



# BAMBOO JOURNAL

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ITALIAN BAMBOO RODMAKERS ASSOCIATION

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**Bamboo Journal issue 23 - January 2023**

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Photo on page 72:	Paul Agostini senior French rodmakers

# EDITORIAL

by Maurizio Cardamone



Unfortunately, Covid-19 is not just a memory behind us, as we have all hoped for in recent months, and that suffix 19 reminds us that the whole world has been confronted with this invisible enemy for more than two years, but certainly lethal enough not to be able to dismiss it as a cold.

As I write these lines we are bombarded with news on the latest variant, Omicron, and there is some concern that the Christmas and New Year holidays may have given impetus to a new and worrying spike in infections. It is debated whether Omicron is really less lethal, albeit more contagious, than the variants that preceded it. But it is true that the situation of hospital wards and intensive care units is for now under control - fingers crossed - and the scientific data show that this is largely due to the vaccination campaign.

Due to Covid also in 2021, for the second consecutive year, it was not possible to organize the traditional annual IBRA meeting. The active and lively Whatsapp group certainly cannot replace the gathering, but in this last part of the year, as soon as the pandemic situation permitted it, two events were organized that allowed many members to meet again in presence after a time that seemed to everyone to be infinitely long.

The first was the two-day stage in September dedicated to "Double Handed" bamboo rods (of which you will read a report signed by Davide Fiorani here). The second was the long awaited IBRA rodmaking course, which took place over

two weekends last November. Also on this event, very important for the life of the association, you will read a personal report by one of the participants, Davide Girò.

Diego Pagani, another of the participants in this edition, drew the beautiful plates that make up the magazine's interleaved pages in this issue.

About nine months have passed since the last issue of the BJ and since bamboo rods are beautiful objects, but they are mainly used for fishing, I would like to talk about the topic that has shaken the world of fishing in Italy this year. In addition to the now usual "complaints" on social networks and in "hearsay" about the fishing season not particularly rich in catches, the constant and progressive fish depletion of our rivers, the increasingly evident decrease in insects and hatches, the increase of cormorant populations, 2021 was the year of the controversial decree on allochthony.

Like everyone (or almost everyone), I need to understand well what is really happening in the different regions; however, I have read the main official documents and I'll try to summarize them. Everything seems to start from an EEC document dated 21 May 1992: "Council Directive on the conservation of natural and semi-natural habitats and of wild flora and fauna". We then move on to the Decree of the President of the Republic of 8/09/1997 which transposed the EEC directive: "Regulation implementing directive 92/43 / EEC relating to the conservation of natural and semi-natural habitats,

as well as wild flora and fauna". Finally, we have a Directorial Decree of the Ministry of the Environment and the Protection of the Territory and the Sea, "Criteria for the reintroduction and repopulation of native species referred to in Annex D of the Presidential Decree of 8 September 1997, n. 357, and for the introduction of non-native species and populations", which is dated 2/04/2020, but was implemented for fish species only this year, after a technical opinion requested by the ministry from AIAD, the Italian Association of Fresh Water Ichthyologists, was formalized in a document approved on 5/03/2021.

This document has identified as non-native and therefore "prohibited" in Italy species such as grayling (non-Italian), lake char, arctic char, brown trout, rainbow trout (while Mediterranean and marble trout are native), as well as many other species perhaps less interesting for fly fishermen even if undoubtedly relevant for the management of the natural environment. Among these, for example, common whitefish and houting, which are of great interest for professional fishing in our lakes. The study has aroused many perplexities and open criticisms especially regarding the temporal criterion adopted to define the para-autochthony or allochthony of some species: the date of Christopher Columbus' voyage!

The decree essentially obliges the regions and entities involved to conduct very specific studies on the impact of the introduction into inland waters of specimens of species considered non-native, to be submitted to the ministry in order to possibly obtain exceptions to the general ban. All this with uncertain but certainly long times.

When it was published, the legislation produced different reactions in the regions, which also in this sector now operate with a lot of autonomy (from personal experience, the Italian fisherman who wants to go out of his own region always has to face a small adventure from a regulatory and bureaucratic point of view).

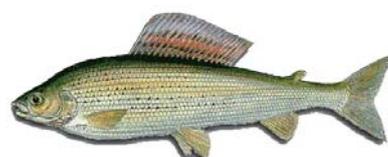
Some regions have undoubtedly had fewer problems than others and some had already taken concrete actions for some time in the direction indicated by the law, but in some there was a total stop at the beginning of the year and in many rivers and well-known fishing reserves the 2021 season has not even opened.

The recent conference of the Regions, last November, saw a clear stance by many regional councillors and representatives of various institutions involved in sport fishing and in the economic activities connected to it (think of tourism, breeding, trade in equipment fishing, and also professional fishing in lakes).

Also, thanks to this conference, some actions were taken at a political level, which resulted in a partial amendment of the decree, inserted in the state budget law approved in the very last days of the year. Let's see what really happens when fishing reopens in a few months!

Let's go back to this 23rd BJ issue. You will find many very interesting technical articles: to begin with, Tapani Salmi illustrates with a practical experiment an unconventional point of view on intermediate wrappings, typical of many historical rods, but also, less frequently, in more recent rods. Then an innovative approach to the construction of an oven for the heat treatment of bamboo, by Alberto Poratelli and an in-depth study on the chemistry and physics of "hardening", by Angelo Arnoldi. You will then find two contributions by Giovanni Nese, in the first he studies what happens in the rods as a result of the great deformations to which they are subject in reality, in the second he deals with the classic theme of the rod spine from a slightly different point of view. Last but not least, the usual philosophical reflections of Giorgio Grondona.

Meanwhile, trout fishing, and also grayling in the few rivers have them in Italy, is definitively closed until reopening. Most of our beloved bamboo rods are resting in anticipation of a fishing season that we hope will finally see a turnaround, in all senses.

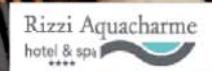




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Once you have split it in half, eliminate the nodes with a chisel, Yay

## Traveller's notes 2021

This is the "Arundinaria Amabilis (lovable)"...at the beginning...then it becomes Odiabilis (loathable)

That I call bambù and not bamboo, where I was raised we stressed the final A in Canada, publicity was called spots, etc.

To measure where you split the culm you need to steal a measuring tape from Ikea (Alberto told us, I trust him)

Go!

# The IBRA 2021 course

by Davide Girò



*(Editor's Note) In 2021 the 13th edition of the rodmaking course finally took place (Eureka!), which was unfortunately "skipped" last year for the reasons we all know.*

*The venue of this edition, an elegant pavilion in the park of the Terme di Boario complex, hosted the workbenches, planes, planing forms, not to mention the shavings, of the five rodmaker students for two weekends last November of this highly anticipated edition: in alphabetical order: Graziano Aceti, Mauro Bortolotti, Davide Girò, Alessandro Marchi, Diego Pagani.*

*With these, the total of IBRA "graduates" reaches the respectable number of 73 (to which we must add the participation of some who found the experience so pleasant that they repeated it!).*

*The very valid group of tutors (again in alphabetical order) consisted of: Argeo Babbi, Moreno Borriero, Luca Marzi, Mauro Moretti, Massimo Paccotti, Silvano Sanna, in addition to the extraordinary contribution of Gabriele Gori and Alberto Poratelli.*

*The rod chosen for this edition of the course is a Goodwin Granger taper, a 7 foot for a 4-line, in the consolidated tradition of IBRA courses.*

*Congratulations to everyone!*

Hi, I'm Davide and I approached fishing the first times as a teenager, by chance, thanks to inexperienced peers and a wiser gentleman.

The tranquillity of the river, the rustle of the wind and the sound of flowing water pushed me more and more to want to go fishing. Growing up, the desire to be in contact with nature and take some time for myself became stronger and stronger. I started fishing with traditional techniques, over time I reached fly fishing, driven by my love for nature and for animals. Last but not least, the charm of bamboo, a natural material, a source of heat, very ancient, but continuously studied and rediscovered with new techniques.

Fishing has always accompanied me, growing with me and in this period of a forced break from the usual routine of a hectic life, I felt the need to look inside myself and to get to the bottom of this passion.







So, by chance, surfing the Internet for information, I came across Ibra's website and I saw that they offered courses to learn the basics of Rodmaking, as well as building your own rod, the number 1. I didn't hesitate and I contacted them; despite the organizational difficulties related to the moment, they immediately proved to be active, resilient and ready to adapt to offer a quality course. The course was organized in two weekends including Friday, practically six days in Boario Terme; the great thing is that everything was included in the organizational package, from accommodation to meals and everything you need.

Before leaving and reaching the splendid place that hosted us for our course, fears began to surface, the fear of not being up to par, of not feeling at ease.

The long-awaited day finally arrives, meeting at 12 at the Hotel Rizzi in Boario Terme, a very nice and clean structure in the centre of the town, spacious rooms with every comfort, the first impression is already positive, excellent start!

In a few minutes all the participants arrive, we introduce ourselves and chat to get to know each other, we are five "students" and seven Rodmakers, including the president of the IBRA association, the vice president and five expert members, nice people and good company, you can already see their great friendship.

After lunch, we move to the nearby structure given to us to work on the construction of the rod, a large and attractive room located in a beautiful park, part of the hotel.

After a presentation on the birth of IBRA and why this magnificent association was founded, the real course begins.

Each student is given all the necessary equipment for the construction of the rod, both in components for assembly and equipment we need for the construction, moreover, very importantly, each student is given a tutor who follows him step by step in each stage of work. I think it is a useful thing to be able to understand and to do all the various steps necessary to achieve the goal well, and the finished rod but also to delve into the various steps and perplexities or doubts that one may have in the process.

Expert people, great rodmakers who help you and want to share secrets resulting from their studies and their experience.



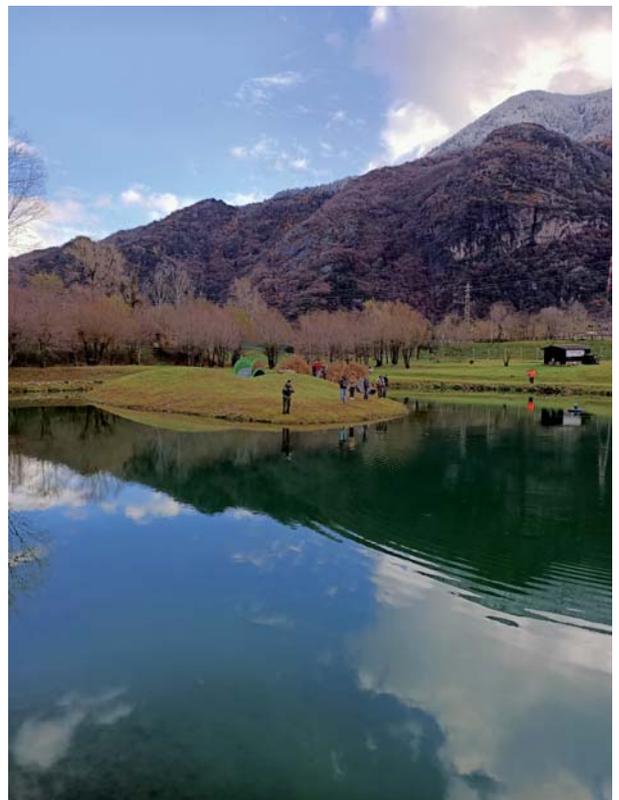
The course, as already mentioned, was scheduled in two weekends, the goal of the first is to do the theory on the design of a rod, and to have the blank glued and ready for the second weekend when we continued with the cleaning of the blank, painting, assembly of components and bindings, in-depth analysis of any doubts and an overview of how to use various well-known programmes on the web like the Rodmakers.

Time flew by during the course and with it all the fears of not being able to be a "carpenter", to plane or to use new tools. The satisfaction of being able to build my first bamboo rod, unique and unrepeatable, even if only for the uniqueness of the initial bamboo culm. But the real surprise at the end of the experience was to be able to try the rod immediately in fishing, a normal consequence of the friendly environment that was created during the stay, both with fellow students and with the Tutors, who with a lot of patience have accompanied us to the final result, people truly up to the task.

Every time I find myself fishing with my Goodwin Granger Aristocrat, all the good times and emotions I felt and shared during the course come back to mind.

Thanks for the opportunity you offer!









We split the culm to get 12 strips, we heat them to straighten them and squeeze the nodes

Be careful not to break them

Alberto...I was thinking...considering I work with bees, I could sign my rods API\* RODS...what do you think Albe?  
(\*Api means bees in Italian - translator's note)



I'LL SUE YOU!

# EFFECT OF INTERMEDIATE / SPIRAL WRAPPING ON STIFFNESS AND TWIST OF A HOLLOW ROD

by Tapani Salmi

The intermediate wraps were very frequently used in the "classic" cane rods. Now we often think that it was because the glues (eg hide glue), varnishes etc were unreliable and the intermediates gave extra support to the rod. The rods were very valuable tools and they had to stay in form for a man's life. Certainly there also were traditions important for the manufacturers, sellers and buyers of the rod.

Thereafter we have discontinued to use intermediates – they are laborious to make and we think that our glues are better than the old ones. When we try to rebuild a broken section eg due to delamination it is however a reason to add silk intermediates to support the newly glued site.

Hollow building is a method to decrease the weight of the rod, to take away the soft pith of the cane and to increase the power (elasticity / weight) of the rod. Because the circular stiffness of cane strips is much less than longitudinal strength we have to include some extra support if we want to make significant or extreme hollow building and to achieve real benefit of the technique. Thus we are using techniques to include internal bridges, fluting etc supporting the hollow structure and to hinder the hollow tube to be flattened when bending causing delamination and break of the rod.

I have tried to make hollow build rods by adding an external support to the rod. The simplest method would be to make dense intermediate wraps. I noticed soon that this was too painful for me and changed to a spiral continuous wrap using silk or a very thin monofilament with a varnish coating. This has helped to avoid to break the hollow rods.

In addition to support the structure, does the intermediate or spiral wrap increase the longitudinal and circular stiffness of the rod? This is a frequent dilemma of bamboo discussion boards. To answer this I made the following very simple experiment.

## Experiment:

To make a simple "hollow rod" I took thin birch plywood with thickness of 1,5 mm. I cut three strips with width of 12 mm and glued them to a triangle hollow tube of 140 cm in length using 30 min epoxy. I added a layer of paper masking tape ("painter's tape") to the rod surface to make it a more solid and some cork to both ends inside the tube. This was the "rod".



*FIGURE 1: triangle hollow beam*



*FIGURE 2: measurement of bending (rod with spiral wraps).*

Next I measured the bending of the rod using modified "common cent method". I fixed the rod to horizontal position and set a mass of 30 European 5 cent coins (120 grams) to the other end. I measured the amount of bending in all three directions of the triangle.



Thereafter I measured the twist, the circular bending of the "rod". I made a simple plywood plate with a triangle hole and put the same weight to measure the twist to clockwise and anticlockwise again in all three positions of the rod resulting in six measures together.



*Figure 3: Measurement of twisting (rod with a spiral wrap)*



*Figure 4 : Twisting of the triangle beam  
(here with the spiral wrap)*

Thereafter I made the circular continuous spiral wrap to the "rod" using UNI thread. I chose black color for clarity. Then I wiped a thin layer of 30 min epoxy to keep the thread fixed to the surface.

Thereafter I repeated the measures, bending and twist of the rod in all directions and measuring the change of the shape.

The results:

The longitudinal stiffness of the rod in bending test did not change or increase significantly, the mean difference was only 1%.

The mean tendency to twist decreased by 11% measured in all six positions and directions.

Conclusion:

The external support using the continuous spiral wrap has some effect on the physical properties of a hollow tube like hollow build rod. The effect on the longitudinal bending seems not to be significant in practice.

