



Pauline Hardiing (left) and Charlotte Smith (right) test bows at London's Royal College of Music

Freelance cellists **Victoria Beattie** and **Katy Whittle** joined The Strad's editor **Charlotte Smith** and contributing editor **Pauline Harding** to try out a range of carbon fibre bows – discovering great differences in weight, balance and playability

In an age of dwindling pernambuco, carbon fibre bows are on the rise. There was a time when the string playing community looked on such items with a certain degree of snobbery – and sometimes with good reason. But in recent years a number of enterprising makers, determined to take up the challenge of creating top-quality alternatives to wooden bows, have brought increasingly sophisticated models to the market. These handmade items, aimed at professional players, are light years away from the early experiments, yet a surprising number of players are still unaware of their capabilities.

We decided to put the bows of five leading makers to the test. To account for the very personal relationship between string player and bow, our experiment featured four musicians, each with quite different instruments and playing styles. Our contributing editor Pauline Harding and I tested the violin bows, while professional freelance musicians Victoria Beattie and Katy Whittle tested the cello bows. My own violin is a 1770 French model by Chappuy, Pauline's is a Jürgen Manthey from 2004, Victoria's cello is a handmade Chinese instrument from 1993 and Katy's is a Kai-Thomas Roth from 2002.



Victoria Beattie and Katy Whittle make notes

The main testing day took place in the Inner Parry Room of our alma mater, London's Royal College of Music, with its wooden floors and fabulous acoustic. We also took the bows away with us to continue testing in various performing circumstances, from orchestral work to chamber music.

It's worth noting that prior to this experiment no member of the group was particularly familiar with carbon fibre models – our previous experience was limited to the odd testing session at trade fairs and the less-than-positive experience of our students making ill-advised purchases of factory-made items. It is unsurprising, then, that at the end of the experiment all agreed that on balance they preferred their own wooden bows – chosen as they were with great care over much more time than we could give to the carbon fibre models. However, in some cases the carbon fibre came a very close second and was even superior for certain playing techniques and situations. Certainly there was a great deal of variation between different makes and models, as the following reviews make clear.

CHARLOTTE SMITH

ALL BOW TESTING PHOTOS PAULINE HARDING

ARCUS



Violin S6
Outfit: sterling silver;
 snakewood frog
Stick: round/octagonal
Weight: 49 grams
Price: €2,260

Violin M6
Outfit: sterling silver;
 snakewood frog
Stick: round
Weight: 51 grams
Price: €2,260



Cello S6
Outfit: sterling silver;
 snakewood frog
Stick: round/octagonal
Weight: 68 grams
Price: €2,360

CARBON FIBRE BOWS



Cello M6
Outfit: sterling silver;
 snakewood frog
Stick: round
Weight: 72 grams
Price: €2,360

First up to undergo testing were several bows from the Arcus range – the S6 and M6 violin and cello models. Before sending the bows, Arcus founder Bernd Müsing had asked about our strengths and weaknesses as players and about our individual instruments, and subsequently matched corresponding models to each person. According to the product information, the S models are the ‘lightest and strongest bows’ in the Arcus range, particularly good for solo work with their ‘big, brilliant, powerful and round’ sound, designed to be ‘more bright than warm’ and well

suited to ‘dark-sounding instruments’. There are several models in the S range with the S6 being priced around the midpoint.

The M6, on the other hand, is designed for ‘perfect balance’ in terms of ‘sound character’ and ‘play and feel’, and is a little more flexible than the S range. All Arcus bows have a ratio of 80 per cent carbon fibre to 20 per cent resin – this, says the manufacturer, makes them more resonant than traditional carbon fibre models, which typically contain around 40 per cent carbon fibre.

C.S.



