



Quick reaction times and a super-fast spiccato are just some of the benefits of synthetic bows. But can they really compete with pernambuco bows on sound? CATHERINE NELSON investigates

# STICKS AND TONES

The rollcall of musicians who use synthetic bows makes an impressive list: Christian Tetzlaff, Isabelle Faust, Gary Karr, Didier Lockwood, Jaime Laredo and Leonid Gorokhov, to name but a few. The Alexander Quartet, based in San Francisco, plays exclusively with carbon-fibre models. The popularity of synthetic bows is clearly on the increase. Dwindling supplies of pernambuco, the traditional wood preferred for bow making, has brought them into the spotlight, but it's the technological advances in performance of new generations of carbon-fibre bows that players are excited about.

'Carbon fibre' is something of a catch-all term when applied to bows – there is a huge range of models available, and significant differences between the brands. Jeff Van Fossen, bow designer at CodaBow says: 'People talk about carbon-fibre bows in a very generic way – it's as precise as saying a "wood" bow. It only tells you about whether the bow will combust or not, rather than anything about its quality or performance. Wood bows cover everything from heirloom-quality bows to cheap ones that are barely worth rehairing, and it's the same with carbon fibre – you can find the same breadth of bows, everything from a really expensive one to a model costing \$100.'

At the top end of the carbon-fibre bow market is Berg Bows, where each bow is handcrafted from start to finish by maker Michael Duff. In other companies, making bows is more of a collaborative process. Van Fossen explains: 'Whereas a traditional maker works within the confines of a piece of wood, carbon-fibre bow makers have a blank canvas. It's a team effort involving specialists in each relevant discipline – our design team consists of a master maker, a material scientist and a design engineer. Being able to engineer both material and structural aspects of bow design leads to tremendous performance opportunities.'

The possibilities for refining the materials and design of a carbon-fibre bow mean that they're constantly developing. For example, CodaBow

The raw materials: graphite fibre spools



uses newly developed materials in the composition of its bows to improve performance, including Kevlar and Spectra. Structures, too, can be innovative: the hollow sticks of Arcus bows make them very light – a reduction in weight of 20 per cent on the majority of their models when compared with traditional wooden bows. Sandy Wilson, leader of the Alexander Quartet, explains why he and his colleagues like the lightness of Arcus bows: ‘We play a lot of Shostakovich and Beethoven quartet cycles, and it can get pretty intense. With the reduction in weight in the carbon-fibre bows, we’re using a different set of muscles – we couldn’t really be playing so intensely on regular bows. You have to do things in a slightly different place in the stick, or perhaps play closer to the bridge, but it just gets better and better.’

Arcus bows are also ‘tuned’, as the company’s general manager, Bernd Müsing, explains: ‘With a hollow design, there is the possibility of adjusting the pitch of the bow to come to the optimal result for each instrument, which you control with the direction of the fibres and the design of the stick. Pernambuco is selected for highest stiffness and lowest weight, and the bow maker doesn’t have much choice in terms of tuning this any further. But just as the bass-bar plays an important role in the sound of the instrument, we found that by altering the stiffness and mass of the stick we were able to tune them. The sound of a wooden bow is 15–20Hz, below human hearing. The tuning of Arcus bows is 50–60Hz, around the C string of a cello, so they can fully support the overtones of the instruments.’

Other brands have made their own technological advances. One of the first carbon-fibre bows to be produced was the Spiccato model, in 1985, designed by Benoît Rolland – Yehudi Menuhin had two of them. It featured an invisible mechanism inside the hollow stick that allowed the player to change its curvature. Rolland says: ‘The response of the bow is increased or decreased according to the adjustment the musician chooses. Weight and balance of the bow are not affected by this mechanism. You have six or seven different bows in one. Some soloists play the bow in concert, simply because it is very easy to play and its sound production is comparable to that of wooden bows.’ Spiccato bows are no longer produced, but of today’s bows Rolland says, ‘The main advantage of standard carbon-fibre bows currently on the market is that, when they are well designed and well made, they usually play well. For players, using a good bow that is not expensive and not fragile is convenient.’

