrule I built a splicing block by roughly copying one from Garrison's book with the following variations:

- I adapted it to the dimensions of the ferrule
- I put a metal guide on the top part
- The central part, the inclined part on which we place the blank, is mobile. This allows it to have different central inserts both as thickness as well as angle

The size of the two sides of this splicing block are

mm 500 x mm 70 x mm 30 (l x h x w).

The central inserts are not rectangular, but they have this shape:



And for the first 9cm they are 70mm high to reduce to 15 or 20 mm i.e. in the final part the widest one is from 55mm to 50mm.

The bolts are 8mm and they are positioned in the centre of the block of wood at 4 – 18 – 32 – 46cm

NB: It is necessary to verify and rectify that the planes are perfectly level.

Oversizing the ferrule in proportion to the taper

Although the spliced ferrule is "taped" to connect the two sections we still have a slight "slipping" effect compared to the glued part that gives the rod more flexion of the rod at the spliced ferrule.

To overcome this inconvenience and restore the natural flexibility/rigidity to the taper as it was designed the makers of the spliced ferrules oversize the taper at the point of the ferrule to give it more rigidity that will compensate for the "slipping" effect.

How much oversize?

Neither is this an exact science, but picking information here and there, I read about an oversizing of the taper of approximately 10%. Sharpe's oversizing was even greater, perhaps to compensate for the greater inertia and heaviness that these rods had.

Considering the above, I conservatively decided according to the various "it is said" to oversize my spliced ferrules 12% compared to the taper.

I calculated this percentage empirically; I am not a two-handed expert caster or a salmon fisherman, so I had doubts more than once.

Considerations on the measurements and oversizing of the ferrules

I'm sorry I cannot supply this data with the support of scientific calculations because the dimensions, the angles, the oversizing were taken or proportioned on the basis of the Sharpe spliced ferrules.

However, Sharpe of Aberdeen is one of the major and best known producers of DH Splice rods, used by many fishermen around the world.

What I wrote in the previous chapters can definitely be improved but as a starting base it is not completely wrong.

Furthermore I received enthusiastic feedback last summer regarding the cast and the fishing from a dear friend who thoroughly tested my "ex" DHS 11'6'' #7 in Kola.

A fishing friend who has turned Atlantic salmon fishing into a reason for living. I can safely say that if these are the results of the length/angle and the oversizing of the spliced ferrules, that I have reported herein, they are reasonably reliable……

Effects of the spliced ferrules on the cutting and splitting of the culm

The rule: “the rod be must be of the desired length and all the pieces must be the same”

The “DH Spliced” rods that are usually three pieces do not escape this rule and the incidence of the ferrules on the length of the single piece is relevant.

So, to avoid making a rod that will then have different pieces or of different measurements once it is mounted, it is a good norm to firstly calculate the length of the three-piece after the rectifications due to the spliced ferrules.

At this point add the staggering and the waste (upper and lower) to have the cutting point of the culm

Only at this point, having calculated and measured again, we can cut the culm.

