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WEB & IPAD SPECIAL

COVER STORY:
JAEGER-LECOULTRE,
180 YEARS OF
WATCHMAKING

MECHANICAL WONDERS

ESCAPEMENTS:
TAG HEUER – AUDEMARS PIGUET – GIRARD-PERREGAUX –
OMEGA – URBAN JÜRGENSEN
MOVEMENTS:
ACCURAT SWISS – VAUCHER MANUFACTURE

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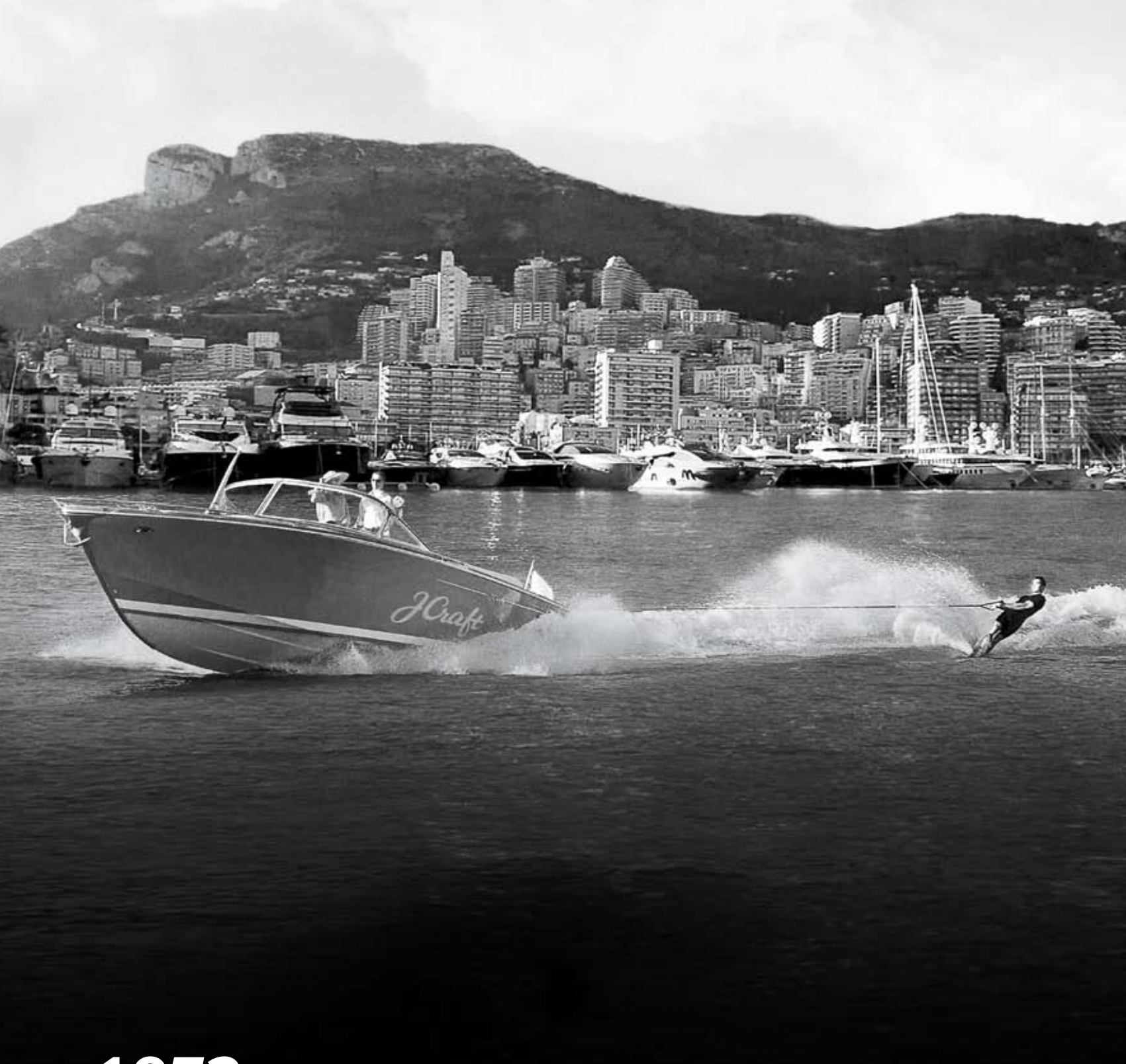

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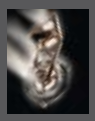


Swatch Group forced to reopen the doors of its "supermarkets"

▸ **Editorial**
Pierre M. Maillard
Editor-in-chief
Europa Star

In mid-July, in the middle of a summer heat wave when watchmakers were finally looking forward to taking some time out, or having a good time, either at the seaside or in the mountains, the now famous COMCO (the Swiss Competition Commission) caused a stir. Going against the recommendations of its own secretariat, which had patiently negotiated with the Swatch Group a progressive reduction in deliveries of its strategic assortments (the balance-spring assembly), the COMCO executive rejected any reduction in deliveries. From 1 January 2014, the Swatch Group will once again have to supply its assortments to anyone who asks for them, without restriction.