Arcus Violin M6

VIOLIN BOWS

Both bow types were incredibly attractive, featuring sterling silver and snakewood frogs and an ash-grey stick. For me, Bernd had chosen the S6, which he claims can brighten the sound of a darker instrument. My first impression was that the bow was amazingly light – and indeed Arcus bows are around 12 grams lighter than most wooden bows – and was also a centimetre or so longer than my own bow. The new weight took some getting used to and especially in faster passagework the bow felt a little difficult to control. In general the sound was brighter and harder, and was particularly resonant on the higher strings. When trying the M6, the slight increase in weight made for a more comfortable experience – generally the feeling that less effort was required as the bow’s weight caught the string more easily. Spiccato was particularly successful with this bow, which felt nicely balanced. Both S and M models seemed to favour higher over lower frequencies, meaning the lower strings seemed less rich and resonant than when using my usual bow.

C.S.

The glossy, almost reflective grey-black finish of these sticks made me feel more like a space cadet than a violinist to begin with: there was something otherworldly about the look of the material! The M6 drew a free and strong sound from my violin and responded well for the most part, although the sound was a little harsh both at the heel and on my E string. I enjoyed the bow’s bounce, which felt balanced and easy to control. In comparison, the S6 felt too lightweight, with hardly any bite to it and a hard-to-access bounce. Nevertheless, it produced a nice tone on my instrument, if not with the resonant warmth I enjoy with my own wooden Hill bow.

P.H.



Arcus Violin S6 head

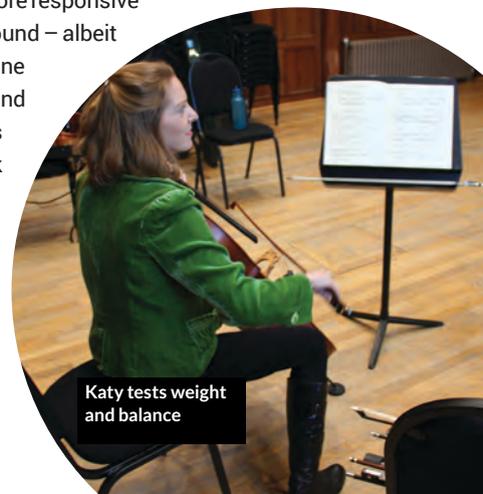
CELLO BOWS

I found both Arcus bows took some time to get used to, but they grew on me with more use. On the initial testing day I was struck by their lightness and longer length. The weight in particular felt more difficult to control and I had to work harder to draw a large sound from the string, especially in faster passages. The S6 seemed to produce a slightly gritty sound on the higher stings, a problem I did not experience with the M6, which had more give and flexibility. I took the M6 home to use in orchestral and chamber rehearsals and concerts. I liked this bow increasingly with time – its slightly chunkier frog felt very comfortable in my hand, and the longer bow length was great for sustaining long, slow notes.

V.B.

I loved the appearance of these bows and I found that both had a good sound when I tried spiccato, martelé and collé attacks. The M6 produced a warm tone all over my cello, with a lot of power in lyrical, fortissimo passages. It was also excellent for playing in a Baroque style, offering a weighted centre to each note. However, there was no grit at the beginning of each new stroke and I found that its light weight made bouncing at the centre difficult. The S6 was easier to control, with a more responsive bounce and a purer, brighter sound – albeit with a slight harmonic undertone when I played on the A string, and without as much resonance as I am used to on the C. The stick felt more rigid and it gave me a better bite than the M6 at the beginning of notes. >

K.W.



Katy tests weight and balance



Violin C4

Outfit: stainless steel

Stick: round

Weight: 54 grams

Price: €925

Cello C4

Outfit: stainless steel

Stick: round

Weight: 75 grams

Price: €995

Bernd Müsing launched his Müsing range in 2008 as a cost-effective alternative to his high-spec, handmade Arcus bows. The Müsing models have hollow sticks and comprise 60 per cent carbon fibre with low resin content for the price range. 'This way we achieve improved resilience, lower weight and significantly reduced damping, especially in the higher overtones,' says the marketing material. The model is also designed to 'draw a sound that is warm and of unique clarity' and to enhance staccato and spiccato playing.

C.S.

VIOLIN BOWS

The C4 was heavier than the Arcus models and therefore felt easier to handle in the first instance. A more obvious carbon fibre design, the bow had a black woven-look stick and traditional frog. My sound projected less well than when playing the Arcus bows and had slightly less definition, but playing spiccato was very easy with excellent results.

C.S.