The effect to the circular bending like twisting during spey casting seems to be more significant and perhaps useful. What is more important the effect certainly would protect the hollow rod to broke or "explode" in normal use. This has been my experience when using long and eg. two hand hollow build salmon rods.

I cannot compare the effect of my spiral wraps to internal bridges. As the spiral wrap is very easy to obtain it is an attractive and easy alternative option to internal bridges in hollow building.

This experiment was a simulation of a rod but I hope that it gives us some knowledge for the real cane rod building.

**Gabriele:**

He is the President of IBRA and ..... I don't know, I think we should love our Presidents regardless because they face problems we cannot even imagine.



At the course he taught the theory lessons in Florentine....

(Artist's note: I couldn't not draw a caricature of the President)

# The oven ... a stranger

by Alberto Poratelli



When it comes to tempering (MOG don't reprimand me for misusing the term) I have read and heard all sorts of things about it in my short life as a rodmaker and in the end I have drawn the conclusion that it is probably the most intimate and personal of the operations needed to build a rod.

It is an operation that is not coded, that everyone interprets in their own way and I am convinced that this is the element that makes a rod unique. Every rodmaker tempers the bamboo their own way that is unique and inimitable and thus makes the rod that they build original and unrepeatable.

One of the biggest problems IBRA has had to resolve during its courses is the tempering because it obliges one of the members to transport his oven to the venue of the course and it is not always a simple operation because our ovens are long, heavy and inconvenient to transport.

So, I got the idea to build an oven suitable for the IBRA courses and that had a series of characteristics that are indispensable for me. I am pragmatic so for me this oven must be:

- Not too heavy
- Easy to transport
- Built with materials that are easy to come by
- Affordable
- Pleasant to look at

Initially I was given an idea by Marzio Giglio who told me that one of the mistakes we all make is to build an oven in metal; this brings great difficulty in the compensation of the temperatures because the metal walls heat up and cool down very quickly.

*He said: "Use 30mm chestnut wood planks and you'll see that it will resolve all these problems because chestnut wood has a very long thermal inertia and 200° tickles if it is seasoned".*

Apart from the fact that 30mm seasoned and stabilised chestnut wood planks cost almost as much as gold, this tip from Marzio made me think about the topic a lot and on how to seriously build an oven to use for the IBRA courses.

I started designing the oven and I thought of substituting the seasoned chestnut wood planks with a cheaper 20mm marine plywood and with an internal lining of plasterboard; this match allows for walls that are light enough and very heat resistant. The function of blowing in hot air with an air gun seemed very easy to accomplish but I faced a series of problems with the circulation and distribution of the air so difficult that I almost gave up. I couldn't find the solution but I understand why air conditioning plants always have problems, managing air flows is one of the most complicated things to do.

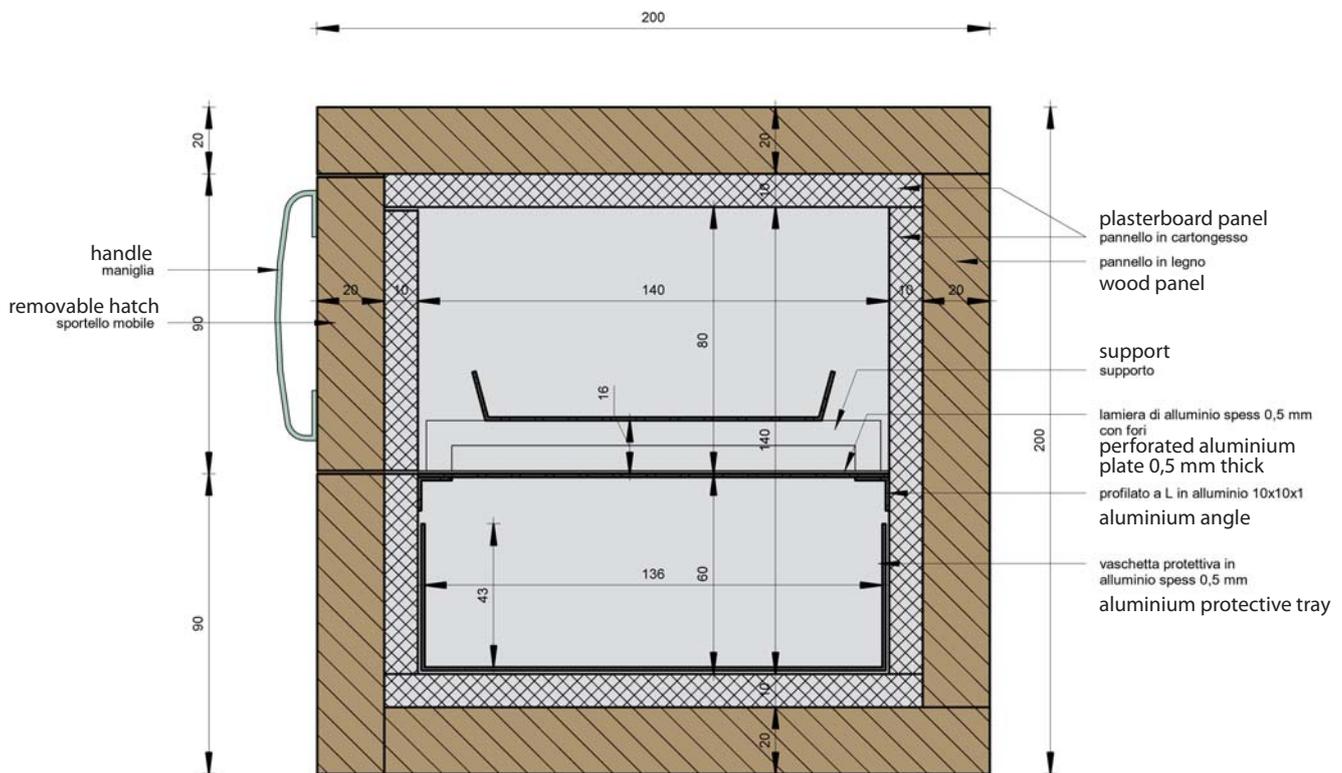
I was helped by a thermal engineer friend of mine, a designer of ventilation systems for very special places, operating theatres, where there cannot be uncontrollable flows and temperatures of air. I gave him the drawings of the oven, he measured the head and flow of the air of my air gun, he carried out the thermodynamic tests and outlined the solution.

Finally, before illustrating the project, I must thank Massimo Paccotti, probably one of the best toolmakers in Lombardy (also a great rodmaker and master in the production of Nocino\* DOC) that assembled what I designed.

The result is an oven that is taken apart in ten minutes, put in the car and in ten minutes is reassembled...practically an IKEA oven.

Below are the drawings of the oven with the specifications to build it as well as some photos. The only thing you need to keep in mind is that the number and arrangement of the holes in the separation plates between the two chambers of the oven are proportional to the flow of air and the head of my air gun; another model probably requires some adapting.

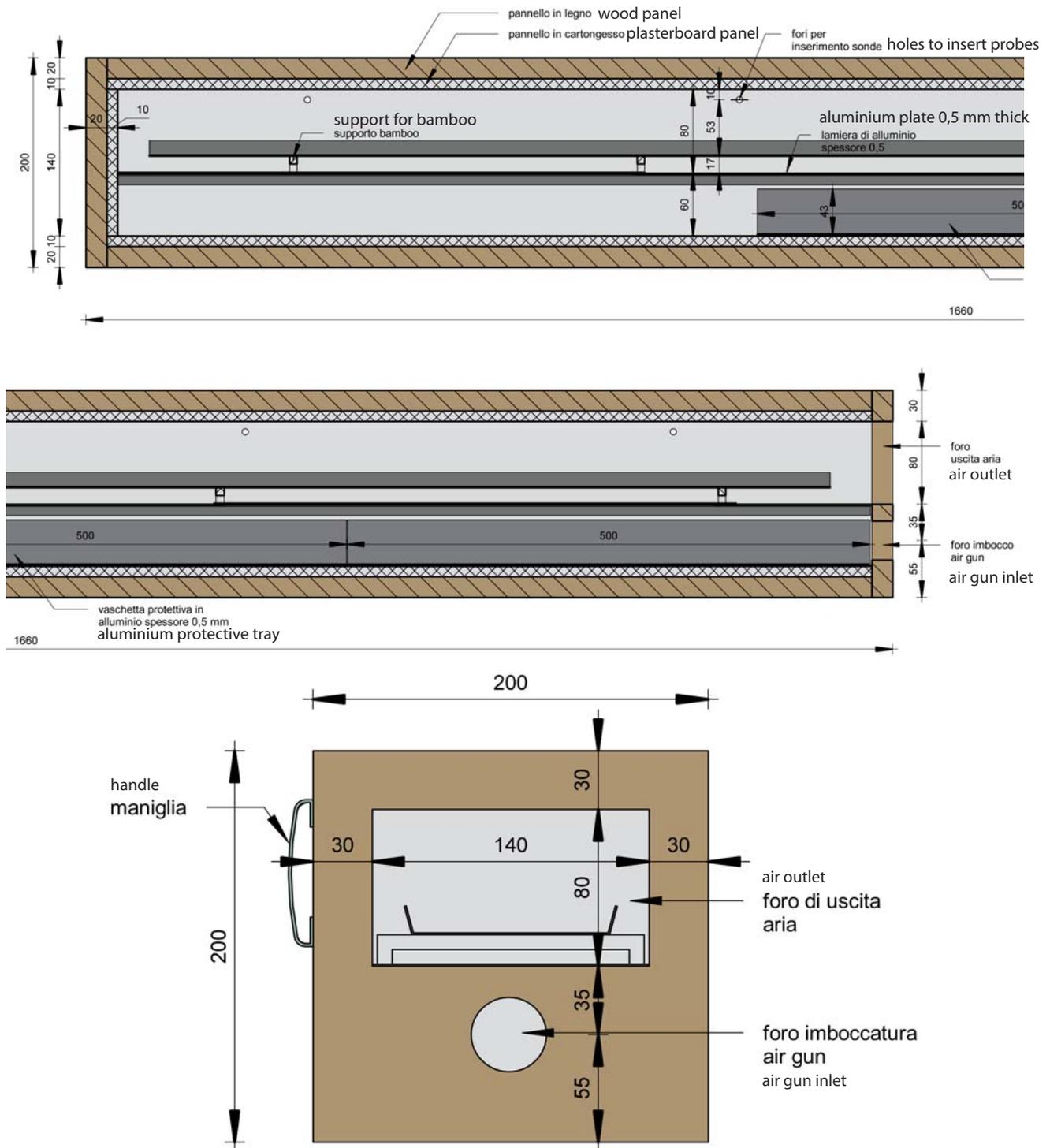
\* a liqueur made with walnuts (translator's not)



In sectional view the oven is composed of a lower chamber where the air is blown in by an air gun and an upper chamber where we place the bamboo to treat. The two chambers are separated by a perforated aluminium plate with variably spaced holes that let the hot air through, the bamboo is placed on an aluminium "tray" that protects it from the direct jets of hot air from the holes.

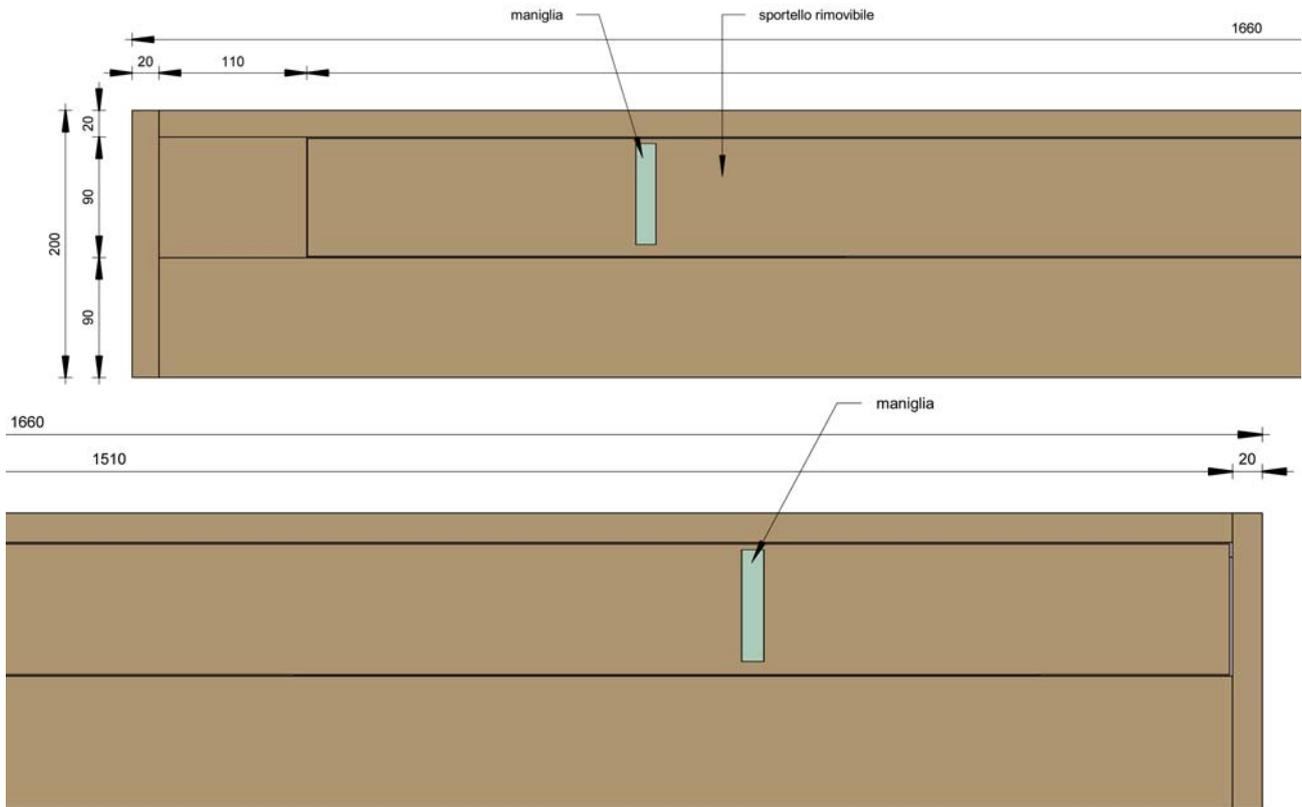
The size of the lower chamber is purposely reduced to the limit in order to optimise the output of the heat gun.

The longitudinal section (split in two due to paging issues) shows the inlet of the air gun and the size and position of the tray where the bamboo is placed. In the upper chamber, on the top part of the bottom wall there are four holes that are used to insert the probes to measure the temperatures of the four areas of the oven.