Whatever the model, carbon-fibre bows share a reputation for being light, extremely durable – Berg bows, for example, come with a lifetime guarantee against structural breaks – and capable of producing very powerful sounds. Christian Tetzlaff finds that his Arcus bow allows him to explore techniques and sounds that his 1840 Dominique Peccatte bow does not. He used the Arcus to tackle the fast-paced virtuosic fireworks of Mark-Anthony Turnage’s violin concerto *Mambo, Blues and Tarantella*, which he recently premiered. ‘The Turnage concerto demands very quick accents and triple fortissimos all the time, and the reaction time of this bow is incredible,’ he explains. ‘For the same amount of power you get more bang for your buck. My Peccatte is very sweet-sounding but it’s not the most aggressive bow.’

Tetzlaff has some advice for anyone testing a similar bow. ‘You have to play in a completely different way. Because they have no

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JEFF VAN FOSSEN, CODABOW

weight, you have to put all the weight into the bow yourself. And the bow does not bend at all. But it can get out everything that is in your instrument. You have to try putting as much pressure on it as you can – really dig in.’

Müsing, who developed the concept of the bow with Andreas Wetzlinger, started out in the innovative world of the bicycle industry. He fed some of the industry’s radical solutions through to the field of bow making. ‘I’m an average amateur player, and when I was 17 I was studying Mozart’s G major Concerto. Playing it in a large auditorium drove me to my limits – I found it hard to get a subtle spiccato. Ever since then I’d been thinking about developing a bow that could deliver what I wanted to play with my fiddle. I felt that with a bow that was much stiffer, much lighter and with a more shallow curve, I could achieve all the wild ideas I had.’ He developed a rough prototype with Wetzlinger in 1996 and felt it really worked. ‘You can do articulation and bowing that you cannot do with a wooden bow, no matter how good it is.’ Wilson agrees with this assessment: ‘I can achieve a really clean and clear articulation that projects with much better diction than with a wooden stick. Anything that helps you to perform a better concert has to be something you take seriously.’

Traditional bow maker Tim Baker, however, thinks that pernambuco bows have the edge when it comes to sound: ‘I have limited experience with carbon-fibre bows, but of those I have heard and from other anecdotal evidence, I really believe that there is something about a great piece of pernambuco that allows most musicians to get a wider range of tonal colours from their instrument.’ He has advice for musicians searching for a new bow that he learnt from a legendary violinist: ‘In my early years at ▶

Some carbon-fibre bows can be tuned to specific frequencies



COURTESY ARCUS



ALEXANDRA VOESDING

Christian Tetzlaff uses a synthetic bow for big-sounding repertoire

Bearé's in the mid-80s I remember Nathan Milstein finding it amusing that players spent so much time assessing how a bow felt by playing spiccato rather than listening to the sound that it produced. He said, "You only buy a bow for sound." I remember thinking at the time that if you're Milstein that's probably true!

Yung Chin, Chairman of the International Pernambuco Conservation Initiative (IPCI), agrees with Baker on the subject of tone: 'Carbon fibre has its place but it lacks variation in sound and timbre, which is the fundamental essence of music. When you have the best of pernambuco, there's nothing like it.'

From talking to professional players, it seems that in general, carbon-fibre bows are used, as with Tetzlaff, for specific repertoire that demands a big sound or whistle-stop articulation.

Jaime Laredo uses a Berg bow, and his approach seems to be typical of a professional soloist using a carbon-fibre bow. 'I've had it for 15 years or so. It's a really wonderful bow. It's not the one I use all the time, but I do use it a lot. It feels like a very strong bow. I use it if I play something that needs a lot of power.' Lynn Harrell could also be seen on YouTube recently in a birthday tribute to Orlando Cole, extolling the virtues of his 70g Arcus bow

for its lightness of touch. According to Müsing, 95 per cent of people using Arcus models use them as their first bow. Didier Lockwood uses his Carbow as his main stick. 'They're solid, supple and very practical — perfect for jazz.'