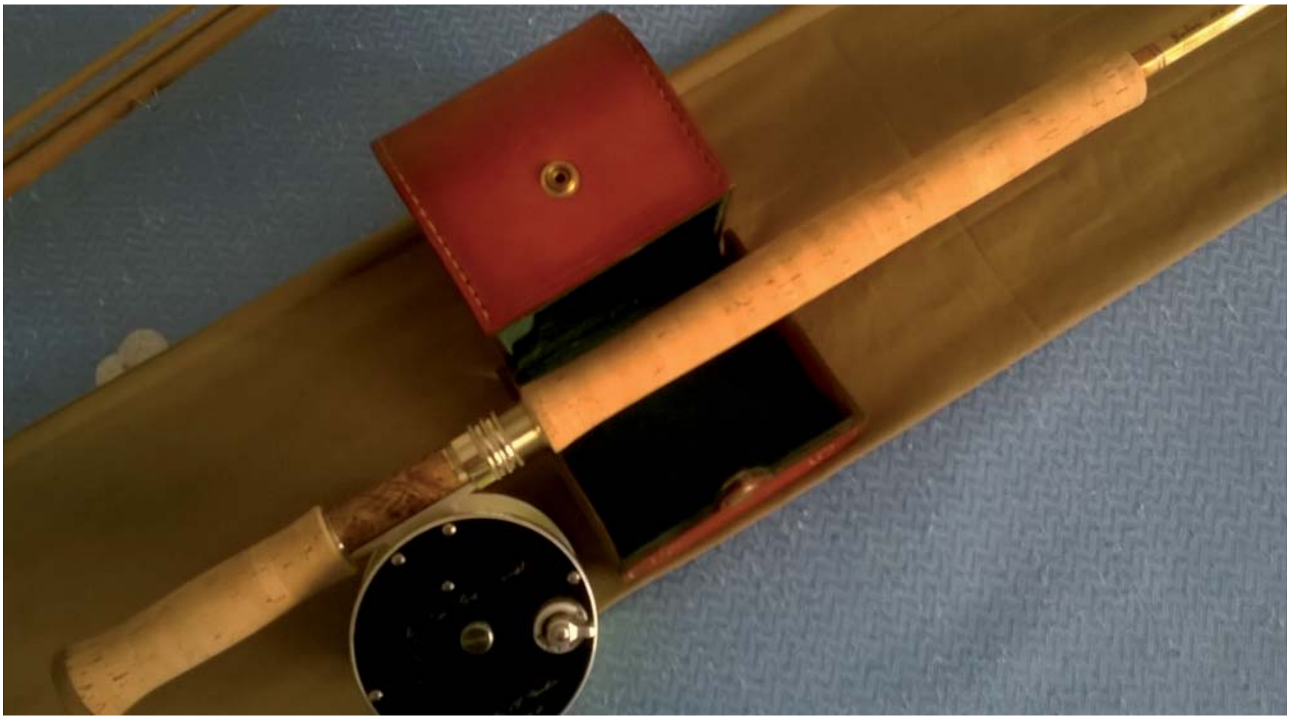
Other point of attention is in the splitting of the culm to obtain the number of strips

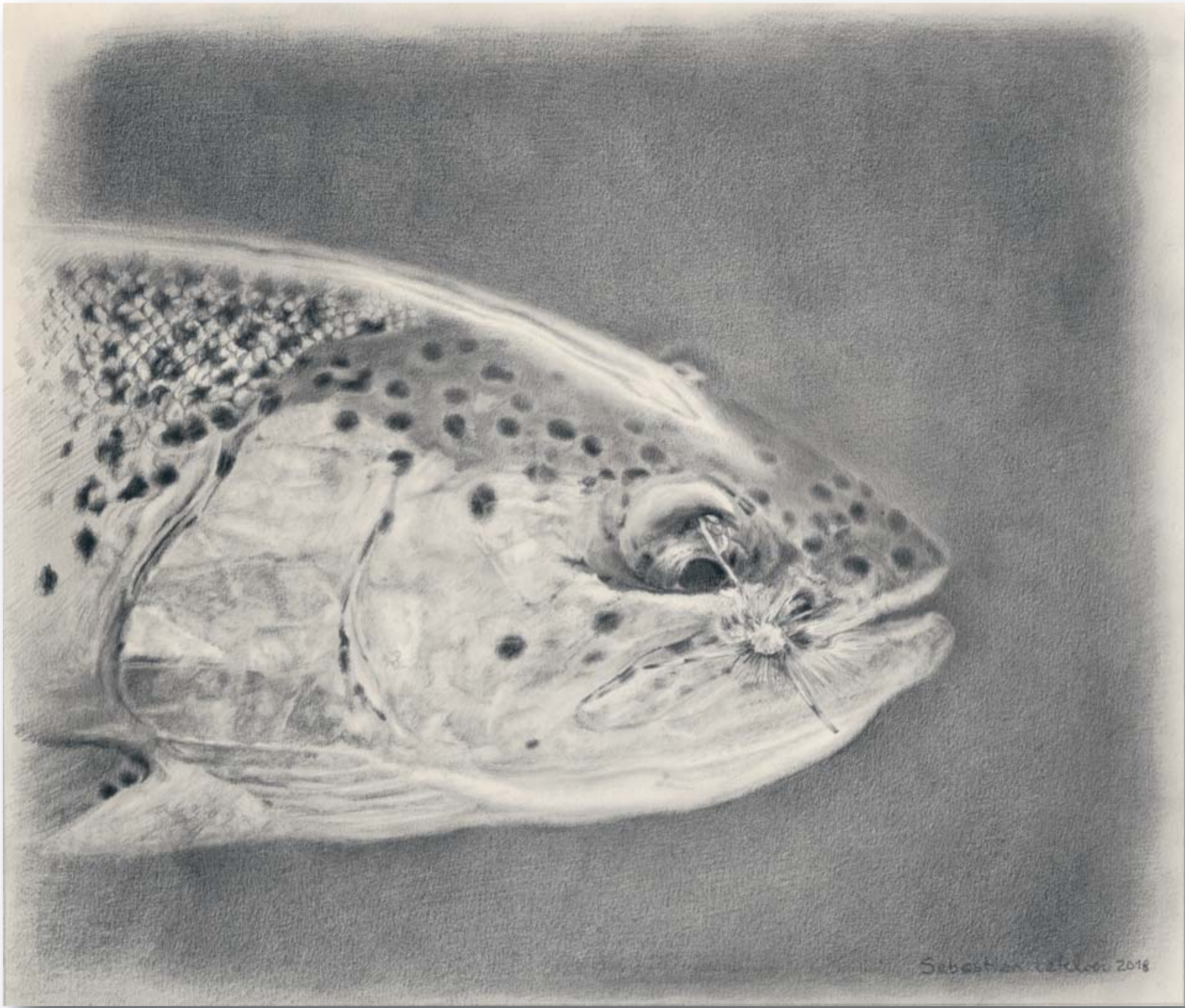
In determining the length of the strip we must consider, in addition to the dimensions of the taper and the usual excess material for a correct planing, the percentage of extra material for the swelling at the postion of the spliced ferrules (especially for the butt).