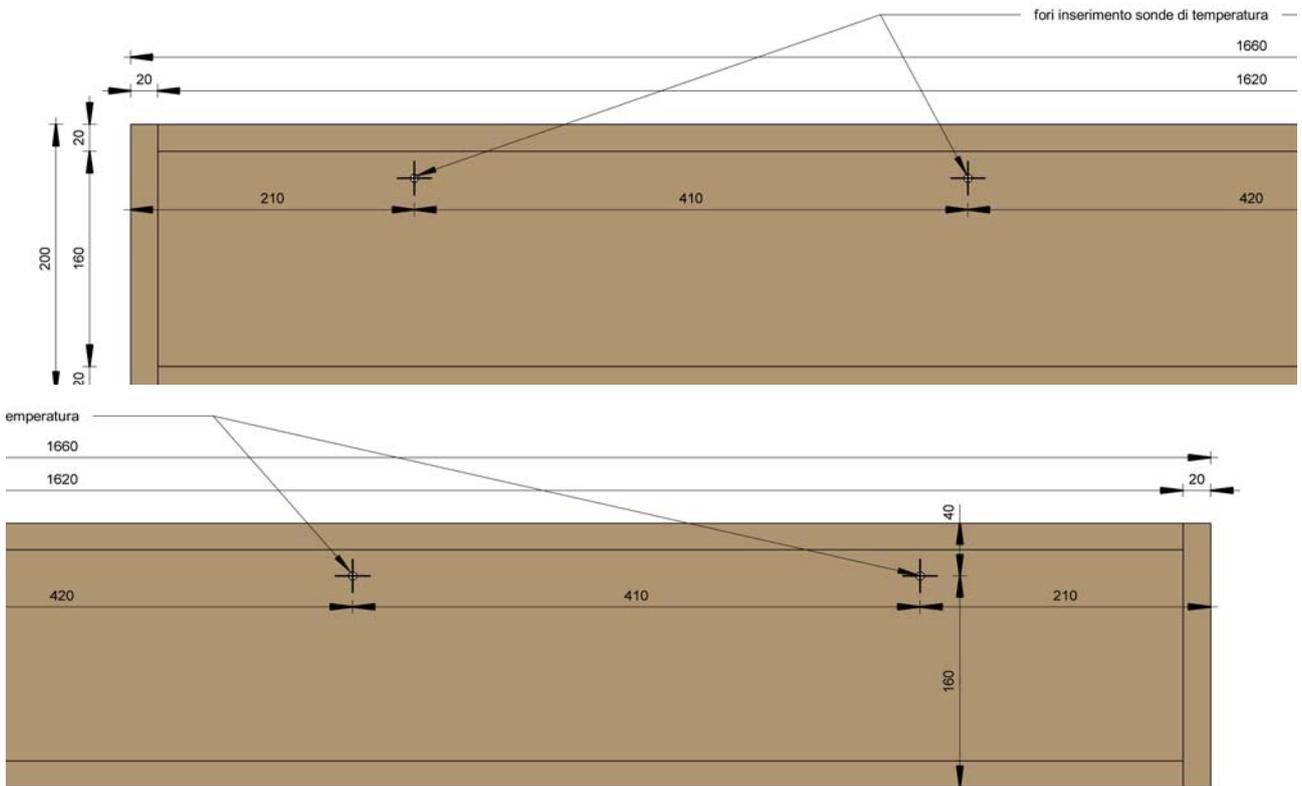


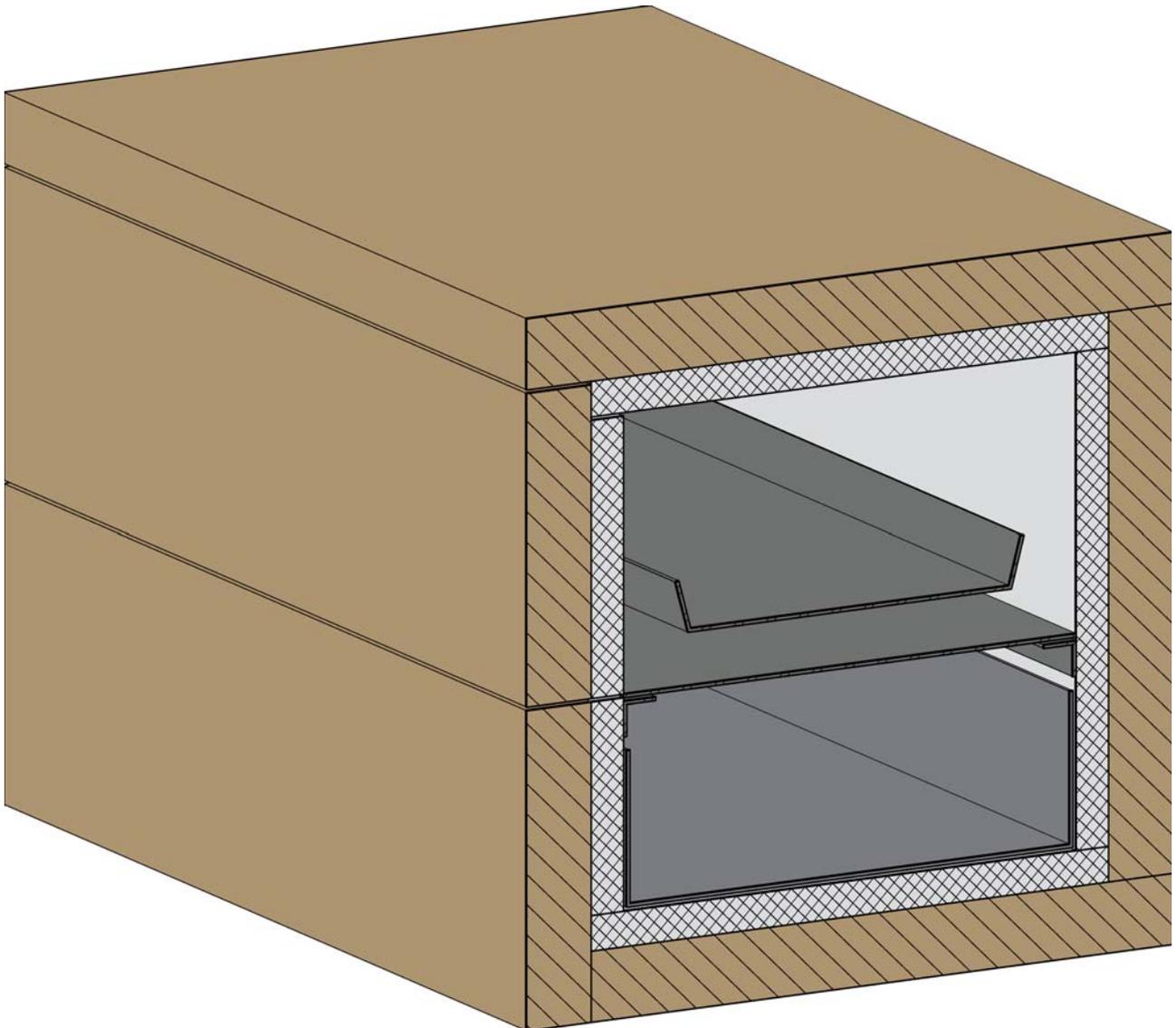
The side view shows the hole to insert the air gun and the large outlet hole for the air from the upper chamber.

The front view shows the removable door that allows the correct positioning of the bamboo on the tray



The rear view shows the position of the holes for the insertion of the temperature probes in the four areas of the oven.





#### Axonometrically cut details

You can see the aluminum sheet coating of the lower part for about half of the length, it is the area where the air temperature is higher.

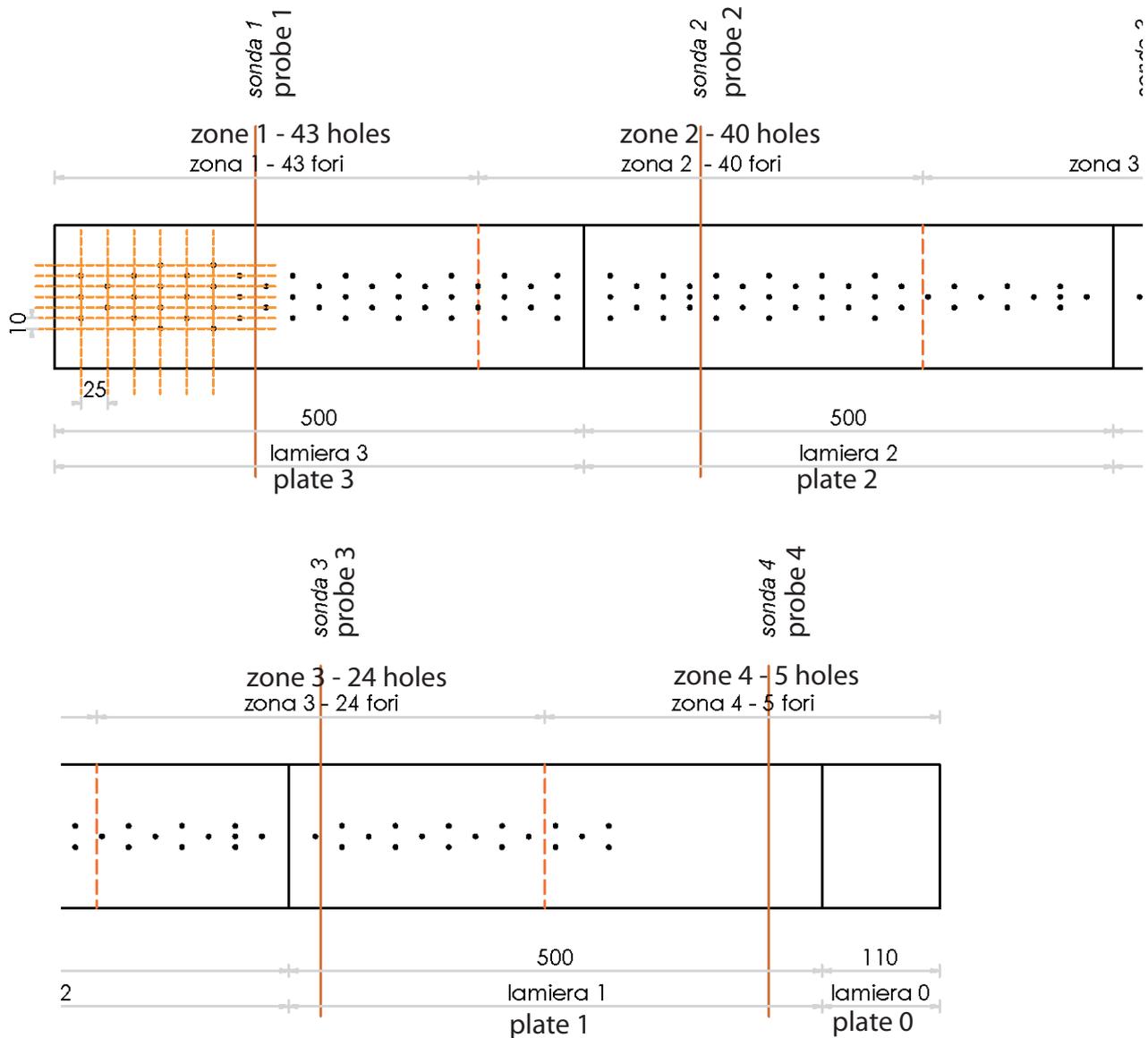


Diagram of the holes in the separation sheet between the upper and lower chambers.

- 3 mm diameter holes
- The size of the holes is made for the air gun Bosch mod. PHG 630 DGE
- The position and number of holes can vary according to the type and prevalence of the air gun used
- The plates must overlap slightly to slide when they expand during the heating

The three aluminium plates are positioned with a small overlapping (approx. 10mm) so that they can slide one on the other and compensate for their expansion caused by the heating.

Now some photos of the oven assembled in my workshop and during its use at the IBRA 2021 course.







The oven described allows the reaching of temperatures in a range of approx. 5/6 degrees centigrade on its entire length except in the area near the inlet of the air gun where the temperature is on average 10 degrees higher, as illustrated on the table below. This area can be put out of use by inserting strips on the outside of it.

The best use of the oven is obtained by gradually increasing the temperature of the air gun to achieve a homogenous increase up to the tempering temperature.

wood oven tests

PROVE DEL FORNO IN LEGNO

state of the oven

3mm diam holes positioned 43-40-24-5 with fibreglass plate

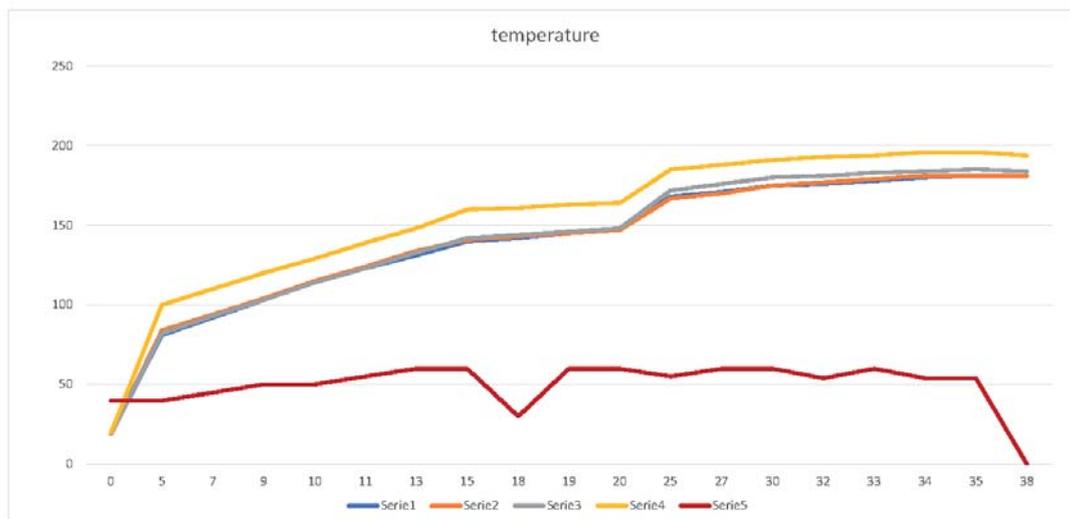
stato del forno	freddo cold																		
data	112 fori diam 3 mm. Posizionati 43-40-24-5 con lastra di vetroresina																		
date	04/11/2021 prova 1 test 1																		
probe	tempo time																		
	0	5	7	9	10	11	13	15	18	19	20	25	27	30	32	33	34	35	38
sonda 1	19	81	92	103	114	123	131	140	142	145	147	168	171	175	176	178	180	181	181
sonda 2	19	84	94	104	115	124	134	141	143	145	147	167	170	175	177	179	181	181	181
sonda 3	19	82	93	103	114	123	133	142	144	146	148	172	176	180	181	183	184	185	184
sonda 4	20	100	110	120	129	139	148	160	161	163	164	185	188	191	193	194	196	196	194
temperatura media nel forno sonde 1-2-3	19	82	93	103	114	123	133	141	143	145	147	169	172	177	178	180	182	182	182
temperatura air gun/10	40	40	45	50	50	55	60	60	30	60	60	55	60	60	54	60	54	54	0
	riscaldamento - 35'															cottura - 10'			

average temperature in the oven probes  
temperature air gun/10

lowered to

n.b. la sonda 4 è quella posizionata vicino all'imbocco della pistola e all'uscita dell'aria NB probe 4 is positioned near the inlet of the gun and the air outlet

0'	400°	18'	abbassata a 30° lowered to	33'	alzata a 600° raised to
7'	alzata a 450° raised to	19'	alzata a 600° raised to	34'	abbassata a 540° lowered to
9'	alzata a 500° raised to	25'	abbassata a 550° lowered to	38'	spento e chiuso sport. Laterale side hatch closed and turned off
11'	alzata a 550° raised to	27'	alzata a 600° raised to	39'	aperto sportello frontale front hatch open
13'	alzata a 600° raised to	32'	abbassata a 540° lowered to		



This oven can definitely be improved but it is certainly easy to build.

The total cost to build the oven was:

wood panels:	Euro	30,00
plasterboard panels:	Euro	0,00
screws and nuts	Euro	15,00
aluminium plate	Euro	12,00
aluminium tape	Euro	4,00
thermometer with four probes	Euro	59,00
total	Euro	120,00

If you need clarification, you can write me to the email: [postmaster@aprods.it](mailto:postmaster@aprods.it)

**After ten hours of planning, I start hallucinating ...**



Do you think you're doing a good job?

Oh, "Gherriso\*" ... don't you start. It's not my day

\* Italian pronunciation of Garrison (translator's note)

# Heat treatment: “cooking” bamboo with the right recipe!

by Angelo Arnoldi



I often read the Bamboo Journal, I am an average rodmaker, so I try to learn from those who know more than me.

A lot of articles deal with heat treatment, there are explanations on how to get to the heat treatment of the bamboo strips, the temperatures to reach and the time needed to complete the process successfully.