The planned reduction in deliveries of mechanical movements – 10 per cent in 2014 – was, however, accepted. But the precise terms of this reduction, which were included in the overall agreement, must be revised.

For the Swatch Group, which officially announced its "disappointment" at the decision, this is a strategic setback. For other brands, it's a breath of fresh air. Just as Swatch is preparing to launch its new Sistem51 this autumn (a highly innovative mechanical movement that consists of 51 elements and a single screw), independent brands face the threat of being caught in a two-pronged attack, from below with the Sistem51 and from above with the increasing rarity of assortment supplies.

They can now breathe a little easier, because "this decision gives more time to movement manufacturers like Soprod, Sellita and La Joux-Perret to make up lost ground," comments Alain Spinedi, the boss of Louis Erard and one of the most strident voices in the campaign to get the COMCO to counter the intentions of the Swatch Group.

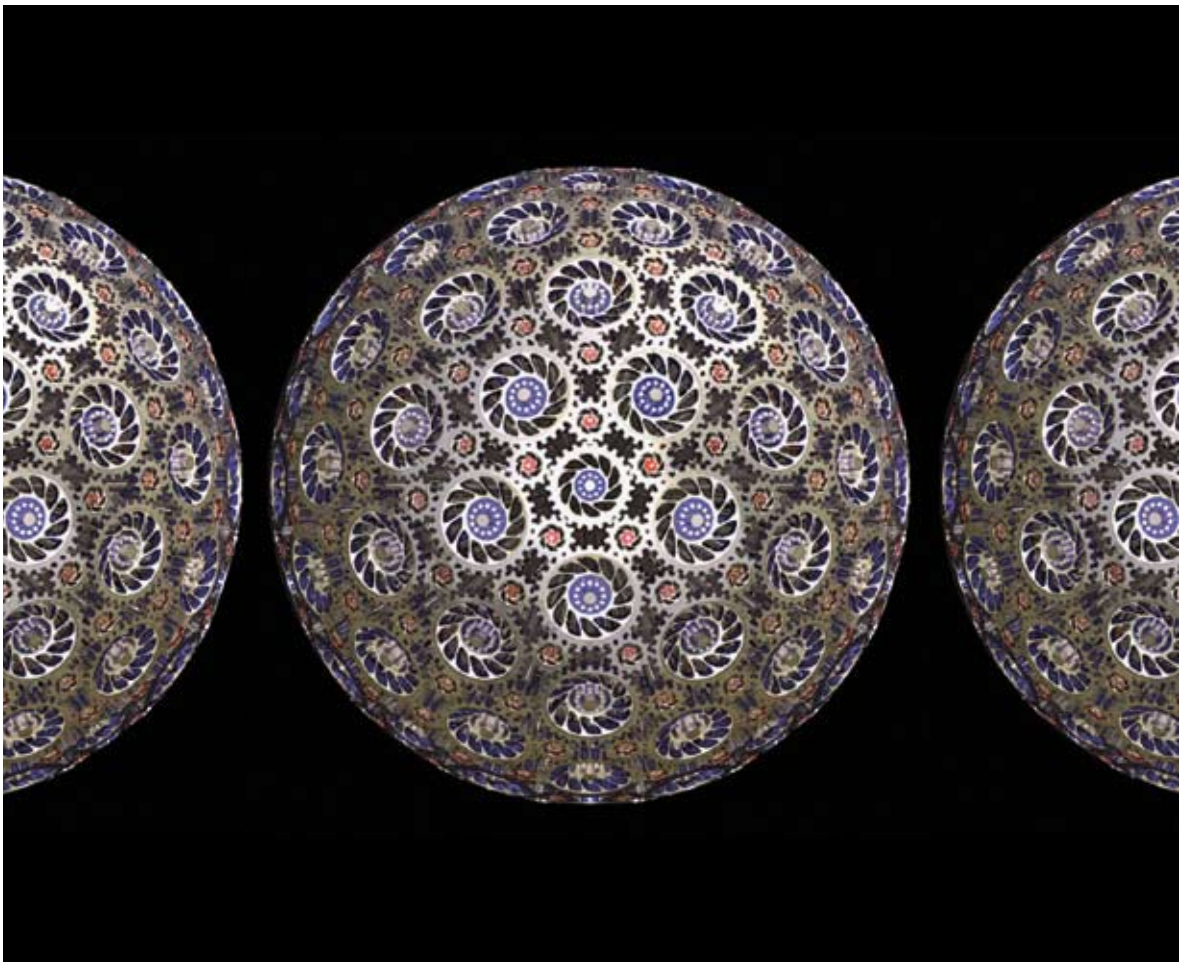
But this respite should not be an excuse for brands to rest on their laurels. Nick Hayek is right to remind everyone that the availability of ETA movements and Nivarox assortments, which represent between 90 and 95 per cent of the market, has for too long allowed other brands to postpone their investments in this field. Now, the long-term future of the Swiss watchmaking industry demands that efforts be focused in this very area.