Rather a few strips less but of the right dimensions. The DH rods are long and large and the bamboo we have is almost always scarse.

At this point I hope that my considerations to make spliced ferrules may be useful and I can only wish you success because to pass from this phase ………………

To the finished rod ………. There is really a lot of work.





rod-building class 2018

by Maurizio Cardamone with photos by Alberto Poratelli

After missing last year's appointment, at great request the IBRA rod-building course returned in 2018. There were again six students looked after by the IBRA tutors Moreno Borriero, Daniele Giannoni, Massimo Giuliani, Alberto Poratelli, Silvano Sanna (in strict alphabetical order) and the president Gabriele Gori.

This year's rod was the Heddon Folsom 7042, a 7 ft #4 weight. Heddon rods were also sold under the names of owners of sport product chains and department stores. Among these the H&D Folsom Arms Co., a chain of products for the outdoors, hunting and fishing. Their catalogue included the Heddon high range rods, like the 7042.

The course was, as usual, held at a weekend from Thursday afternoon on the 22 to Sunday 25 November. The workshop was in the spacious room offered by the Podere Violino in Sansepolcro. This, together with the cloudy weather, helped with the concentration on the work at hand: from the bed to the workbench, with a stop at the lunch and dinner tables, all in less than 30 meters: no distractions!

A novelty in 2018 were the new workbenches, more stable and "smoother" than the ones of the edition I frequented in 2013 and perfect lighting.

The programme was respected, with the final phases completed slightly early. I arrived on Saturday for a courtesy visit at lunchtime and the group was busy with the cleaning and finishing the blanks, followed by the preparation and gluing of the ferrules. In the evening, a long night which went on past one o'clock, all the students completed the gluing of the grip and the reel seat and the tricky wrapping of the stripping and snake guides. Hard work, but satisfying for everyone.

The six rods produced this year can boast beautiful reel seats in very shiny, Garrison-style metal by Davide Fiorani and the reelseats in six different woods, prepared by Silvano Sanna (Rosewood, Thuja, Acacia, Olive, Apricot, Apple).

On Sunday morning, while waiting for the rain to stop so we could test the rods on the lawn, another theoretical lesson on the characteristics of the various classical rods and the way to analyse them with Garrison's equations (and the software that implements them today).

Finally, the persistent rain stopped a little and we tested the action: everyone was satisfied; the six students who go home with a beautiful rod, a rod they "made", as well as the IBRA tutors who saw the results of their hard work and teaching rewarded by success.

So compliments to Claudio Colli, Mario D'Alessandro, Matteo Di Martino, Massimo Galvanetto, Michele Montessoro and Alessandro Piatti, who we hope to see at the 2019 gathering with their rods.


prosea

Rapidity of the rod: definition, effects on the cast and its measuring

(*) 2018 European Gathering
Waischenfeld
Gabriele Gori's Speech

by Gabriele Gori

I will start by referring to Roberto Pragliola's concepts on the flyfishing rod.