But what is heat treatment? What is this mysterious process that for better or for worse conditions our rods?

If we look up the definition of heat treatment in a dictionary, we discover that it is a treatment that involves the sudden cooling of a metal, or glass after taking it to an austenisation temperature, it is the speed of cooling that gives the metal a high mechanical resistance.

It is therefore obvious that it has nothing to do with bamboo; the term is inappropriate also because there is no cooling of our culm or of the strips, only a simple heating.

However, there are some chemical reactions which are activated by this heating that will bring about an alteration of the physical coefficient, that is the property of bamboo to deform when subjected to different forces. Perhaps this is why we talk about heat treatment in bamboo, even if inappropriately.

The chemical reaction triggered by heat treatment has five main characters and an outsider, water. These characters in order of percentage contained in bamboo are: cellulose, lignin, hemicellulose and starch in two components: amylose and amylopectin.

Almost all of these substances are sugars.

For some, sugar is the sachet they put in their coffee in the morning, for others, influenced by the antiscientific and obscurantist wave of the so-called “social networks”, it is the source of all evils of humanity. Actually, sugars are the most common organic molecules present on our ill-treated planet, they are the primary source of energy of the cells in our organism and that of almost all living beings, as well as their structural component, constituting the vegetable cellulose and the animal cartilage. So, let's get to know them better, to understand what happens to our five characters with the heat treatment of the bamboo.

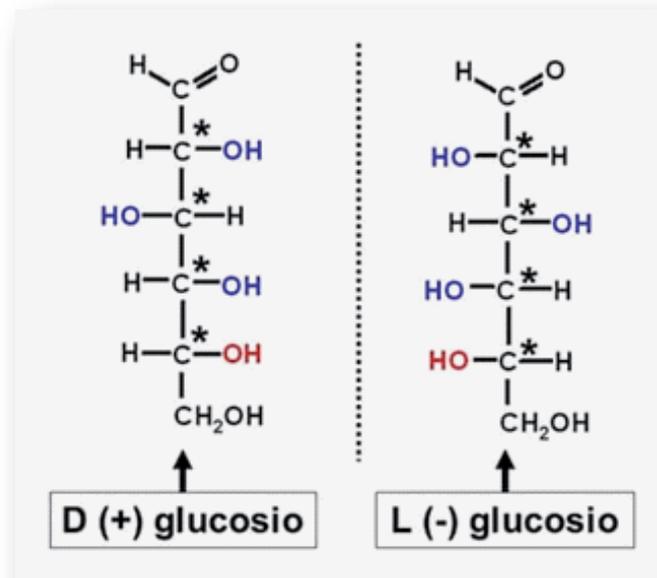
Sugars have a very complex chemical structure with complex chemical reactions, their molecule consists of a long aliphatic chain of carbon, hydrogen and oxygen atoms. From a chemical point of view, they are aldehydes or ketones due to the acyl group CHO of the aldehydes or the carboxyl group C=O of the ketones and they are characterised by the presence of hydroxyl groups. There is one hydroxyl group, -OH in every carbon atom, they are also called hydrates and it is the reason sugars are more appropriately called carbon hydrates or carbohydrates. They can also be bonded to proteins, the famous glycoproteins or to amino groups, the aminosaccharides.

Carbohydrates can be divided roughly in three groups, the monosaccharides, in which the molecule chain is composed of only one unit which repeats itself, for example glucose, the disaccharides, in which there are two units of a molecule repeated to form the chain and polysaccharides in which there are many molecules repeated to form a chain constituting the carbohydrate.

All these carbohydrates are joined by the glycosidic bond between the hydroxyl group -OH of a molecule with the hydroxyl group -OH of another carbohydrate group, or with the hydroxyl group -OH of an alcohol.

This glycosidic covalent bond, when it forms, results in a water molecule H-O-H that remains in solution.

They also have another interesting characteristic that concerns us.

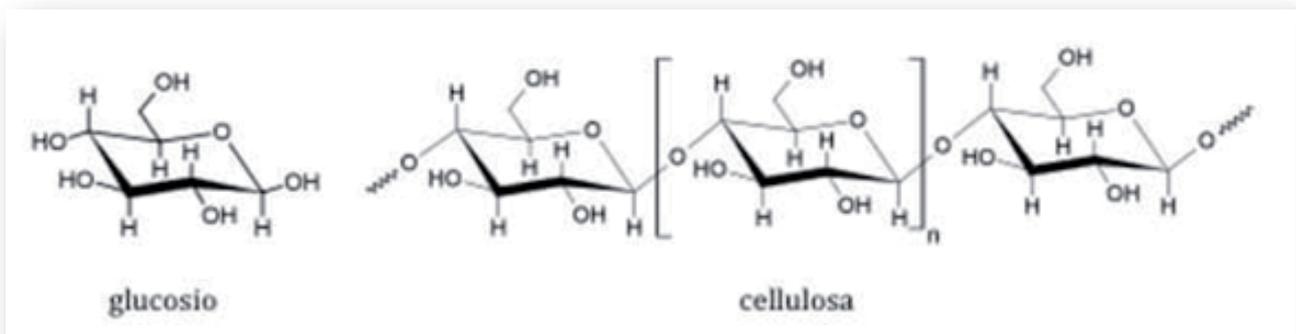
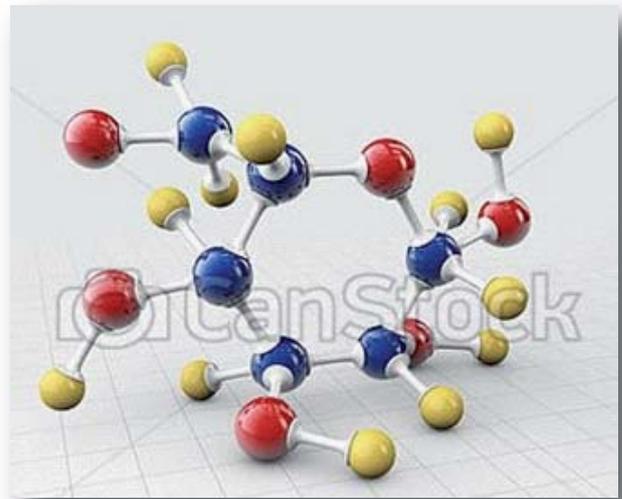


When we write the chemical formula of any compound, we simply draw a two-dimensional graphic representation, an artifice, more or less like a geographical map that once opened up on a table shows us the world. Actually, our planet is rather spherical, three dimensional. And yet the molecules of any compound occupy a spatial space. The formula of methane is written: CH<sub>4</sub>, but actually it is as follows:

from the image we can deduce how the carbon atom is at the centre, a space surrounded by four hydrogen atoms held in position by the force generated by the density of electrons of the carbon and hydrogen atoms.

Carbohydrates, given their complex molecule, have this three-dimensional aspect pushed to the limit and this greatly affects the hardening process that interests us.

However, let's go back to our polysaccharides, cellulose is one of these, indeed we can certainly say that it is the most important one



It is made up of a large number of glucose molecules, from a minimum of 300 to about 3000, joined by the glycosidic bond. This chain, or to call it more appropriately, this polymer, has an unbranched spatial structure, differentiating itself from our other character, hemicellulose.

In fact, hemicellulose is different due to a greater molecular disorder, it is highly branched and is made up of various types of carbohydrates: arabinose, mannose, galactose and xylose, unlike cellulose which is composed of glucose alone. Currently, three types of hemicellulose are known, the best known is certainly the family of xylans, which have been studied a lot because they are among the components of the integument of the kernels of wheat and other cereals.

Hemicelluloses also have another property that greatly differentiates them from cellulose. The cellulose polymer is composed of chains formed by glucose alone arranged in parallel with each other and in a very orderly manner. This spatial arrangement of the molecules causes the cellulose to assume a very amorphous behaviour, typical of crystals, and does not absorb water. The highly branched chain of the hemicellulose, on the other hand, allows it to absorb a lot of water, it is very easily hydratable, this allows the membrane of the bamboo cells to have a constantly high water content.

Now let's see what lignin is and what it is used for.

Lignin, which after cellulose is the second largest biological polymer present on earth in terms of quantity, has a very different conformation from cellulose and hemicellulose. Chemically it is a phenolic polymer, i.e., an aromatic compound, with a hydroxyl group, like carbohydrates. To be a little more precise, it is a derivative of cinnamic acid.

However, the presence of hydroxyl groups also allows lignin to form very long and very branched chains whose considerable complexity, increased by the aromatic group, has not yet made it possible to accurately understand the molecule. Structurally, lignin serves to keep the cellulose and hemicellulose molecules bound together. It has a binding function, it is present in a percentage of 20% in soft woods, it is double in so-called hard woods. Having hydroxyl ions, it absorbs water and has a plastic consistency when hydrated.

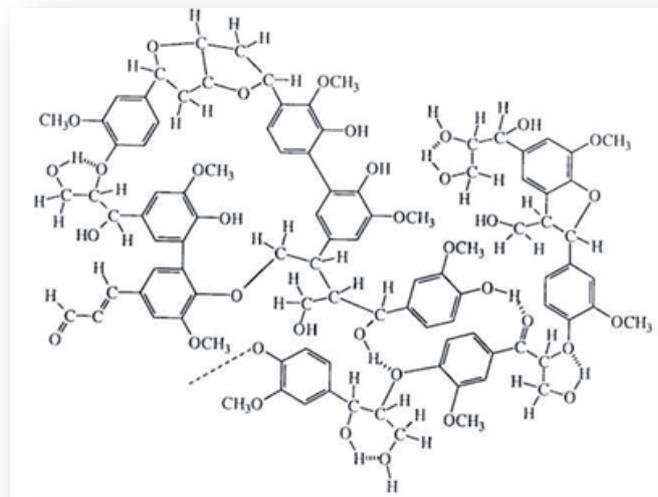
Even in bamboo it is very present and measurable, the content obviously varies according to the age of the plant and its type. (1) Here you will find a system for the dosage of lignin, cellulose and hemicellulose in Moso bamboo.

Now all we need to do is look at the starch ...

Starch is the plant's energy reserve ... almost all plants accumulate it in the form of granules, in seeds, roots, tubers or fruits. It is also a carbohydrate, a complex carbohydrate in which two forms are diversified, amylose and amylopectin. Both are made up of glucose which, however, forms a linear chain in amylose and branched in amylopectin. Obviously different plants with different ages have different structures of both amylose and amylopectin.

In bamboo, the starch content averages 2.7% in weight (2).

Now that we know a little about the actors involved, let's see the reactions triggered in the heat treatment process.



The heat treatment process triggers a change of state from a physical point of view, and two chemical reactions.

In bamboo, similarly to many plants, the water content is very high, in relation to the age and position in which it is found, starting from a percentage of at least 40% in weight and rising. Water is found in the form bound to the hemicellulose, in the cell wall, and in free form between the cellulose fibres or in the vascular bundles. The elimination of the latter does not give any chemical-physical variation in the plant tissue. Even with the elimination through heat-induced evaporation, there are no structural changes, except for an evident weight loss. The loss of this water can be easily measured with the formula

$CU = \frac{Mu - Ms}{Ms}$  (2), where  $Mn$  is the weight of the initial substance and  $Ms$  that of the dried substance.

The loss of water from the cell wall, on the other hand, induces a limited weight loss, but produces shrinkages and contractions of the wall and consequently changes in the size of the culm or strips, responsible for the cracking of very seasoned culms. Its loss increases the elastic modulus, which is inversely proportional to the content (2).

It therefore appears evident that the mere transition from the liquid to the gaseous state of water, caused by the heat of the heat treatment process, already stiffens our strips.

But we still have to consider the chemical reactions induced by the heat on our carbohydrates and on the lignin which, remember, is not a carbohydrate, but has a similar behaviour due to the presence of the hydroxy -OH.

These reactions are two, one fairly simple, commonly called caramelization, and another, enormously complex and not entirely known, despite its great importance in food chemistry, called the Maillard reaction after its discoverer.

These reactions are quite similar. They are called non-enzymatic browning reactions and are both triggered by temperature.

Caramelization only involves carbohydrates, while in the Maillard reaction, carbohydrates and amino acids are involved. Remember that there are also proteins in bamboo, in a variable percentage depending on the portion of the plant considered, in the shoots it is around 27%.

Caramelization is triggered by temperature, and takes place more easily in the presence of little water. The temperature must be high enough, it starts after 100 degrees Celsius, and each carbohydrate has its own characteristic temperature of initiation of the reaction. Fructose, for example, starts the reaction forming complexes called aldiols, at about 110 degrees, galactose, glucose and sucrose at 160, maltose at 180. From these temperatures it is clear that the bamboo heat treatment process must be carried out at more or less 180 degrees.

The caramelization reaction takes place in several phases, and it is a pyrolysis in which the carbohydrates, especially the ketones, which are more reactive due to the double oxygen bond, split forming the aforementioned aldiols, unstable alcohols that bind, polymerizing, with other carbohydrate molecules, forming different carbohydrates, or identical carbohydrates but with different stereoisomeric properties,

i.e., compounds with the same formula but with different spatial conformation.

The caramelization reaction can be summarized in: condensation reactions, with the formation of intramolecular bonds; isomerization of aldosis and ketosis; dehydration reactions with formation of unsaturated polymers.

These processes lead not only to the formation of carbohydrates with different structures, but also to the formation of hundreds of unbound compounds which, together with the water resulting from the formation of the glycosidic bond, form the so-called caramel, which in the case of bamboo heat treatment is the foamy liquid with a characteristic odour that comes out of the heated stalk.

From a physical point of view, this reaction changes the rheological properties of carbohydrates by polymerization and bonding between different carbohydrate molecules. Starch, for example, gives rise to the phenomenon known as starch retrogradation, the suspensions of which acquire a rubbery consistency by eliminating water in the form of exudate, a process caused by the thickening of amylose molecules, which cause the collapse of the expanded structure of the amylopectin.

Now let's look at the Maillard reaction, discovered in the early 1900s by the French chemist Camille Maillard. It is the chemical reaction that occurs between reducing sugars and amino acids. Remember that proteins are long chains of amino acids, starting from a fairly high temperature, and it is the reaction that causes the formation of the brown colour in food products when they are heated. The colour of freshly baked bread and its scent, or the aroma of roasted coffee, are due to the formation of compounds caused by this reaction.

Given its enormous importance in the food industry, the formation of a particular scent or a pleasant colour can make you prefer one product over another, therefore it is essential.

It is a highly complex reaction which, in very simple terms, can be divided into some phases. The first of these leads to the degradation of some essential amino acids, there is no colour or aroma. The second phase with the formation of intermediate products, called Amadori products, by the binding of carbohydrates with amino acids, with a light colour and a noticeable scent.

A final phase in which the Amadori products are split giving carbonyl derivatives which in turn break down further giving nitrogenous compounds, called melanoidins. These nitrogenous compounds give a more or less dark colour to the initial compound, bamboo in our case.

The Maillard reaction is influenced by many factors, from the type of carbohydrate, ketoses are more reactive than aldoses, and polysaccharides are less so than hexose or pentose type sugars, that is, with 6 or 5 carbon atoms. But above all it is influenced by time and temperature, parameters that must be considered in pairs, i.e., lower temperature with longer time or higher temperature with shorter time.

Anyway, the initial temperature must start from at least 120 degrees and not exceed 180 so as not to degrade the initial product.

The Maillard reaction, together with the caramelization, leads to the result we want when we subject our strips to the process called heat treatment. New bonds are formed between carbohydrates, stereoisomers are formed, the structure and cell wall are more compact and rigid. Both need a temperature, which must not be below 180 degrees, so that all the various carbohydrates can begin to form new bonds, and a time, unfortunately not easily determinable, but which is empirically estimated to be about 15 or 20 minutes in order to complete the various processes.

