

# The Power of Now

“We make today’s watches not yesterday’s,” says De Bethune’s David Zanetta

Its stunning timepieces offer me ample reason to like De Bethune; however, when passionate co-founder Zanetta recently told me, “We will only be happy when we have crafted the world’s most accurate (series) wristwatch,” my initial appreciation turned into serious respect. For those who believe the baton of precision should be wrested back from quartz, rejoice! The quest for mechanical isochronism has a new knight in shining armour – fitting, as the brand name derives from the Chevalier de Béthune, an 18th-century French knight who pioneered a two-lever clock escapement. *QP* pays a visit to Zanetta’s tiny manufacture, where big ambitions are being realised with a sharp, contemporary edge.

Ian Skellern

De Bethune’s core consists of two men practically destined to work on great things together. Having collected and dealt in timepieces since his childhood, President David

Zanetta’s refined taste and knowledge led him to become a valued consultant and advisor to some of the world’s most prestigious private collections and museums.



(Above) De Bethune’s new automatic ‘Power’ (ca SFr.40,000), which makes a colourful feature of the power reserve. True to its ‘Sport’ status, the case is water-resistant to 500 m.

(Right) President and co-founder of De Bethune, David Zanetta, whose Italian roots bring “fresh vision from outside the closeted world of Swiss watchmaking,” according to Denis Flageolet.



Denis Flageollet at his bench where he tests and develops prototypes. His computer is linked directly to the CNC machine department below, which allows for quick modifications. New parts can be on his desk in under an hour! It is this speed and flexibility that enables a small company like De Bethune to achieve so much.

“Our goal was to create a real horological *manufacture* – not just a brand...”

It was Zanetta’s lifelong love for vintage L Leroy timepieces that started it all. In 1998, Zanetta was inspired to re-launch the once-noble brand, which was then owned (and since sold) by Techniques Horlogères Appliquées – or THA. While THA is not well known outside the Swiss watch industry, it was a super-group of incredibly talented watchmakers who joined forces to develop bespoke projects anonymously for big brands. Realising that his lofty ambitions for L Leroy were not developing as he wished with THA, Zanetta left in 2002 to start his own brand, De Bethune. Joining him in the new venture was THA’s then Head of Production and Research, Denis Flageollet.

French-born Flageollet ranks with the world’s very best horologists. A son, grandson and great-grandson of watchmakers, Flageollet followed a spell teaching horology with a position as senior watchmaker for Michel Parmigiani, who, pre-Parmigiani Fleurier, was specialising in restoration and crafting complications for brands like Breguet. One interesting project that Flageollet

was involved in was the then “world’s most complicated wristwatch” for Franck Muller (since upgraded by Paul Gerber).



(Above) With its movement reversed, De Bethune’s DB S displays its titanium triple-shock-protection balance. The four torpedo-shaped platinum weights of the balance can be seen under the bridge.

In 1989, Flageollet left Parmigiani to join fellow horological heavyweight, François-Paul Journe in founding THA. He set up the workshops and production facilities then took over responsibility for technical direction and design. Journe left in 1994 to found his own brand (you might have heard of it), and in 2002 Flageollet got the call from Zanetta.

“Our goal,” recalls Flageollet from his bench at De Bethune’s remote facility in La Chaux l’Auberson, “was to create a real horological *manufacture* – not just a brand – with the facilities to do all of the conception, R&D, prototyping, manufacture, finishing, assembling and testing, in-house.”

Not surprisingly, given the vast experience of the two men, De Bethune was launched with a very clear horological business plan. This included not only developing both classic and contemporary collections, but also researching uses of new materials such as titanium and silicon. This research has already resulted in practical applications and the future looks very exciting.

“We feel that to have a solid base on which to build, a true *manufacture* should have the following in-house calibres,” Flageollet reveals: “A simple hand-wind with a long power reserve to drive complications (ours is a comfortable eight days), an automatic movement and a chronograph. After that you have the movements and skills to develop as you wish. And because of our size and structure,” he continues, “when we discover or hear of a new procedure/method/material which sounds interesting, we can experiment, develop and implement it very quickly. That is the benefit of independence and having our own *manufacture*.”