As you know, Roberto, has unfortunately passed away. Allow me to say a few words to remember him.

Flyfishing and casting were Roberto's life.

A controversial character in some aspects, with a difficult character, a little gruff, with an extremely direct way of saying things and an ethical vision of flyfishing without compromises: all these brought a great deal of animosity.Without doubt, Roberto contributed a great deal to spreading flyfishing in Italy and the development of the casting technique.

Almost all the Italian casting schools derive directly or indirectly from his commitment and his teachings.

I like to remember him in the many pleasant meetings in Serravalle with some IBRA members for the designing of the IRP rod.

We learnt many things from him, but I think Roberto learnt a few things from IBRA too, at least the rediscovery of bamboo to make “modern” rods.

He used two terms to define the behaviour of a rod:

“Lever” rod and “spring” rod

Lever Effect

The ideal lever is a rod that cannot be deformed: if it is used with a simple shifting movement, the speed of the tip is the same as that of the caster’s hand.

If instead, I add a rotation to the shifting motion, the movement of the tip is amplified and if the time of the cast is the same, the tip will gain greater speed than the hand.

Spring Effect

The rod, subjected to the inertia of its mass, the resistance of the line and the resistance of the air, is charged – it flexes – accumulating elastic energy and at the end of the cast, releases it by casting the line.

A rod conceived like this will be a rod that flexes its entire length so as to store the greatest possible energy and will also have a certain mass to accentuate its flexing.

In the real world, all rods are a flexible lever, i.e. both the spring effect and the lever effect coexist in the same tool: but there are rods in which the spring effect is greater and others in which the lever effect is prevalent.

Thus, we must speak about the prevalence of one effect on another.

To understand how this works, we must introduce the concept of rapidity of a rod: if we impose a deformation on the rod and we release, the rod regains its original position: the shorter this time, the faster the rod.

The rapidity is tied to the natural frequency with which a rod vibrates.

Every oscillating system has its own natural frequency of vibration that corresponds to the 1st way of vibrating.

We can carry out a simple visual experiment to understand the natural frequency of a dampened elastic system as is the rod.

Take a weight of 20-40 grams, tie it with an elastic and holding one end of the elastic let the weight hang in the air.

Wait for it to come to a standstill and then start moving your hand repeatedly up and down and vice versa: first slowly (low frequency, less than the natural one of the system): the weight moves like your hand, it goes up when the hand goes up and goes down when the hand goes down: the width of the oscillations of the system (weight) is the same as the one of the forcer (your hand).

So when the frequency of the forcer is less than the natural one, the width of the oscillations is proportional to the forcer.

Now, instead, move your hand up and down faster with small, fast movements: the weight vibrates but the lengthening of the elastic is rather small, i.e. the width of the vibrations is still less than that of the forcer and in this case the frequency of the forcer is greater than the natural one of the oscillating system.

Now move your hand up and down with an intermediate speed, increasing it progressively: you will notice that at a certain point the weight moves in a space much wider than the movement of your hand and tends to get longer and longer until it breaks, if there was not the dampening effect of the elastic, which is not a perfectly elastic means, but it dissipates energy in the form of heat.

This is the natural frequency of the system that oscillates with much wider movements than those of the forcer: a small oscillating force equal to the natural one of the system, provokes enormous oscillations and ever increasing: this is why some bridges have collapsed, for example, under the effect of strong gusts of wind, when the frequency of the latter coincided with the natural frequency of the structure.