These two reactions, together with the loss of water induced by heating, make our strips suitable for the use we intend to make of them, skipping this fundamental step is the best way to build rods that are not suitable for casting a line with a fly at the end...

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*Li, X. et al. Determinazione di emicellulosa, cellulosa e lignina in bambù Moso mediante spettroscopia nell'infrarosso vicino, Sci. Rep.5, 17210; doi: 10.1038 / srep17210 (2015).*
- 2) [https://issuu.com/giulapistoiesi1/docs/bamboo\\_stampa](https://issuu.com/giulapistoiesi1/docs/bamboo_stampa)
- 3) *Bambù tabah tabanan - Arca del Gusto - Fondazione Slow Food*



**Silvano and Moreno's mellow advice ...**



The hand behind the plane... for G\*d's sake!!!!

How is it?

How is it? It's a piece of shit, that's what it is

# Rabbits, metres of twine and deformations.

## It is a long premise but there it is, perhaps ... we'll make it fit!

by Gio' Nese

I'm fishing and I'm not catching anything. The mind wanders; for a while I look at the mountains;

"There it is!

It is sitting on a stone, tinkering. It seems to be there by chance but it has always been there. It is the shadow of my conscience. Assuming that the first is there, the second must be there, but it is as useful as a shadow. There it is! And you don't know what to do with it. Useless. On most occasions its mere presence is disturbing.



«Listen up Alverman! Suppose we pull a string that surrounds the earth along the equator. They are about 12000 Km in diameter x 3.14 about 36000 Km, thirty six million meters long!

It would take you about two and a half years to walk the circumference of the earth at a good pace. Let's assume we cut the twine and add 1 meter with 2 knots.

Question: "Can I get a rabbit to pass under the string?"

I don't wait for an answer. The stupid look does not reveal it. I know the type. Well, it would have been radical chic and illogical nonsense. I'll give you the answer.

«If the rabbit is like the ones we know, the answer is yes!

1 / 3.14 is about 32 cm high and the rabbit passes under it even with a certain safety margin.

Demonstration:  $((3600000 + 1) - 3600000) / 3.14 = 0.318$  meters. The new diameter is about 32 cm larger than the previous one and the rabbit passes through it! "

«Here we go again, an example that fits like a wet boot! What do you mean with this story?

«Nothing, I wanted to try a trick to bring out the "relativity" of a dimension: 1 compared with 3,600,000 and pointing out that this infinitesimal variation has macroscopic effects and such as to solve a vital problem for rabbits seemed interesting to me. I want to tackle a phenomenon that connects numbers with very different orders of magnitude and justifies an unthinkable condition so different from the previous one as to be disconcerting and meditating, comparing the big with the very small.

"I look forward to the numbers now and the relative bewilderment, disconcert me then!"

## Large deformations and the importance of shear stress in ...

*with quick sketches and theory.*

So, great deformations are those that affect buildings in the event of an earthquake, the shock absorbers in cars, spguides in general ... fishing rods.

We are obviously talking about rods. Because there lie the great deformations that interest us, because they are the only ones that actually interest me.

For what purpose do we use equipment? To protect us and get food. What are the characteristics that such devices must have?

- duration, availability.

And compromises are made to find intermediate solutions between the two poles. Not very solid but easily available; practically unavailable but very solid and long-lasting and so on. One of the ways - saying that we can accept a deformation in equipment. In houses and bridges they are very small; non-existent in water pipes; in a nutcracker still small; big in fishing rods! Why?

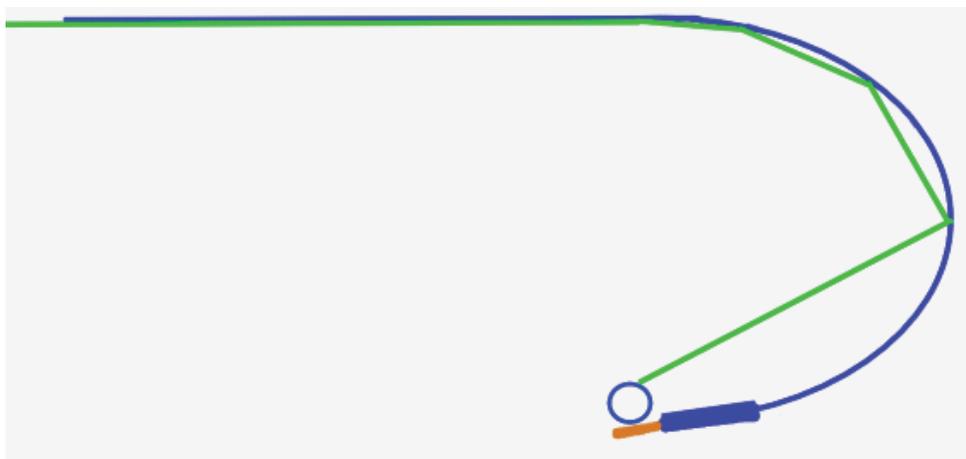
Because to make them work, we used the availability and strength / durability of natural cane. If natural cane and houses made of wood work, they will also work for our noble purpose.

The consequence of the large deformation is that in their use the lines of application of the forces change and what in a rigid rod is qualified as "deformation due to bending" if we insert a large deformation, it becomes a bending and a traction.

Attach the line to the tip of the rod and pull!

When the tip aligns with the line there the bending stress has a zero, very low value, that can still increase if the pull is increased it is only the traction / tension.

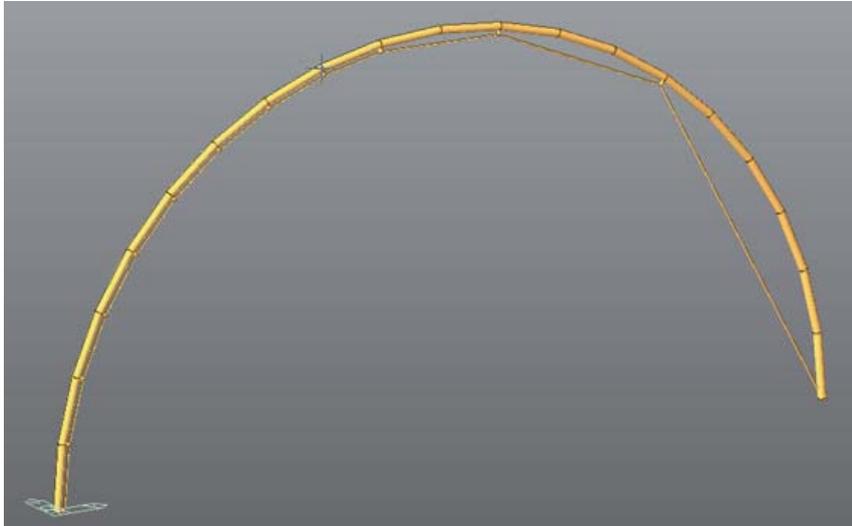
If we apply the guides to the rod, the traction is no longer there but by pulling more and more on the line, the limit of the flexural resistance of each section of rod is reached, which aligns with the line / line in tension. The limit of this type of deformation / tension / stress is the formation of a semicircle curve which indicates that in each section upstream of the curve we have reached the limit stress value. (Try to think if and how you could obtain a deformed rod made in a circle and what phenomena of instability are created ... This consideration on the circular deformation is pure geometric delight, unusable in fishing.)



Good!

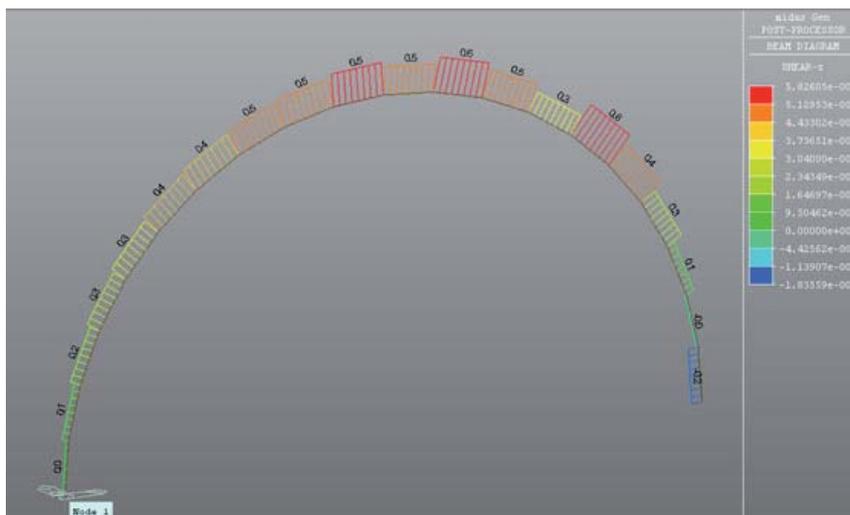
Now let's see what happens inside the section of a bent rod.

Let's consider the curved part of the rod. The bending moment, shear and compression stresses have a linear trend, (irregular shear due to the irregular position of the guides)

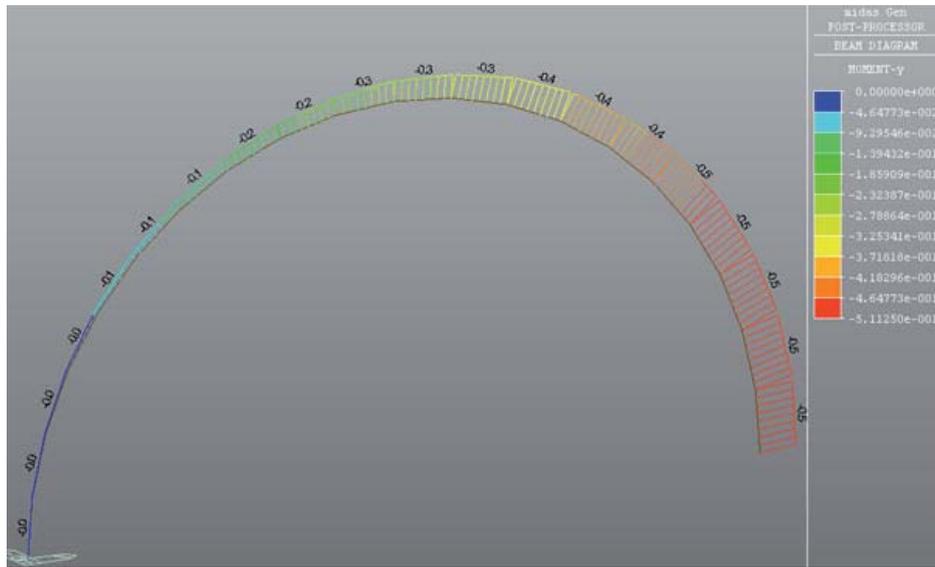


*Static diagram: rod, guides, line. A load of 500 grams is applied to the line. The reel part is bound / fixed to the ground.*

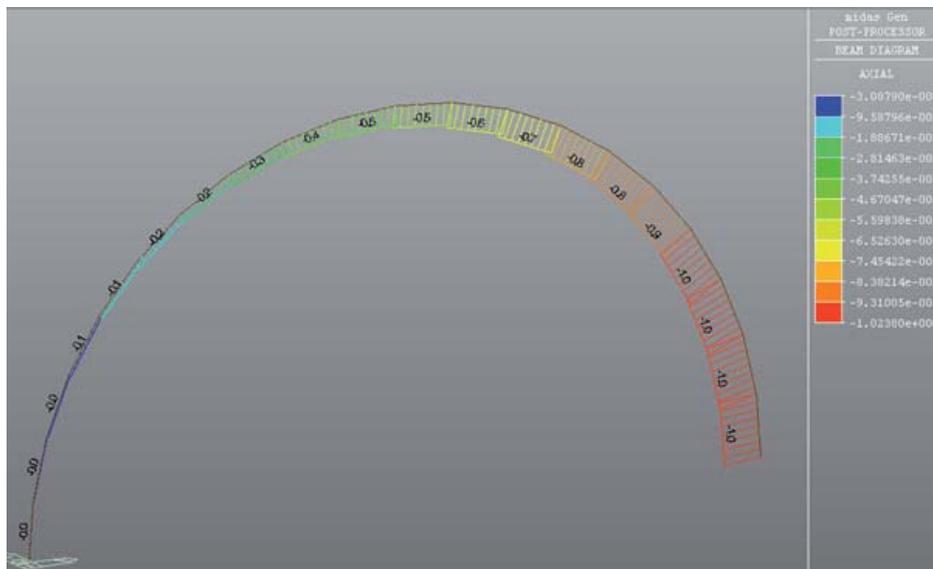
It can be misleading that there is also a bending effort in the part aligned with the line. There is not! It's zero! The bending moment is the product of a force for one arm. The cutting effort is linear in the sector between the beginning of the bending and the fulcrum on the butt plate, the variation is due to the fact that as a consequence of the shape, there, the cut is partly balanced by a compression effort !!!! !!!!!



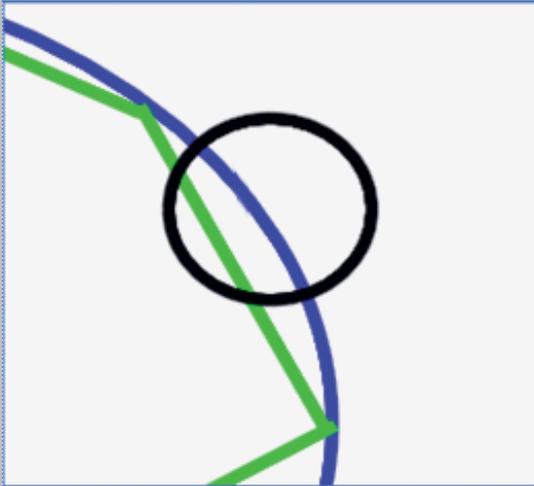
*Shear stress*



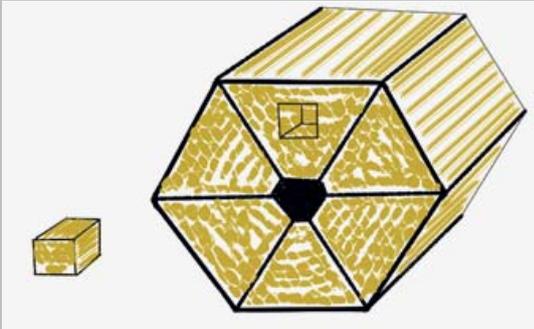
*Bending moment stress*



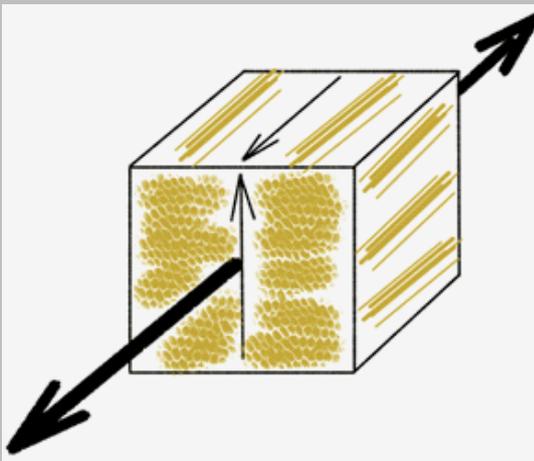
*normal stress / compression stress*



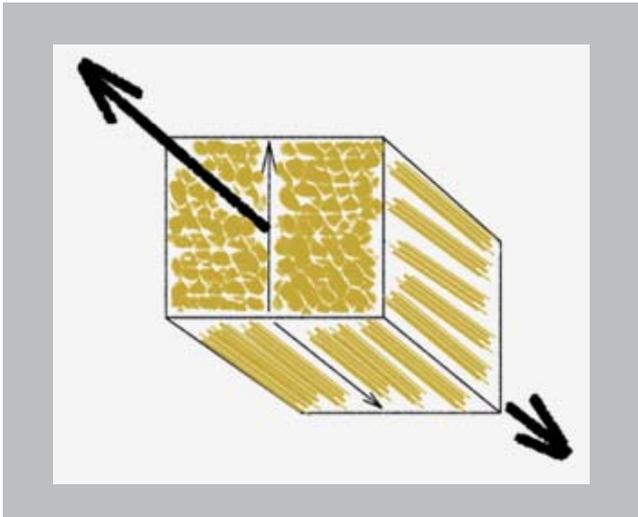
Now let's isolate a very small brick, which is one mm under the skin of the rod. For the sake of simple illustration, we'll consider a cubic brick, if you do it prismatic it becomes just a little more difficult to understand.