The bow stick had a standard grey-on-black chequered-style pattern, which I liked: it was an honest carbon fibre stick, not pretending to be anything else. For me, the bounce was a little sluggish and the sound was a peculiar mixture of bright, harsh and muted, especially in the higher registers. The tone was relatively open and resonant at louder dynamics.

P.H.

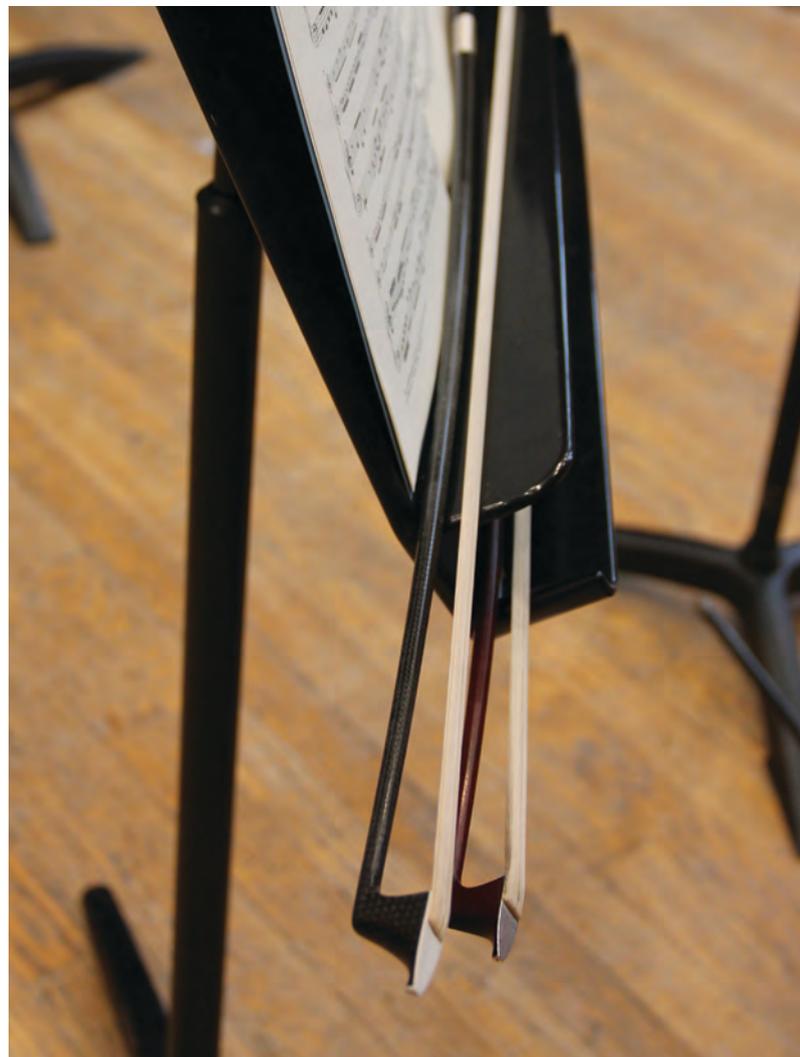


Müsing Violin C4

CARBON FIBRE WAS EVEN SUPERIOR TO WOOD FOR CERTAIN PLAYING TECHNIQUES AND SITUATIONS



Müsing Cello C4



CELLO BOWS

The extra weight of this bow, with its chunkier frog, made it feel reassuringly solid in the hand. My sound was thinner, especially in the upper register, but brighter than when using my own bow, and I was able to generate a satisfying bite at the beginning of notes. Faster passages in particular were easy to control.

V.B.

This was heavier than the Arcus M6 and S6, but not as attractive. It was also very hard to tighten up the hair! I found spiccato tricky with this bow, and I couldn't do sautillé at all. There was a nice bite at the start of each note and the bow was good for martelé, collé and for playing fortissimo, but I found it more difficult to create a good pianissimo. >

K.W.