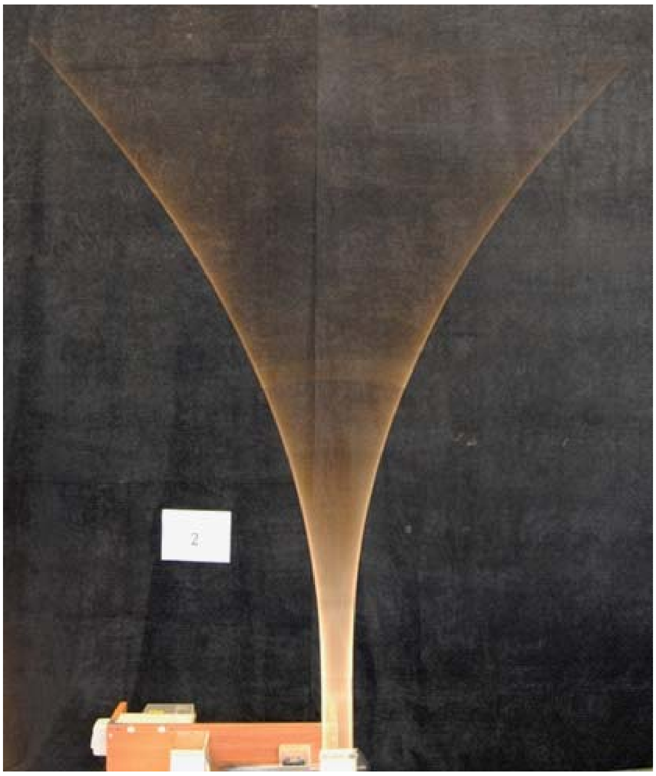
This is why, while crossing a bridge, the captain will order the soldiers to stop marching in time, because the rhythmic pace of the soldiers could have a frequency close to the natural one of the bridge.

Let's shift these points to a rod, which is a dampened oscillating system.

To find the natural frequency of the rod we start by letting it oscillate with a slow frequency: i.e. moving our hand backwards and forwards slowly: the rod moves following the movement of the hand, synchronized with it and the width of the tip's movement is proportional to the movement of the hand. i.e. a small movement of the hand, a small movement of the tip, wider movement of the hand, wider movement of the tip.

If we increase the frequency of the oscillating movement of the hand, we will reach the point when the movement of the tip is very wide even if the movement of the hand is controlled: the push of the hand has the same natural frequency of the rod and every further push, even slight, will add to the previous ones and the oscillations keep increasing: in theory, infinitely and until the rod breaks; in practice the dampening effect comes into play (both of the material and of the resistance of the air) that dissipates energy by friction limiting the width of the deformation of the rod, allowing the system to find a dynamic balance.

This and the natural frequency of the vibration of the rod that corresponds to the first way of vibrating.



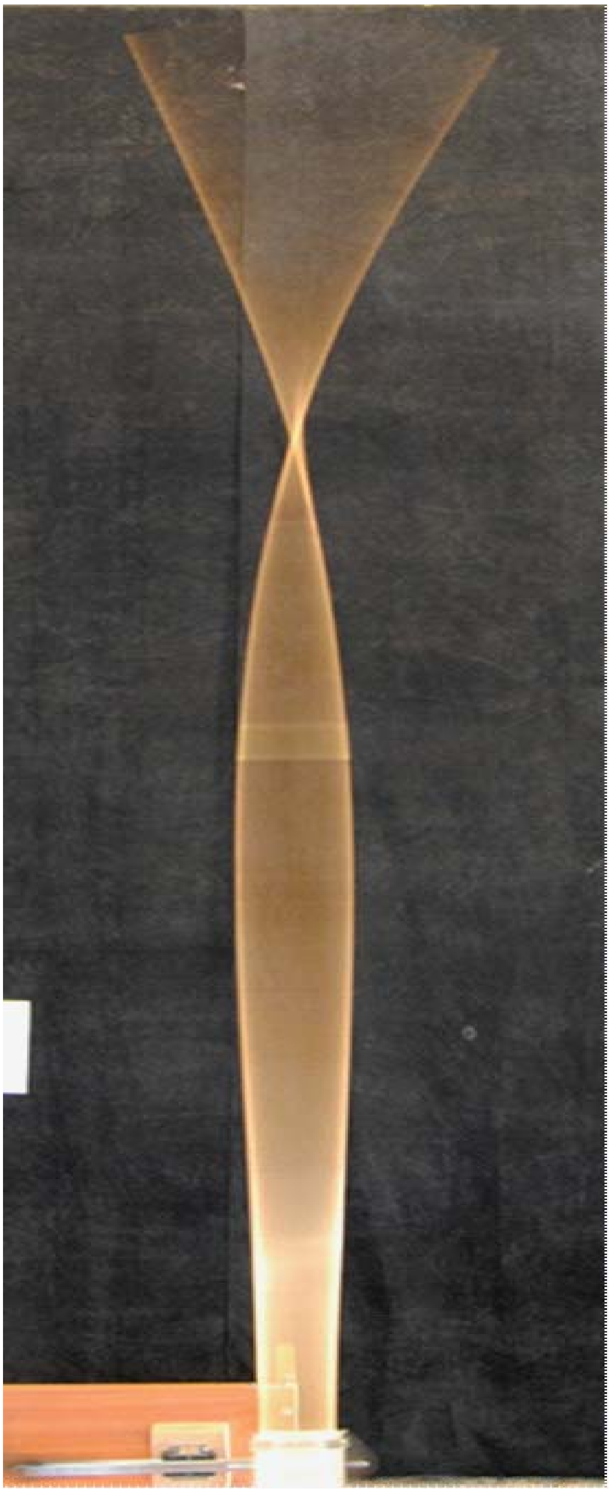
It is clear that every rod has its own frequency, which is higher (or the rod is faster) the shorter the rod, lower is the barycentre (distribution of the masses, or the taper) the higher the elastic module of the material.