- 1) The theoretical microscopic situation is this.
- 2) The brick, in a rod, or obtained from a structure stressed by bending, is subject to these tensions.

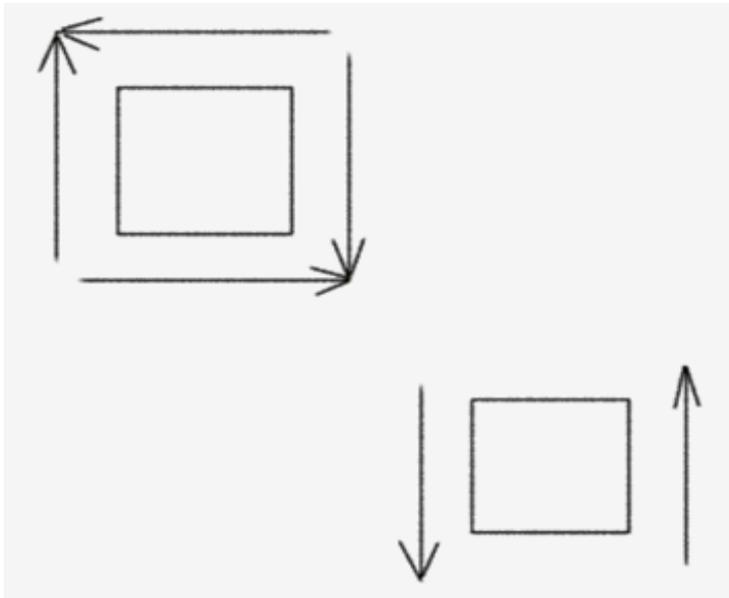


The large arrows represent the state of "traction" tension, we have selected a cube in the "taut" area, the small arrows represent the cutting tension.



And seen from below.

The direction of the arrows representing the cut is important. They must point coupled on an edge otherwise the cube starts to spin.



*Small Cube seen in elevation*

Let's try to explain what the arrows indicate.

The large ones represent the state of longitudinal tension, on the side we have chosen, we have obtained the cube from the upper part of the section, where there is traction. The small ones represent the shear stress. Why are there 4 instead of 2?

Because if we left only 2 to represent the tension due to the cut, the system would not be balanced and our cube would start rotating. So, for the rotation balance there must be stress on the side and on the one next to it. That is, there are forces that make the Power fibre bundles slide over each other again and again, at 90 degrees, which tends to open them. Displacement is prevented by the pith (parenchyma).

I make a non-isotropic material work in shear and if this, like our rods, is made up of a substance that resists traction very well, power fibres but not as well to cut, pith, and I make sure that precisely due to the presence of large deformations the shear stress is important. What I get is not the optimal exploitation of the material / substance. Not being able to do otherwise, I am bound by the structure of the material, I adapt to it and I try to optimize this situation as well.

How?

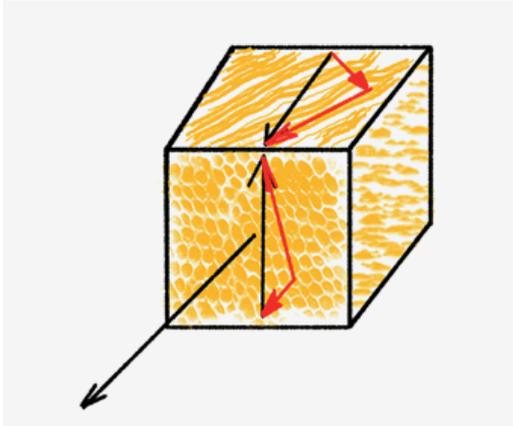
Using appropriate section geometries, high and not wide, for example, or impregnating with substances that corroborate the pith. The extremely porous structure of the bamboo allows us to do this. Adopting a suitable heat treatment temperature, MAKING WRAPPINGS / WRAPPINGS, etc. Here too the imagination is unleashed and things are invented.



Bending breaks: on one side it was free, on the other it was bound. it should be noted that the clear breaking of the wrapping developed at the point of maximum bending moment. The other one too, but the point is less easy to identify.



Detail of the breaking of the wrapping. In the free one, without wrapping, the length of the broken Power fibre bundles is an indication of the poor quality of the pith, not the excellent quality of the Power fibres, let's demystify a little ...



One of the reasons DeVINE rods, the spiral rods, seem to react better is linked to a phenomenon that, by exploiting the rotation of the section, transforms the stress of the cut that works on the pith into traction and compression along the power fibre bundles. and orthogonally to them. It is a vector decomposition: if I have two obligatory directions in which to decompose the traction and shear vectors, I will try to make sure that the decomposition is in favour of stability and seal, which transversely compacts the constituent fibres. This is exactly what twisting does,

it also does it on rope, with a good twist I can get decent quality from a rope, made of recycled material and short fibres. The shorter the fibres, the greater the need for twisting.

I was walking around with the Academy group, on the Serchio river, I believe, and in a pile of material abandoned by the usual troglodytes I found a spool of cotton thread. Useful for making wrappings, I picked it up. When I try it, I realize that it is low quality material. It bears the traction little and badly, too bad. I keep it anyway for doing unimportant jobs.



*Short and long fibres in the same yarn just a few centimetres apart*

I will certainly not bind the rods in the gluing phase. Too bad, I would have had enough cotton until I quit the business but it burns me. And one day I start looking at why the heck there are areas where resistance is good and others where it really hurts. The immediate observation is that the length of the fibres in the areas of poor strength is small, the fibres are short. And by pulling the fibres come off each other. How is the situation remedied? By increasing the twisting. The practice has always been known among rope makers. If the material is scarce, the torsion is increased in order to increase the friction and the compaction of the fibres to keep the section consolidated. This also works for the thread I found; if I need a section where I have to pull, I twist it more and it becomes an excellent yarn.

Well, DeVINE does the same thing, he takes the rod and twists it and what was the weak part of the section: the pith, works in a different way. I transform the cut into compression and traction along the new direction of the fibres and in a direction orthogonal to them and the rod stiffens. The simplistic explanation explains the higher performance, with the same section, of the twisted rods. We would have to argue about how to do the twists and the formula that is the most popular: 1/6 of a turn between two successive coils, it is not exactly the most effective, well, that's okay. Credit to DeVINE, who had the right intuition, transferred an observation to his own comfort zone.

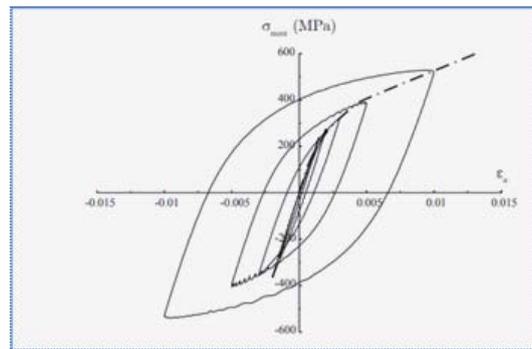
In his time the matter of the need to apply more twist to the ropes of recycled material was well known ... in those days they also recycled the hemp of the old worn ropes.

Let's go back to cutting and large deformations.

One could imagine that the action of the load on the rod performs a duty. (work = force x displacement) and that, to compensate for this work, the tensions due to the bending moment, which resists bending, the shear moment which resists the shearing action and normal stress which resists traction, somehow balance the external stresses. Now if we imagine that the deformations are very small and the load is orthogonal to the axis of our shelf /rod. The product of the traction for the X component of the load is = 0! (It is a vector product, an area in which the displacement is a Cartesian axis and the force the other axis). That is, there is practically no pure traction, it cannot work, to balance any of the applied forces. Conversely, the bending moment that works on the rotations does a job and if the rotations are small the value of the moment will be large, very large. (Bridge beams) similarly for the cut that works in the same direction as the movement, produces work and compensates for the application of the load and the deformation of the structure /strip /rod.

What is illustrated above are the assumptions on which construction science is based in its simplified settings, which were good until yesterday and continue to be good whenever the deformations are small. Small when compared to the size of the structure. 1/200 - 1/500 and even less. (This loosely illustrated stuff is called the Principle of Virtual Works. Lorenzo Contri my construction science teacher had this to say about the PLV, although it is a principle that does not require demonstration to do it you have fun; you need: a stack of paper, a new pencil and a lot of patience. It's a bit like writing music, a score. If you have guessed the scheme of operation, you have taken a good step in understanding the science of construction)

What happens if the deformations are large, comparable with the dimensions of the structure: our rod, the rope of a suspension bridge, a shock absorber spring ... the simplification seen above, that having small deformations, is no longer acceptable. The bending moment that sees the force application arm change will see its value decrease; normal shear and effort will have to compensate for this reduction. The balance of the work must close to zero, positive work by external forces and negative work by internal ones. +/- = 0. Any small difference is transformed into heat. But it would start to be a challenging assessment to do, (they do it, they do it, other physicists do it). You do it too every time you apply the "first law of the wire" and succeed with repeated bending to break the wire. It is the hysteresis cycle, it is the transformation of energy into heat, opening of cracks and collapse of the molecular structure of the material induced by the phenomenon of plasticity ... Deformation of the material in the plastic field, the material deforms and once released it no longer returns to its original dimensions. Due to the sum of successive deformations, the elastic / plastic limit is reached, cracks are triggered, which progress reducing the resistant section of the material which eventually breaks ...



Our rod which has a relatively low elastic modulus does not allow us to access this phenomenon and the problem does not arise; arises less, in the long run the rod gets "tired". And, unless the conditions have been created to exasperate it: we saw them last time with the lips of the thick ferrules and the concentration of tensions in one point, or we induced them by creating a crack. (The phenomenon is evident in the ferrules which are embellished with carvings and knurls in improper points). Graphite breaks are more frequent than in bamboo, which pays the price of having thin and therefore immediately fragile walls.

My 2 cents:

Once you have discarded the DeVINE system, which should be discussed a lot also for aesthetic reasons ... There are two systems to increase the cut resistance:

- the wrappings, important in the point just outside the ferrules, or the wrappings along the shaft, the benefit of which is in my opinion invalidated by the greater added weight;
- the impregnation: I use acrylic resin, PARALOID.
- I have already written about the section changes from hexagonal to hexagonal / trapezoid. Tall and narrow sections work best, we put them where the cut is highest and we want there to be lower deformation. If the distributions of the section variations: wide and low, high and narrow are "matched" to the rod we teach how to move as we want and how we need it to make the most of the modes and forms of vibration.

Bibliography:

the software for the graphics is:



for the calculations:



the image of the hysteresis cycle is from: Approccio alla fatica multiassiale basato sull'energia dissipata dal materiale. RELATORE: Prof. G. Meneghetti, CORRELATORE: Ing. D. Rigon, LAUREANDO: Vittoria Formilan

PS I found unusual proof of the rabbit theorem.

The geometric solution is this: a buttonhole! 32 cm in diameter.



And the rabbit fits through it!

The technical terminology is English: planning form, stripping lines, staggering, crowning ...  
I don't know ...



Remember to buy a box of plasters

I am here swearing while I do

The wrapping and I blame my mother for making my fingers so thick (salamis)

# Lissajous and rods

by Giovanni Nese

The initial link is to the site <https://www.tutelman.com/>

And the threads :

<https://www.tutelman.com/golf/shafts/allAboutSpines.php>

<https://www.tutelman.com/golf/shafts/FLOphysics.php>

And to the rest of interesting things that the site contains and that in some way can be adapted to the world of rodmaking.

Why mount the rod on the spine?

- Because mounted on a (soft) spine, the rod works on the lowest vibration frequency, the one that is easier to use for casting. And as an answer it should suffice;
- Because the main vibration plane of the tool will be the same as the casting plane.

I take it for granted that the reader knows what the rod spine is and how to determine it. The static rod is easy to obtain and due to one of the sacred mysteries of the science of rod construction it almost always coincides with the dynamic spine and the problem solves itself (1).

I want to write about dynamic spine.

Why?

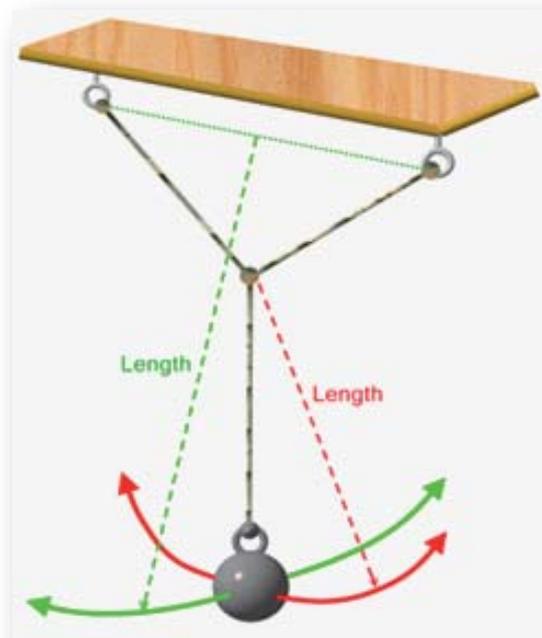
In the general discourse on vibrations and the dynamics of vibrations that I am slowly trying to instil in the mind of those who cast flies with a rod that the dynamic spine is involved in an important way.

How?

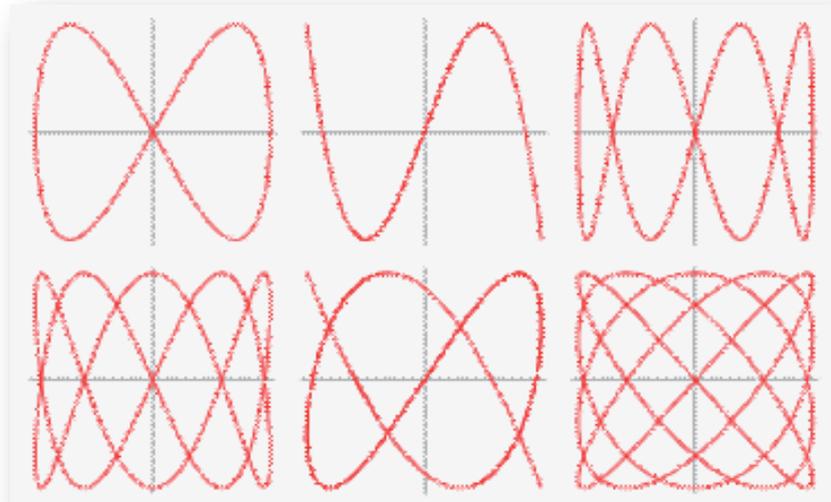
With Lissajous diagrams.

?