Another plus point is carbon-fibre models' resilience to the professional musician's bugbears — changes in climate and altitude. The material is inert, so isn't sensitive to its surroundings in the way that a wooden bow is. There's also the advantage that they're replaceable. As Wilson says: 'When you're working with a stick like this, if you sit on it or lose it you can get another one.'

This is also part of the appeal for younger players and students. Research carried out by the IPCI shows that the vast majority of beginners use carbon-fibre and fibreglass bows because of their durability and the fact that the quality of the bow is often higher than a similarly priced wooden stick. ▶

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The Alexander Quartet players find that carbon-fibre bows are particularly suitable for performing intense Beethoven and Shostakovich quartet cycles





The hollow sticks of Arcus bows make them 20 per cent lighter than wooden bows



CodaBow uses newly developed materials such as Kevlar and Spectra in the composition of its bows

Many orchestral players are also won over by this durability and the robustness of carbon-fibre bows. Timothy Cobb, principal double bassist with the Metropolitan Opera Orchestra in New York, uses the Metropolitan model, designed by David Gage craftsmen in collaboration with CodaBow. 'I travel with my Metropolitan – it is easily replaced! And I love to use it in pieces calling for much *col legno*.' Emanuel Borok, concertmaster of the Dallas Symphony, feels the same about his synthetic bow. 'I have had a Berg Bow for many years, and I cannot deny that one of the pleasures it gives me is to see the expression on people's faces when I tell them it isn't pernambuco. Not to mention the sense of security, safety, and increase of zeal I get when I see the notation of *col legno* in my orchestral part.'

It seems that there is still a stigma attached to synthetic bows. Jaime Laredo says: 'I show colleagues my bow and say how great it is, and they look at me a bit strangely! It's a shame, but when they hear me play with it many of them are amazed.' Wilson has found the same. 'Sometimes if a busy professional musician comes in with a carbon-fibre stick, I think it makes people's hackles go up a bit – they wonder why I'm not supporting my local bow maker! I sympathise, but pernambuco just doesn't offer all the advantages of a carbon-fibre bow.'

So what are the implications of musicians choosing to use composite bows? Will the increasing prevalence of carbon-fibre bows eventually put traditional makers out of business? Baker isn't worried. He explains: 'I may well have a biased view as when musicians come to me they have already made up their mind that

they want a pernambuco bow. In the 19th century, Vuillaume made many steel bows that were very popular at the time, and they didn't prove to be the end of the pernambuco bow. I welcome the increased variety of bows available to musicians, but I feel that good pernambuco bows will stand the test of time.'

Since the 19th century, though, changes to the global climate have pushed environmental concerns to the top of every agenda. The CITES listing of pernambuco in 2007 adds weight to the carbon-fibre cause – with depleted stocks of specialist woods, a synthetic bow does seem the more environmentally friendly alternative. Lynn Hannings of the IPCI sees a valuable role for composite bows. 'Wood is definitely our greatest material – musicians depend on its subtlety and its sound characteristics. But carbon-fibre bows are an important piece of the puzzle, and it's good that people are thinking about how to preserve our supplies of pernambuco.'

What does the future hold for synthetic bows? Technology is advancing all the time. Müsing reveals that he is keen to make similar advances in developing a high-quality synthetic bow hair. 'I want to optimise our sources of hair and look at alternative materials. I've learnt a lot about what the hair does with the resin. I haven't found anything yet but I may come up with hair or fibres that deliver a better sound. I've found some material that sounds beautifully smooth but couldn't hold the resin – you had to re-resin the bow every 20 minutes!' Perhaps synthetic bow hair could one day provide a similarly worthwhile alternative to horsehair. The future is wide open. ■