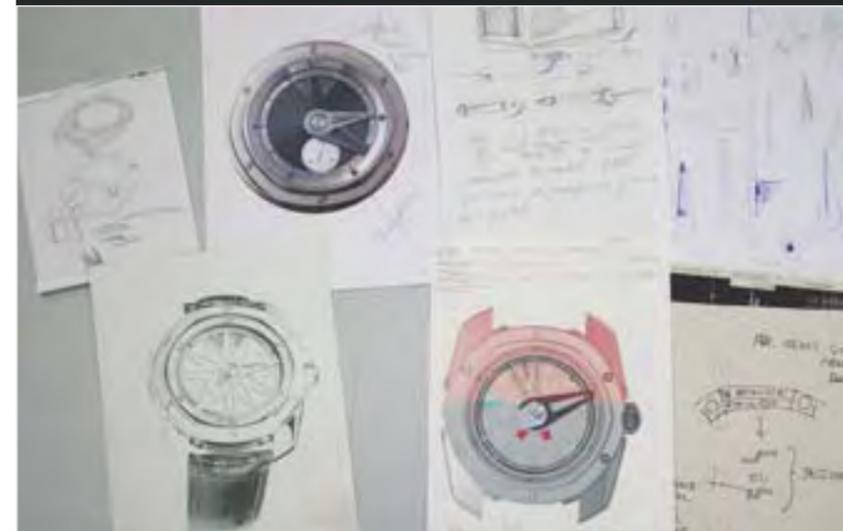
### Silicon balance springs, their way

The most notable development in De Bethune’s movements is the triple balance protection. While more shock protection is certainly better than less, the driving motivation behind the design was something much more significant: a silicon balance spring.

(Top) De Bethune’s nondescript headquarters in the tiny village of La Chaux in the Swiss Jura region. This building now houses administration, R&D and prototyping. The production has very recently moved into a new purpose-built building. The new facility will allow the company to slowly expand its present 25 staff to 80.

(Centre) These complex CNC machines are used for prototyping only. The company will be moving into its new production facilities in March.

(Bottom) These sketches show how the timepieces develop at De Bethune. Zanetta and Flageollet discuss rough drawings, which slowly evolve and are refined until they are ready to become technical drawings. Note Zanetta’s fax to Flageollet on the bottom right, suggesting different section profiles for the Power’s bezell





Silicon offers a number of advantages over traditional balance-spring materials including stability, strength, lightness and being non-magnetic [see 'Heart of Lightness', Issue 19]. Its low mass ensures that its form is little affected by gravity or shocks and, as the electronics industry has been working with silicon for decades, the production techniques are very well developed. The main disadvantages of silicon are that it is not very stable with fluctuations in temperature and it is very brittle.

The ultimate accuracy of any timepiece is determined by the isochronism of the balance (spring and wheel), so naturally De Bethune improved these first. A normal balance is supported by a 'cock', which is a bridge supported at one end. Attaching a balance, balance spring and cock to a movement with just one screw (as is usual) means that the whole assembly can swing both horizontally and vertically while being positioned and secured. This presents few problems for a standard balance spring, but the fragility of a silicon spring places it at great risk. Fitting the balance to a bridge, which is attached at both ends, allows for very precise positioning and fitting; however, De Bethune's testing revealed that the extra rigidity of a twin fixation reduced shock resistance. Their answer was 'IOS' - Isochronic Oscillating System. This consists of a supple titanium bridge with shock protection at each end as well as the centre.

To allow for a free-breathing, flat balance spring, De Bethune developed its own proprietary curve too - nearly a full turn of beryllium copper. Fitted to the end of the hairspring, this curve provides the benefits of a Breguet overcoil (concentric 'breathing') without the disadvantages of extra height and human inconsistencies when shaping it.