JONPAUL

Violin Carrera

Outfit: sterling silver; ebony, white- or black-horn frog
Stick: round; firm or flexible
Weight: 59.5–61.5 grams
Price: \$1,518

Cello Carrera

Outfit: sterling silver; ebony, white- or black-horn frog
Stick: round; firm or flexible
Weight: 78.5–82 grams
Price: \$1,749

JonPaul's composite bows are handmade at the company's workshop in Salt Lake City, Utah. We were sent two Carrera models for testing, for both violin and cello – a firm stick with an ebony frog, and a flexible stick with a striking white-horn frog. Patterned after a Pajeot bow, the Carrera is a handsome model with a red-brown stick, mounted in sterling silver. Available in a range of strengths, the model is designed to fuse 'balance, weight and flexibility' and to create 'warm, rich and powerful tones'.

C.S.

VIOLIN BOWS

For me the ebony-frogged Carrera was immediately easier to control than the Arcus, as its weight was more in line with my own bow. The sound was clean and clear in longer strokes, with a pleasing balance from the frog to the tip and a good, direct connection to the string in both loud and quiet playing. My instrument's tone also projected well and with a full, resonant range, capturing overtones on both the lower and higher strings. The white-horn Carrera was lighter and more flexible, again producing a clear sound and pleasingly smooth action in longer strokes. Although tonal resonance was good, the sound was slightly more muffled in terms of projection when compared with the ebony – but again this was a strong, workable bow, which brought out the characteristics of my violin well.

C.S.

I began with the white-horn bow and my first impression was, aesthetically speaking, that this was a carbon fibre bow pretending to be (dazzlingly shiny) wood. Its bite was a little gritty for my taste and I found it to have a reluctant bounce, although in general the sound was clear and pure. I liked the ebony-frogged bow more: the sound was pure, free and resonant, from the bottom to the top of my instrument, whether I played quiet or loud, and the strong, nicely balanced stick gave me good reserves of power and control.

P.H.

JonPaul Violin Carrera



JonPaul Cello Carrera

**CELLO BOWS**

I was less taken with the highly polished look of the JonPaul sticks in comparison with the Arcus range, but the relatively thin frog felt comfortable in my hand. I was pleased with the sweet, pure tone that both bows drew from my cello and with how easily they spoke in quieter playing. I found the ebony Carrera slightly top-heavy and as a result it was more difficult to achieve a decent bite at the heel. By contrast the white horn was lighter and less solid, with great flexibility.

V.B.

I liked the snakeskin-look grip on the white-horn bow, which I thought would be a great look for pop gigs. The bow had quite a heavy tip, which made it easier to create a sustained sound in the upper half, and in general it had a really bright, creamy sound on my instrument. It also worked brilliantly for all the bouncing bow techniques, although I found that my sound wasn't as full as it could have been in spiccato. I wasn't so keen on the appearance of the ebony bow, but I liked its weight. To play, I found it quite similar to the other model, and it had an even better dynamic range. Still, neither made as rich a sound as my wooden bow. ▸

K.W.



Violin Peccatte

Outfit: silver mounted, ebony frog, silver and iguana-leather grip
Stick: round
Weight: 61.5 grams
Price: €2,050

Erich Perrotta makes both wooden and carbon fibre bows in his workshop in Verona, Italy. With his carbon fibre sticks – Lamy, Peccatte and Sartory models, for violin, viola and cello – his aim is to help players obtain a purer, less ‘noisy’ sound than might be achievable when using a wooden stick. In the case of the Peccatte, which we tried for violin, an additive in the resin expands to produce gas bubbles when heated, to ‘emulate the porosity of wood’. The stick itself is slightly thicker than other models, which Perrotta claims results in a more powerful sound and a ‘slightly slower spiccato’. The Sartory, tested by our cellists, has a slightly denser stick, designed for greater agility.

P.H.

VIOLIN BOW

The Peccatte model bow had the look of a traditional wooden bow, with a dark brown stick, matt finish and black and tortoiseshell frog. The fairly rigid stick produced a very clear but slightly narrow sound with less resonance than some of the other bows, along with a smaller spectrum of overtones. Spiccato and shorter strokes were nicely crisp and defined, and the bow felt well balanced from frog to tip, ensuring a pleasingly smooth action.

C.S.