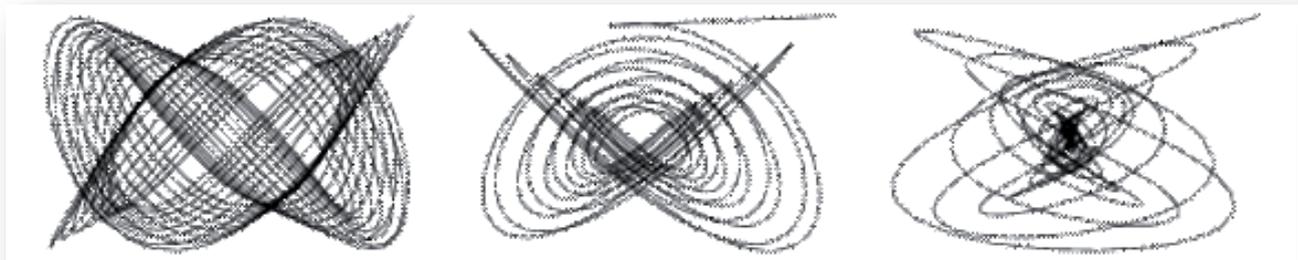
They are those curves that arise from the combination of two motions, vibrations and frequencies, applied in orthogonal directions to each other. Imagine building such an object (drawing taken from the abovementioned site): He calls it a Y pendulum. One senses that if the pendulum swings in the GREEN direction, it does so with a certain frequency, determined by our Galileo according to the length of the suspension arm, ropes. If I swing it in the RED direction, it will do so with another, higher frequency. If I swing the pendulum in any direction, the mass of the pendulum will describe trajectories that are obtained from the combination of the two motions. These are the Lissajous curves.



(1) It is not magic; the central ellipse of inertia has an orthogonal axis. If it is an ellipse. Things change though if instead of an ellipse we are dealing with an egg



Even some artists are experimenting with the effects of this type of motion:  
<https://www.youtube.com/watch?v=Daao>



Now in our rod the constitution of the "Y" pendulum is due to the spine, to the different stiffness to the bending of the strip. All builders know this, the others have heard of it.

Whose fault is the spine (1); what are the strategies used to avoid it (2); how it can be put to good use and increase or stabilize the performance of the cast (3).

(1) For the bamboo rods the fault is: of the builder, of nature, of the climate, of the weather, of... for the rods in synthetic materials it is the same. Let's put it this way to proceed further: the spine is there and we must deal with it. Sometimes it's not there, it's rare but sometimes it's not there.

(2) To avoid the spine, very precise geometries and homogeneous materials must be used and the bamboo is displaced from the start.

(3) With these assumptions should we reset the spine or instead take advantage of its peculiarities?

So ... we have our rod, a cane rod, which, although built with all possible attention, has an "uncertain" bending plane, let's say it in a different way: if stressed by bending it has a tendency to systematically bend according to a defined, apparently random plane, not coordinated with the faces of the rod. There will then be other consequences that arise if the surface is also mobile and not determined. Practice and logic want the line of guides to be placed on this surface. The logic is in the premises made above: the plane of movement of a rod during casting must develop in the plane of the spine.

And here we return to Lissajous curves. If the spine of the rod is in the green trajectory of the pendulum design, every time we cast, we flex the rod to cast, the tip will follow this plane and the line follows the tip in the plane. It is a condition of minimum energy which from the caster is totally transferred to the line and not used to bend and straighten the rod that enters and exits the plane of movement.

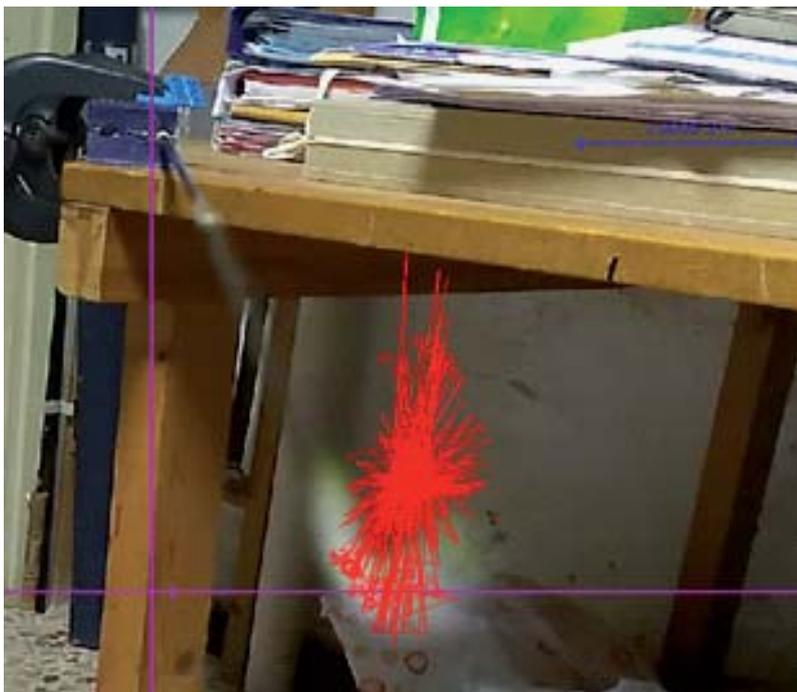
Imagine the rod made as a ruler. Long, wide and not very thick. If you flex it in the plane of lesser thickness it flexes regularly and when you release it, it returns moving, strictly, in that plane. Now try to fold it in the plane defined by the greatest width. Assuming you are there somehow the ruler is twisted 90 degrees and twisted and flexed in the direction of least resistance. If you release it, it returns to the starting position but the path is about  $\frac{1}{2}$  an ellipse. Then it vibrates here and there in a seemingly random way. Which obviously is not random as it is related to the different resistances to bending in the two directions X and Y.

Now imagine a rod mounted out of the spine. You load it to flex and cast the line and what does she do? She moves to the side to look for the condition of minimum potential, the flexion plane that requires less effort. It is not that it does so rationally, it is that the material of which it is made and the geometry that characterizes it "force" it to do so. A minimum potential is when you try to make an object stand upright. Among all the possible conditions of equilibrium it will "choose" the most stable over time. Large deformations generate situations of minimum potential.

The bending of the rod can also impose out-of-plane movements. But they are easy to identify and easy to remedy.

Let's go back to the Liss curves. We fishermen are interested in the casting phase, even the intermediate phases of line lengthening are no less important if affected by parasitic vibrations and curves. Let's say that what interests us is that the rod casts its line in a linear, straight way. If it is necessary to make a curve inside it, I will command it and I do not have to suffer it or constantly remedy it.

So now, let's see how the curves for a tip are made.



Here are the recorded positions of maximum displacement.

It should be noted that they are in all directions. As theory dictates.



And here are two half curves that define the elliptical path of the point of the tip.  
Two consecutive frames.

#### DETERMINING THE STATIC SPINE

In contrast and with the phone in hand. You know what to do ...  
I will not dwell on it.



SUPPORT EQUIPMENT

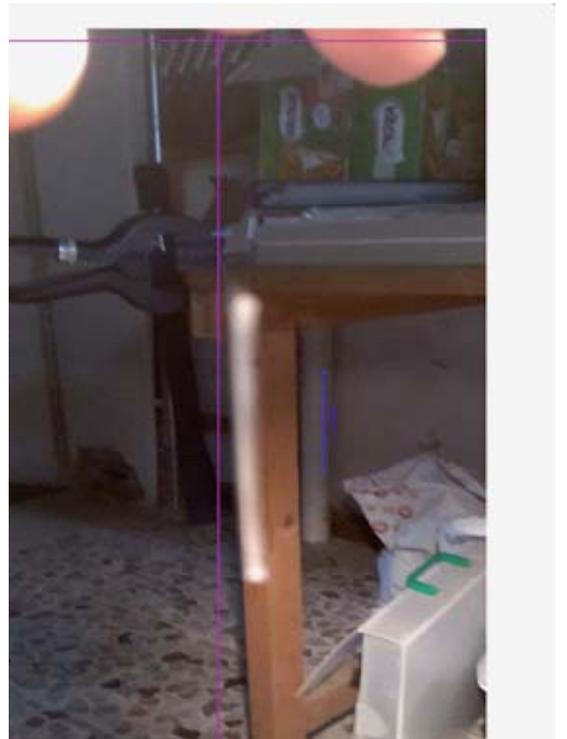


Two pieces of wood hollowed out to firmly and precisely hold the rod in various positions, just below the joint. Spring clamps are the quick solution to stop everything and allow quick repositioning.

FRONT VIBRATIONS views

I film and photograph the white-tinted point of the tip. You see the trace of the move. For the purpose of these photos, the layout is sufficient.

VIBRATION ON THE Y



... AND THE X PLANE

In X too it has a quite regular direction, almost horizontal and without many curves. It is not possible to appreciate the difference in frequency between the two without a more in-depth analysis and without a high-speed recording, but there it is!

I try different points of vibration initiation until I find one that is stable: which shows that the vibration pattern is straight.

I mark it!

Try again ... with a vibration start at 90 degrees from the previous one.

It doesn't always work, but if it works, it confirms one of the theories set out in the article on golf clubs (2).

we rotate the stem 180 degrees on the support and see what happens. Nothing or almost nothing, the main plane of vibration is stable. That's what I'm going to line up the guides on.

Ok, first spine found.

What problems can arise? That the spine is "wound" on the rod and that it changes direction (3).

I don't know how to remedy it. But we are working on the tip and we are talking about very high frequencies that will probably never be used in the casting phase and we can consider it irrelevant, we can, we must not ... on very short casts they can be a nuisance.

Now let's assemble the second piece and try again. The frequency is much lower. We are testing the second piece. To align it with the first. Because in the bending phase it does not push the tip out of the plane of movement.

(2) The 90 degrees of the second spine is a position that I can accept but with some perplexity. As there are ellipses with non-symmetrical axes, which are oval and more frequent than ellipses. But of totally inaccurate definition. Strange!

(3) It happens more often than we would like. In the photo is the reason for the slight curvature of the trace line.

This procedure identifies the dynamic flexion plane. It "remedies" manufacturing errors and bending of the strips. Don't be surprised if in the end the rod is misaligned, crooked, we are looking for something that works from a dynamic point of view, not from a static or aesthetic point of view.

In the general philosophy of the approach to the rod used as a fishing tool and not as a collector's item, we can leave the rod in this situation and go fishing with it, or straighten it, reassemble the ferrule and look for the dynamic spine again. Gradually the procedure can be perfected and the result will also be acceptable from an aesthetic point of view.

### **Review of the method**

It's a good use of time! However, I believe that it is an intelligent use and justified by the needs of casting. It is more justified if you cast light lines and use short rods.

It requires that your casting technique is adequate and of superior quality to the characteristics of the rod you use: if you "sauté" the dynamic spine of the rod, it will not work! It is not necessary. In truth, in this situation you don't even need static.

So?

First learn to cast well: to keep the casting plane; to distribute the accelerations correctly; to make tense and fast casts; to cast at an angle ...

Then you use the most suitable tool to enhance your casting technique. The rod is practically a neutral instrument.

Evolution?

Use the spine to get more performance out of the strips. Higher performance means higher vibration frequencies, higher speed and angle cast. And the consequences of these situations: precision and efficiency.



*Giovanni Nese, Radivoy Savli, Nirvano Franzoglio*

And let's not talk about measurements, convert in feet, millimetres, inches....

And when you break the silk thread on the last turn a curse word explodes from your mouth...but it comes from your stomach



What a drag!!!!

Sorry...what a 0,787 inch drag....

I can't find two that are the same ... we can't work like this

**IBRA:** Passion for precision ... even at lunch ...



# Rodmaking, flyfishing and ... points of "oversight"

by Giorgio Grondona

**O**n the last issue of the B.J. we left while I was preparing for the first fishing trip of 2020, the seasonal opening was postponed due to Covid. I like to fish and I like to stay on a stream, be it a mountain stream or a stretch in the valley. For more than fifty years I have been going fishing as often as I can or even just to look at the water. I can still discover something new, every time, even if I often frequent the same places ... over half a century spent on the banks or in the water is a long time and I was lucky enough to fish in still natural environments, some, very few, have suffered little or nothing at the hand of man, while others, unfortunately most of them, have been subject of environmental disasters (floods / pollution) only to be reduced to stone and gravel highways by virtue of high-sounding "safety measures" where one passes from dry summer to disastrous floods with the consequence of being now devoid of life.

Many years of fishing, at the beginning, like most children (even donkeys are born small) I fished with natural baits, a fixed rod and float for "easy" prey then, the rod remained the same but I removed the float and I started to use crickets and grasshoppers to fish for chub on the surface. Where I come from there are crickets and grasshoppers only in Summer, but chubs rise even in Winter and continue to do so until the following Winter ... and then start over ... so I began to buy some flies, spiders, only spiders, depending on availability, personal availability of money not availability of the shopkeeper's offer!!!

At the beginning of the seventies the river that flows a few kilometres from where I live was, like all watercourses in those years, very rich in fish, being a plain river it was classified as coarse fishing and chubs were present in very high numbers and to attracted fishermen from nearby regions, among these "foreigners" some of them fished with equipment that I had never seen but you know, children are curious and this curiosity is also extended to young donkeys so when on the banks of the river I saw a fisherman who used that "strange" equipment I stopped fishing and I approached to observe (a few moments) and then move on to a barrage of questions (usually hours of interrogation), by now you know me, I am talkative, I speak ... oopppsss , sorry, bray with ease and in any case from those encounters I learned that that "strange" equipment, that is, a shorter rod than the one used to fish with natural baits, a rotating reel and fishing line. He called the line "rat tail" (translator's note: in Italian this is to explain that the line tapers) and he used artificial flies in the English way.

Also, at the beginning of the seventies I began to buy and ... read a fishing magazine that, timidly, began to talk about fly fishing and that was how I became passionate about buying the first "strange" equipment (SUPER economic) and I started to practice this type of fishing.

Many years have passed, I still have the fiberglass rod of the first equipment, the seventies coincided with the arrival of fiberglass first and carbon soon after in the production of fishing rods. The first fishermen I saw using the tapered line used bamboo rods!

In a few years the bamboo rods disappeared by rods in "modern" materials ... cheaper (???), and with the same speed also the fishermen who, with a lot of patience and passion, answered the curiosity of a child, disappeared ... they too (the "patient" fishermen) have been supplanted by the "modern" generation. This does not mean that while fishing it cannot happen to meet fishermen with whom it is a pleasure to chat, rarely, but it happens. My most recent experience is from Autumn 2019, there could have been others but we all know what happened from February 2020 to the present moment ... what we don't know is how long the state of emergency will last. Let's leave the pandemic aside and ... I will try to tell you about the meeting on the river I was referring to above and to do so I ask you for permission to use the "Question / Answer" system, indeed perhaps it is better to indicate with the F of flyfisherman interventions of the person object of the meeting and the R of rodmaker will indicate my parts in the exchange of words. By doing this I apologize to all those who have turned up their noses when I was awarded the title of rodmaker, I know I exaggerated but now it's a long time since the "Reflections from the donkey bench" are published in the Bamboo Journal and I feel like one of you ... the important thing is that none of you feel like me!!!

Very well, I set off and ... after two hours of travel I reach my destination, I abandon the state road and enter the square of the trattoria bar where I will collect the permit. I will fish in a

stretch of river where fishing is managed by a group of fishermen and to access it is necessary to buy (and fill in) the permit, I park next to the cars of the owners, another car is parked right in front of the clearing where there are games for children. I get out and even before closing the door one of the two sisters who manage the facility comes to meet me, welcomes me with enthusiasm and, as always, brings me the completed coupon, I would like to say something but ...

F) Ahh, another flyfisherman!!! If you wait for me, let's have a coffee together, I'm ready in a heartbeat!!!

A) With pleasure, I answer turning towards the voice and only at that moment I see a distinguished gentleman leaning against the car in front of the playground that is wearing waders, no more than a meter away he has a bench, he could sit on it and stay more comfortable but it is "furnished" with everything he will bring to the river.

I feel free to exchange greetings with the bartender, I thank her for her kindness and I inquire about the origin of the inviting perfume that comes from the kitchen, the undisputed reign of her husband, meanwhile I witness the last stages of dressing or, better still, the filling of the vest which begins with the insertion in the rear pocket of a camera, rain jacket and water bottle, closing the zip and subsequent attachment of the landing net with a magnet.