Now if we increase the frequency of the hand movement again, we will see that the deformation of the rod reduces remarkably, and at the same time takes on a different shape: a flection starts, a core at about a third of the length from the tip, and we will also see that the movement of the tip is no longer synchronized with that of the hand: when the hand moves forward, the tip moves backwards.

This is the second way the rod vibrates and it comes into play in several occasions during the cast:

to see it simply and efficiently, put the rod in front of and parallel to a sheet of paper hanging vertically and then make a quick jerk forward with your hand: the tip will move in the opposite direction and hit the sheet of paper.

Increasing the frequency, there will be other ways of vibrating, but the explanation would be too long.



Further comments.

The spring effect is at its greatest when the tool moves at speeds close to the natural frequency: small shifts of the hand cause great shifts in the rod that in this way stores great energy.

Thus, a rod designed like this has its optimal time to be used: the famous timing.

This term brings us back to the classic cast.

In the forward cast as well as the back cast, the movement is essentially rotary with the core in the elbow of the caster.

I am convinced that the various types of rods were designed to satisfy a certain idea of casting.

So this type of rod was the answer to a casting style that was most suitable to the aesthetic rules of the most noble form of fishing: composed and controlled movements with the elbow close to the side, ideal for an English gentleman of the early 1900's.

A rod like this one had to be used with its timing, it stores elastic energy that it then returns in the forward cast: the rod seems to act on its own. This type of action is appreciated by some fishermen and indeed it allows for long casts with very little effort.

The limit of this type of rod is easy to guess: the rod has its own timing, in a sense, it is the rod that imposes the rhythm of the cast.

For those who instead feel the need to control the cast as they please, to have a tool that follows their will, they prefer a more rigid and faster rod, i.e. the "lever" rod and this is the one that was always chosen by Roberto.

Measuring the frequency

To measure the natural frequency of the rods (first way of vibrating) a machine equipped with an electric motor with an inverter was used, which with a crank imprints a linear movement back and forth on a steel bar on a re-circulating ball bearing guide, which has the support fixed to the free end to hold the rod: the movement is fluid and constant at various speeds that are detected by a revolution laser measurer.

The natural frequency is calculated at the one at the widest point of the movement, just before going into the transitional regime which is a prelude to the second way of vibrating.

The frequency of the rod is measured in revolutions per minute.

Sebastián Letelier

Sebastián Letelier was born in 1979 in Santiago. He has dedicated more than half of his entire life to fly fishing and fly tying. In 1993, then 12 year old Sebastián met Mr. Adrián Dufflocq who ran the famous "Cumilahue Lodge", where they established a friendship and Sebastián learned many aspects of the development and discipline of fly fishing. It was in his home where Sebastián saw for the first time examples of the beautiful and colorful classic salmon flies. Since then this young man has been tying truly delicate trout flies, and classic Atlantic salmon flies. He started to work as a guide in 1996 when sixteen years old. Sebastián was the youngest guide at Dufflocq son`s operation based in Chilean Patagonia. In 2000, Sebastián started his regular studies in Fine Arts in a traditional Academy, drawing and painting with the Spanish painter and teacher Martin Soria, who teaches in the tradition of the renowned Real Academia de San Fernando, where he was trained as a painter in the 70s. In 2006 he was asked to collaborate on a book about Atlantic Salmon rivers, by the world famous salmon conservationist Orri Vigfusson, chairman of North Atlantic Salmon Fund (NASF, Iceland). He donated some twenty drawings of salmon flies to enhance the book. Since 2006 he donated Artwork or Classic salmon flies to the North Atlantic Salmon Fund, in Charity auctions in UK and Norway.

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