I liked the sleek, dark brown finish, but this bow again seemed to be ‘pretending’ to be made of wood, both in its aesthetic and with its technology. It spoke easily on my violin, with a good bite and a vibrant sound, although I found the tone quality a little hard.

P.H.



A Perrotta violin head and cello frog

Cello Sartory

Outfit: silver mounted, ebony frog, silver and iguana-leather grip
Stick: round
Weight: 81 grams
Price: €2,650



Erich Perrotta violin and cello heads

CELLO BOW

I appreciated the more traditional look of the Sartory model, as I prefer a less glossy aesthetic. The sound from my cello was a little muffled in terms of projection, and shorter strokes such as sautillé felt slightly more difficult to control than when using other models. The frog felt a good size and shape in my hand, however, and the stick felt strong and flexible, capable of producing a decent, firm tone.

V.B.

This bow had a classier, less shiny look. The stick was strong but flexible, and it responded reasonably well for bouncing techniques. It was easy to create every dynamic from pianissimo through to fortissimo, although I found the sound a bit muffled.

K.W.



Charlotte plays a Carbow model, finding it 'smooth and clear on the upper strings'



Victoria (left) and Katy (right) test the blend of sounds between JonPaul and Arcus models

ENTERPRISING
MAKERS HAVE
BROUGHT
INCREASINGLY
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THE MARKET

CARBOW

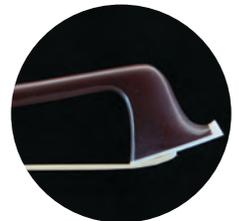
Violin CarboWave Eb

Outfit: Ebony frog inlaid with abalone pearl; optional silver mounting

Stick: CarboWave; round

Weight: 59–65 grams

Price: €975 (€1,300 with silver mounting)



The French company **Carbow**, a subsidiary of aerospace and marine composite-engineering firm Les Nouveaux Matériaux, has a strong following among double bassists and proponents of popular styles. It uses traditional bow making techniques combined with computer testing to develop bows from digitally designed moulds, using high-pressure techniques to eradicate excess resin and increase uniformity. The bows are then shaped, polished and varnished by hand, and fitted with frogs made by Paulus GmbH in Germany. Carbow makes bows in established designs but also builds to order. We tried a single bow from its CarboWave series, which its website claims has 'exclusive combinations of materials, fibres, resin [and] pigments' to produce 'even more harmonics' for a richer sound and at a lower price.

P.H.

This was a no-frills bow with a comfortable weight and an imitation wood stick that would not stand out from the crowd. Overall it made a perfectly pleasant sound on my instrument, especially in louder dynamics, but I found resonance to be lacking generally and I did not find the bow very responsive in pianissimo. However, for its price it could be a suitable alternative to a spare wooden bow.

P.H.

The Carbow model was another that had an unflashy, traditional appearance. On my instrument it produced a smooth, clear tone and was particularly effective on the upper strings, which were ringing and resonant all the way to the top of the fingerboard. I did find it a little more difficult to find the balance point, however, meaning that spiccato and sautillé were less defined and slightly muddier than I would have preferred. But in general the bow was a good weight and a fairly easy fit when transitioning from my own wooden bow. >

C.S.





CODABOW

Violin Marquise GS

Outfit: Xebony frog; fibre-reinforced composite tip plate, tip wedge and button screw bearings; Moroccan leather grip
Stick: octagonal
Weight: 61 grams
Price: \$1,295

Violin Diamond GX

Outfit: Xebony frog; fibre-reinforced composite tip plate, tip wedge and button screw bearings; Moroccan leather grip
Stick: octagonal
Weight: 61 grams
Price: \$845

Violin Joule

Outfit: Xebony frog; fibre-reinforced composite tip plate, tip wedge and button screw bearings; Moroccan leather grip
Stick: round
Weight: 61.5 grams
Price: \$695

Cello Marquise GS

Outfit: Xebony frog; fibre-reinforced composite tip plate, tip wedge and button screw bearings; Moroccan leather grip
Stick: octagonal
Weight: 81 grams
Price: \$1,555