At this point, to stuff the front side, F decides to wear it but stops and retrieves the camera which is moved to an internal pocket, its place next to the bottle will be occupied by the streamer box, on the bench there are five other boxes. Flies that will be distributed in the front pockets and he is feeling observed:

F) There is nothing worse than losing the only fly that works, better have some spare!!!

A) The supply of lines and silicones is also important, don't forget the la

lanyard!!! (Lanyard: a cord closed in a loop and worn around the neck bearing various coils of wire, clasps, small jars and various tools)

Finally, the bench is cleared, we can go and have the coffee that we will consume sitting at a table in the veranda, we are at the end of September the air is fresh and in the sky a layer of light clouds prevents the sun from filtering. I take this opportunity to tell the bartender that I will be back at 1pm for lunch:

F) Please reserve this table!!!

A) It's fine

F) I offer the coffee in the meantime I have to collect and fill in the fishing permit and I have the license in my wallet.

A) Thank you, very kind, I gladly accept ...

Having completed the "coffee ritual of ... knowledge", we get up and take opposite directions, F goes towards the bar counter, I towards the car but I still have to take the fourth step that I hear a thud behind me, I whirl around and see an overturned chair, dragged to the ground by the weight of the vest that F has hung on the back, he took it off when he realized that he had his wallet in his back pocket and to reach it he had to lower his waders. I see a metal box rolling on the floor, the thud made it come out of a pocket and it ends its irregular run by bumping into the base of an umbrella, the impact causes it to open and a small white thing comes out and creeps under the base itself:

R) The pill has gone under the base ...

F) It is not a pill!!! It is the first tooth that my granddaughter lost, it is my lucky charm, I always carry it with me every time I go fishing!!!

I approach, I bend down to retrieve the precious amulet and my gaze falls on the vest on the ground, in the open pocket there is a cardboard box, probably it contains a spare reel but it could also contain ... a wedding favour to remember that worse things can happen in the life of a fly fisherman than losing the only fly that "works"!!!

... two hours of fishing go by quickly, I arrive at the "base camp", F is already next to the car, visibly sweaty, we greet, a few steps and I reach the fence that separates the garden from the parking lot, I rest my rod and vest. I take off the leg loops and while I put them back in the trunk:

F) I can't believe it!!! A Bamboo rod, I haven't seen one for years ... how do you use it? Who knows how much it weighs?

A) I'm ready, can we have a "bianchetto" (Prosecco) before they serve us lunch?

F) Yes, of course but aren't you putting the bamboo rod and the vest away?

A) I would like to change the ending and sitting at a table I will be more comfortable than sitting on a stone ...

Passing in front of the entrance I look inside and ask for two glasses of Prosecco, then I accelerate my pace towards the table where a few hours earlier I had coffee with my new friend, it is the table furthest from the entrance but it is the closest at the river. In Spring, before the leaves sprout, you see the water flow, before I sit down, I hang the vest on the back of a chair and I also put the rod on it

F) Don't do it!!! First it overturned ... I almost lost my lucky charm!!!

A) I'm sure it won't overturn!!!

F) How can you be sure!!!? If the rod falls as before, the bamboo is fragile and can break!!!

A) Nothing catastrophic will happen, in the vest there are few things, only what you need and the weight of the rod is not enough to knock down the chair, even if it weighs a handful of grams more than yours ... and in any case Bamboo rods are less fragile than graphite rods!!!

We are served aperitifs, braised venison with polenta, dessert, coffee and grappa, we talk ... now F knows what IBRA is, he learns how it was born and why it was born, he knows how Bamboo rods are born and knows how many prejudices they have, which for a long time have disadvantaged their use ... F is an intelligent person, carries out an important profession, comes to the "conclusion" (obvious) that to clear the field of prejudices and clichés there is only one way: QUALITY !!!

## QUALITY

Don't you really think that a poor donkey can explain what and how a Quality Bamboo rod is (how it should it be)? I can try to tell you what this poor donkey thinks (ha ha ha, a donkey that thinks) a Bamboo rod is ... but yes ... I will try!!!

Bamboo fly rod: extraordinary "tool" for the Care (1), the Wellbeing (2) and the Beauty (3) of the person

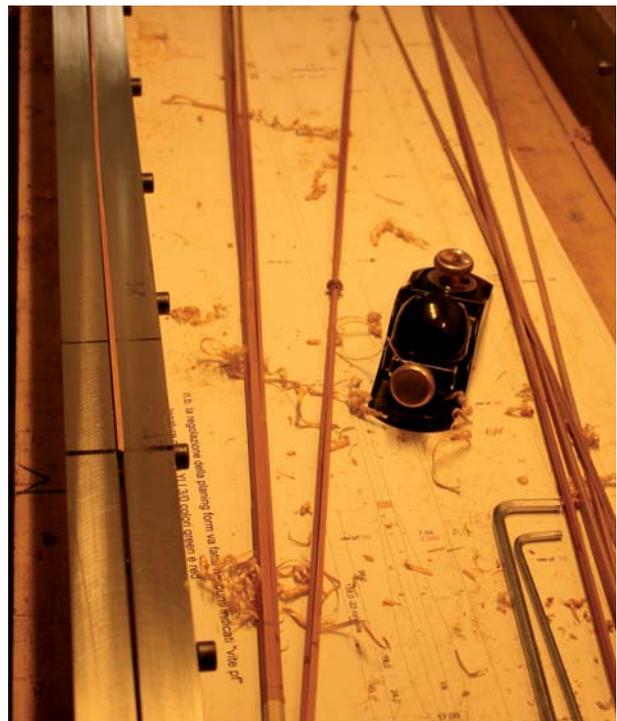
1) By "Care" I mean everything that can be used to make the use of the Bamboo rod "neat", fly fishing is "elegant" fishing, it can be harmonious even to the eye of the observer without being a fisherman ... 2) The second point, (physical) Wellbeing is what I "feel" more than the other two. Fishing is practiced on waterways where you walk, even for hours, all muscles and joints as well as the cardio-vascular system are involved and "naturally trained", this training also takes place in "sessions" of fishing in environments. lakes or in brackish waters, no one asks you to walk on water, your training is stimulated by the greater physical effort of casting in these circumstances; even the psyche benefits from this practice, moments of happy fulfilment will alternate (inexorably) with moments of gloomy despair. You will take refuge in Religion and, at times, you will be tempted to approach "beliefs" different from yours ... you will get out of it stronger or, at least, more informed ...

3) What does Beauty have to do with it? Simple, as said the "fly rod", if used for fishing (we all know that it is not always so obvious), it is used in the open air and therefore at least face and hands will be tanned!!!

What I said in point 2 is almost entirely valid also for rodmaking, the walks on the river are replaced by kilometres travelled by pushing the plane on the planing-form or making a hand-mill "chirp", the psyche will be (not for everyone) busier in calculations and / or research of "virtuosity" which, almost certainly, will increase the moments of discouragement and therefore will lead to a "religious" approach!!! Unfortunately, there is a negative side, both fly fishing and rodmaking were born as unisex practices, over time, however, a detachment was created which then turned, at least in some cases, into real aversion on the part of wives, lovers and girlfriends ... hey?!!!

Do not think I was joking, this is really my vision of the Bamboo "fly rod" of its "use and construction", they are the same things I said to F recommending to him and you not to give too much weight to my words because as always:

*"Donkey braying does not go up to heaven"!!!*



The last day we went to try our rods on the lake of the Borto brothers. I am hopeless at casting but luckily Enzo was there



L'ULTIMO GIORNO ANDIAMO A PROVARE LE CANNE NEL LAGHETTO DEI BORTOBROTHERS CHE IO, A LANCIARE SON DA PIANGERE MA PER FORTUNA C'ERA ENZO...

COSÌ MI SON FATTO DARE QUALCHE LEZIONE PERCHÈ COME DICEVA ANDREA PAZIENZA: "HO ACCETTATO QUANDO SON NATO, TUTTO IL GRATIS DELLA VITA!"

So I asked him to give me a few lessons because to quote Andrea Pazienza, "When I was born, I accepted all that was free in life".



# Two-handed bamboo rod IBRA Course on the Oglio river

by Davide Fiorani

When we talk about fishing with two-handed rods, we imagine large spaces and almost uncontaminated environments, rivers of considerable size and flow, big and very combative fish. Fishing with two-handed rods is an interesting and fascinating aspect of fly fishing and being able to do it with a bamboo rod designed and built correctly is not trivial. The equipment is completely different from the one-handed ones, not only in size but also in design: excellent reasons that increase the desire to learn more.

These topics are not easy to deal with: there are not many rodmakers who build rods of this kind and also there is not much bibliography available. For the design and construction of these tools, issues and problems must be addressed ranging from the length and action of the rod, to the combination of the right line to be used in fishing, to the processing of larger strips, and gradually other issues that, I repeat, necessarily require a different approach from the one used to build one-handed rods.

IBRA therefore thought that it could be a good opportunity to organize a course for members in which to discuss all this: the first official meeting since the beginning of the Covid-19 pandemic. So, on 24 and 25 September we tried to delve into these topics for greater clarity. This was done by planning the meeting so that the various casting and fishing techniques were exhibited, the characteristics that the equipment must have and the aspects of both the construction and design process that lead to the creation of a rod.

The participation of the members was very good and personally even surprised me a little: probably the desire to meet again after some time also played in its favour.

Regarding the cast and use of two-handed rods in fishing, IBRA asked Pino Messina and Roberto Pedrazzini to be our speakers and instructors. Pino and Roberto are both excellent casters and world-renowned fishermen. Roberto is an UNPEM instructor, he was a student of Mario Riccardi and mentored Pino who is a Double Handed GAIA instructor, the first Italian instructor of the Game Angling Instructors' Associations and UNPEM instructor. Let's say that IBRA wanted to play it safe



While for the part of making the rod, Sergio Dal Lago, who among the IBRA members is perhaps the most dedicated to the construction and use of two-handed rods, was asked to exhibit what he had acquired over the years.



The venue was Boario Terme and the Oglio river. The first day we all met at the "La Sosta" lake in the municipality of Esine (BS), owned by the brothers Armando and Mauro Bortolotti, excellent two-handed rod fishermen as well as IBRA members and friends of Pino and Roberto. The place is perfect because in addition to a fabulous pond, there is a large, well-kept green area with an adjoining bar and dining area. As soon as I saw the "barbecue area", I fell in love with it.



I mentioned earlier that some friends had not seen each other for a long time and it was wonderful to be able to meet again: I did not notice any particular aftermath left by the previous lockdown period, such as long and dishevelled beards, leavened bellies, unkempt looks ... and on a psychological level everything seemed normal. All fit!!! And then we started with the working.

Pino and Roberto thus began to tell us about the equipment and casting techniques that have evolved in history, illustrating the one called Spey, the Scandinavian and the Skagit. We continued with the importance of lines for different techniques, casts and different fishing strategies: a world!

Sergio then told us about the design of the rod, the construction steps and the tricks to make it based on his experience. How the development that the lines have had can allow different design approaches in lengths and actions was also mentioned. Meanwhile, it was possible to share knowledge, information and so on with the members, which could help those who want to try, or already do, in the construction of a double-handed rod. All this to build tools that can also be used in our waters, in environments that do not necessarily have to be those of Alaska, Scotland, etc. and on fish that are not only salmon and steelhead, but which can be our rainbow trout, brown trout but also asp, Twaite shads and others



Then I got hungry... and so lunch!!

The Bortolotti brothers, under the far-sighted supervision of their mother and together with their fishing buddy and IBRA member Mauro Moretti, have outdone themselves, starting with excellent and abundant cheeses... as if we had robbed a mountain farm!! We continued with a "village festival" style barbecue, but looking around the whole village wasn't sitting with us at the table. I was almost moved to see the barbecue that never struggled to keep up with our jaws in action. Separate note: water at the table, not provided.



After that, everyone ready to go to the river! Some had their own equipment and for the others, more was available. Having Pino and Roberto as instructors, the aim was both to become familiar with the tool for those who had never tried this fishing before, and to be able to improve a little for those who knew it already.



We had the river behind us and after a short walk we were all lined up in groups and ready to start casting. We spent a nice afternoon trying different rods, different combinations with various lines, looking for the best setup to make the most of our bamboo rods.

The weather helped us and after returning to the Hotel Rizzi Aquacharme, which in recent years has hosted our meetings, we all met for dinner, each accompanied by our green pass. We then proceeded to the hotel garden forming the classic "small groups" where you can hear anything being discussed: from fishing technique to extraordinary trips made in the past years and those planned for the future, amazing catches and infallible flies, rodmaking tools built and developed personally that solve any type of problem and secret procedures that improve any constructive step of the rod. If your mind was not already clouded by your "brilliance" at the table in pouring the wine, after some time you have the same feeling of intoxication from all this mixture of words and speeches that starts to fill your head.

Second day: here the weather I would say has definitely not helped us!

Looking at the others at breakfast, some of them certainly had a hangover, but not from training with the two-handed rod.





We choose a new spot on the river and move further downstream than the previous day. We change quickly, form groups and off to the water to pick up on the basics, while someone tries to go fishing too. It doesn't take long for the first storm to arrive: some return to the parking, others slip into the nearby bar but most of them remain in the water. On the other hand, this type of fishing was born to undermine fish in the places already mentioned above and it is often practiced in weather conditions very similar to those of this day. The rain gives us a short respite, and then starts again later, even stronger. The water does not get murky for now and it does not even seem to rise in level: we continue undeterred. Around noon we all go to our cars to change and then return dry to the hotel, where we have lunch.

Time to say goodbye. Satisfied faces for many reasons: promises to meet again soon to fish, to organize another course, to finish setting up next November's rodmaking course and much more.

It was an excellent opportunity to get to know this world better for those who practice this fishing assiduously and have devoted time and effort to gaining a wealth of experience and knowledge, and sharing it with us. A special thanks goes to Pino, Roberto, Sergio, the Bortolotti brothers, Mauro, the President and the Board of IBRA who organized this event and to those who participated in it. I would say that everything took place in the full spirit of the association which, as the statute states: "aims to spread the art of building bamboo rods for fly fishing (Bamboo Rodmaking), promoting initiatives aimed at developing the knowledge of the art of building bamboo fishing rods".

I would say, followed to the letter.

Go IBRA!!

## THIS JOURNEY ENDS HERE

At this point I would like to thank the people who have made it possible: Gabriele, Alberto, Silvano, Luca, Mauro (Lawyer), Argeo, Massimo, Moreno and then Mirco, Enzo and Francesca and Maurizio.

Lastly my travel buddies: Davide, Mauro B., Graziano and Alessandro



Well ... in the end they showed us how to make a bamboo rod and now ... it's up to us

**THE END**

**S**ince we have noticed that members and also non-members use terms that refer to some kind of "Certification" that IBRA issues to rodmakers who have attended the rodmaking classes, we feel obliged to specify the following.

The Italian Bamboo Rodmakers Association, in accordance with the social purposes, organizes introductory courses in the construction of bamboo rods with the aim of providing aspiring rodmakers with the basic notions and the correct techniques to achieve the result.

The courses are held by rodmakers who have gained a certain experience and who believe they can make their knowledge available freely to those who want to start the wonderful "adventure" of rodmaking.

At the end of the course, IBRA issues a certificate of participation to the new rodmakers, which only proves that the new maker has followed the entire development of the class.

Our association has never intended - nor could - issue certifications concerning the ability of individual rodmakers.

I therefore ask all members and anyone else to comply with the above and to avoid using phrases such as "IBRA certified rodmaker" or similar in any context because they do not correspond to the truth.

*Gabriele Gori*  
*IBRA President*

PAUL AGOSTINI  
DEAN OF THE FRENCH RODMAKERS



Newsletter  
of Italian Bamboo Rodmakers Association

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