(Above) De Bethune's experience with titanium has enabled the use of the lightweight but strong metal in both the balance bridge and the rotor arms of the new automatic movement in the Power. As a result, the rotor (like the balance) has the highest inertia:mass ratio available today.



The current IOS in production, Version 3 (left), features titanium arms and platinum weights. Adjusting the pair of screws linking the arms fractionally increases or decreases the diameter and thus the rate. Version 3 already has the highest balance inertia:mass ratio available. Version 4 (right), now in testing, replaces both the arms and the spring with silicon thus increasing that ratio even further. Silicon's elasticity constant (k) changes constantly with temperature. Patek got around that by coating its silicon balance springs in silicon oxide, which apparently compensates for the problem. Flageollet's solution was using a bimetallic curved strip between the arms of IOS version 4 (equipped with the silicon spring). As the temperature changes, these metal strips automatically push the arms apart or let them close in. This increases or decreases the diameter of the balance, adjusting the inertia:mass ratio, so constantly maintaining the balance spring's 'K'.



(Above right) Last year's platinum DB17 perpetual calendar; (above) the caseback of the similar DB15, which shows De Bethune's characteristic heart-shaped baseplate; (right) the dial-side movement of DB15/DB17, revealing the bevel-gear mechanism behind that enchanting spherical moonphase.

The goal of improved isochronism also led De Bethune to develop a new balance wheel. An ideal balance wheel has the highest inertia:mass ratio possible, i.e. maximum weight at the perimeter, minimum in the spokes and hub. To achieve this - and they now have the highest inertia:mass ratio balance commercially available - De Bethune made the arms of the balance wheel from ultra-light silicon and replaced the usual wheel with torpedo-shaped platinum weights.

The current IOS, Version 3, has a standard De Bethune curve balance spring with the rate regulated by screws between the arms. Version 4 will be fitted with a silicon spring that self-regulates for temperature thanks to bi-metallic curves between the arms. Amazingly, it will need no rate adjustment screws because of the higher precision and low mass of the silicon spring. But don't despair if you've already bought your IOS-spec De Bethune - older versions are all fully upgradeable to the new.

### Flourishing repertoire

So will silicon be fitted to all De Bethune's balances in future? "My opinion is yes," reckons Flageollet, "unless we discover something better, but I don't know when. Based on the results we have today it is an exceptional material; however, we need to go slowly in gaining experience working with it."

Experience is something that both of De Bethune's founders aren't strangers to - reflected strongly in their Classic line, born of Zanetta's past steeped in traditional watchmaking, and Flageollet's solid apprenticeship in restoration. This collection includes one of my favourites, the DB15/DB17: a perpetual calendar (all functions quick-setting) with a three-dimensional moonphase. Launched in 2004, the DB15 gave us the first indication of just how high De Bethune was aiming. While the

dial side provides pure sensual overload, the back rewards the technically minded, with the distinctive triangular back plate, twin barrels providing five days of power reserve and that unmissable triple-shock balance bridge.





“Starting with a clean sheet of paper, we have the freedom to explore any technical or design path we feel is interesting without any baggage of tradition.”

Where the Classic collection offers traditional elegance, the new models in De Bethune's Contemporary and Sport collections feature some daring, *avant-garde* design. Despite Zanetta and Flageollet's traditional influences, I have the impression it is these radical timepieces that reveal their true passion and direction. The designs are not at all constrained by history.

“The principle benefit of starting a new brand over developing an existing brand is freedom,” emphasises Zanetta. “Starting with a clean sheet of paper we have the freedom to explore any technical or design path we feel is interesting without any baggage of tradition. At De Bethune we make today's watches not yesterday's.”