Cello Diamond GX

Outfit: Xebony frog; fibre-reinforced composite tip plate, tip wedge and button screw bearings; Moroccan leather grip
Stick: octagonal
Weight: 81 grams
Price: \$1,015

Cello Joule

Outfit: Xebony frog; fibre-reinforced composite tip plate, tip wedge and button screw bearings; Moroccan leather grip
Stick: round
Weight: 81 grams
Price: \$830



CodaBow Cello Diamond GX

CodaBow, based in Minnesota, avoids not only pernambuco and ivory, but also other threatened resources including ebony. Its composite

Xebony frogs are made from resin and organic fibres, and its sticks are composed of Kevlar, carbon fibre and natural plant fibres fused together under high pressure, with materials woven and layered for flexibility. CodaBow classifies its bows from 1 to 10, where 1 is student and 10 professional: we each tried the Marquise GS (levels 9–10), Diamond GX (7–10) and Joule (6–10). The Marquise ‘Master Model’ is the most traditional of the three, designed in the style of top-quality wooden bows to provide high sensitivity and response. The Diamond GX, in the company’s ‘Performance Model’ range, is balanced and weighted as a traditional wooden bow, and designed to be responsive, warm and strong for all types of stroke, played in company or alone. Finally, CodaBow claims its Joule bow offers excellent projection in all ranges – with particular power and resonance on the G and D strings – and especially shines with electric instruments.

P.H.

VIOLIN BOWS

I began with the Marquise, which was a strong bow with good response and resonance. It drew a lovely rich, mellow tone from the lower range of my instrument, but I found the sound bright and harsher on my A and E strings. It gave my bounced bowings a ‘pecking’ quality and I found its energetic rebounds from the string very hard to control. Next I tried the Joule, which seemed heavy-heeled and less resonant – frustratingly so in fortissimo. Nevertheless, bounced bowings were easy to control and the sound was even across my whole instrument. It was a nice bow overall, but I did struggle to make it sing. The Diamond was punchy and strong, singing on the A and E strings but more muted on my D and G.

P.H.



CodaBow Violin Marquise GS

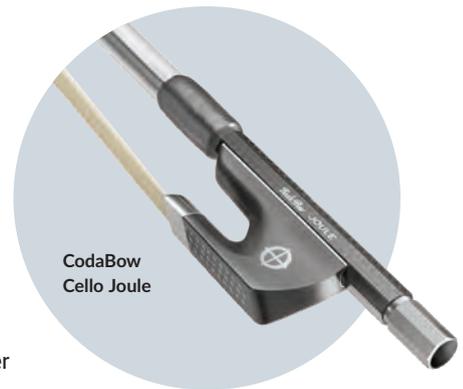
CodaBow’s Diamond model had a fairly light and hard stick, which produced a bright, clear sound in the upper registers. Semiquavers, when testing the bow in a cathedral performance of Handel’s *Messiah*, were pleasingly crisp and defined, which suited the work particularly well. I did find the frog a little angular, meaning the bow was not the most comfortable fit in my hand. By contrast, the Marquise had a less resonant and less golden sound, especially on the lower strings, which sounded slightly gritty. Spiccato was more difficult to control with this bow, though staccato notes were nicely articulated. The Joule was the heaviest of the three models and produced a very smooth, non-grainy sound, which on the lower strings was mellow and soft-edged. Spiccato with this bow came wonderfully easily.

C.S.

CELLO BOWS

The CodaBow Diamond was comfortable to hold and unlike some other carbon fibre models was not noticeably longer than my own wooden bow. I was less happy with the glossy appearance of the stick, which seemed almost distractingly bright under performance lights. I felt the bow was weighted for heaviness at the frog, but was light elsewhere. Consequently I found it fairly easy to make a large sound at the heel, but had trouble producing a soft, clear sound in the upper half. The Marquise for me was a better match. I felt there was more flexibility in the stick and the look of the bow was more in keeping with a traditional aesthetic. The sound was fine, although a little gritty in comparison with my own wooden bow. My least favourite was the Joule, which didn’t give me enough power to draw a decent sound from my instrument. However, I am sure this rather smart-looking bow works much better with electric instruments. ●

V.B.



CodaBow Cello Joule