QP's Ken Kessler voted the DB20 Automatic GMT his outright 'high-high-end' favourite of all time (see p.56), as well as his favourite watch of Basel 2006. While perhaps lucky to spot it in the first place (De Bethune distances itself from the hoi polloi by mooring a boat a taxi ride away from the Baselworld's thronging halls), he certainly could not have ignored the DB20's bold styling, polished and heat-blued titanium hour markers, and generous 45 mm case. Technically, the movement features a

host of innovations including a gold gear train, power reserve driven by a gold rack through a patented differential and the third-generation IOS with the silicon/platinum balance wheel.

The DB22 Power, the latest model in the automatic line-up, takes the 'Sport' aesthetic kickstarted by DB20 - a sort of Fritz Lang-inspired future-industrialism - further still. The hands scream Chrysler Building, while the triangular screws and indexes whisper *Star Trek*...

The DBS Digitale was my favourite of last year, though. The Geneva-striped dial displays its calendar and time indications with the austerity of a Benedictine monk. Yet turn it over and you are transported to the heavens, with De Bethune's trademark spherical moonphase floating on a beautifully restrained celestial caseback. The Digitale is a natural evolution of 2005's DB S, whose striking case and openworked dial design first took De Bethune away from its 'Classic' round case with four torpedo lugs, into the brand's new, futuristic era. As Flageollet explains, “The idea behind the [Contemporary collection's] horseshoe-shaped cases was to have a distinctive dress watch without its lines spoiled by a crown.”



### 72,000 vph

As stiff as competition was from its siblings, it was a massive triple-column-wheel monopusher chronograph, aptly named 'MaxiChrono', which at least *promised* to make the biggest horological splash at Basel this year - still being, as it is, in prototype stage. The inevitable waves shouldn't die down quickly. De Bethune has always placed accuracy, readability and practicality high on its agenda and, above all else, the MaxiChrono prototype is an extremely practical keeper of elapsed time. For maximum legibility all five hands are as large as possible, so co-axially central. Due to the restricted space at the back of the chronograph movement, the anti-shock system protecting the balance is a shorter X-shaped bridge boasting no less than five anti-shock mountings!

While a silicon balance spring coupled with a balance wheel of high inertia:mass ratio would make a superb regulating organ in any movement, the low overall mass may allow for even bigger gains in the MaxiChrono - namely a faster beat rate. This normally improves isochronal stability, but with the downside of increased wear. However, the minimal mass of De Bethune's balance assembly should ensure that wear is less of an issue, and beat rate may go up from 28,000 vph to an incredible 72,000 vph! With the type of precision this should allow, we may see the 30-second chronograph dial become a 15-second dial.

There is no doubt that the quality and meticulous dedication to detail in De Bethune's collections are literally second to none, but the sheer presence of its timepieces risks overshadowing what I feel may be an even greater achievement: superbly accurate movements. De Bethune's development of gold, titanium and silicon movement parts, plus its ever-evolving IOS may well fulfill Flageollet and Zanetta's dream of producing the world's most accurate watch. Centuries ago, the Chevalier de Bethune invented an escapement allowing for seconds; it will be interesting to see just how small today's De Bethune can split those seconds up. ○

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(Opposite page) The sublime caseback on the DBS Digitale provides us with a playful surprise; the more so as it is in stark contrast to the austere, machine-like dial.

(Above left) A new Power automatic being assembled. An audacious design like this does not come easy: the case alone comprises 30 parts.

(Above) The third of the Sport collection, and still being prototyped: MaxiChrono. Its frequency is slated to be a super-precise 72,000 vph! The polished steel hands show the hours and minutes while the chronograph indications are displayed as: 24 hours, short blue hand at 12 o'clock; minutes, long red hand at 11 o'clock; and seconds, precisely shown on a 30 second dial by the long blued hand at 2 o'clock. To marry the case and strap, an innovative articulated mechanism in titanium is in development, which allows the fit to adjust automatically to the individual's wrist. Large cases sometimes have a tendency to turn on small wrists and De Bethune appears to have found a comfortable solution with these 'floating' titanium lugs. More on all this soon...