The week after this decision from the COMCO, another announcement drew attention: Swiss watch exports to the Eldorado that is China dropped by 18.7 per cent in the first half of 2013, and those to Hong Kong by 11.1 per cent. And it was above all gold watches that were concerned by this reduction rather than those in steel. Although this may well be a direct consequence of China's policy to stigmatise open displays of luxury, it may also be the indication of an end to the good times. Could market forces be regrouping around a slightly more modest offering? Come what may, efforts towards industrialisation are more necessary than ever to secure the long-term future of the industry.

The "respite" accorded by COMCO to all stakeholders gives them time to get organised and invest to ensure their autonomy. The "supermarket" may be opening its doors once again, but before rushing to empty its shelves, its "customers" would do well to think seriously about their future. ■

ESCAPING FROM THE BOUNDS OF **THE LEVER ESCAPEMENT**

The so-called Swiss lever escapement has enjoyed an uninterrupted rein over mechanical watchmaking ever since it was first invented in 1757 by Thomas Mudge, who succeeded in adapting the classic lever escapement for portable watches. Just as this escapement was on the verge of being forgotten, Georges Auguste Leschot breathed new life into it in 1825. Ever since, its uninterrupted success was a major factor in the blossoming of the Swiss watchmaking industry. This success is because of its intrinsic qualities: it is robust, reliable, relatively easy to produce and allows high-precision adjustment, unlike some of its now defunct rivals such as the cylinder escapement, which was a lot less precise, or the detent escapement, which was too sensitive to shocks. (Read Paul O'Neil's article about Urban Jürgensen for more on the rebirth of the detent escapement).



The whirlwind surrounding the arrival of quartz technology was so strong that this mechanical regulator was for a second time nearly blown into oblivion. But, as we know, it emerged from the crisis stronger than ever and, with constant improvements to its performance, the Swiss lever escapement continues, some two centuries after it was first invented, to equip the vast majority of simple or prestige mechanical watches. The persistence of this ancient technology is itself a unique anomaly: apart from the bicycle, which other technology has lasted so long in spite of being scientifically outdated – at least in terms of chronometry? With mechanical watchmaking having stood the test of time and reasserted its dominant position in terms of prestige, the Swiss lever escapement continued its path, without anything (or hardly anything) threatening its primacy. In addition to its inherent advantages, the lever escapement has enjoyed such widespread adoption that it has also been able to benefit from huge industrialisation efforts and a streamlining of its production. And we know that, despite what we often think, industrialisation means better reliability.

But over the past few years, watchmakers have embarked upon a conceptual and economic race that has seen them look for other solutions for mechanical escapements that could either offer better results or set them apart from their competitors.

So far, none of these innovative solutions has managed to put a noticeable dent in the supremacy of the lever escapement, the rare exception being Omega's decision to develop for mass production the co-axial escapement invented by George Daniels (read the article by Paul O'Neil for more information on this).

One brand, however, stands out in this area: TAG Heuer. For a few years now, TAG Heuer has been committed to genuine scientific research to develop new and radically different escapements that allow the brand to go beyond the limits imposed by the Swiss lever escapement, in particular in the field of high frequencies that allow very short time intervals to be measured. (Read Pierre Maillard's article for more information).

But while TAG Heuer is the pioneer in this area, other brands are looking at new solutions, for example with the constant escapement – the lack of consistency in the lever escapement being one of its weaknesses – or even hybrid escapements.

We devote the main contents of *Europa Star*'s annual "mechanical special" to these advances in escapement technology, as well as to new movements. ■

△ "Here is a set of 242 interlocking bevel gears arranged to rotate freely along the surface of a sphere. This sphere is composed of 12 blue gears with 25 teeth each, 30 yellow gears with 30 teeth each, 60 orange gears with 14 teeth each, and 140 small red gears with 12 teeth each." – Paul Nylander, bugman123.com

JAEGER-LECOULTRE – 180 YEARS OF WATCHMAKING ROOTED IN EXCELLENCE AND INNOVATION

The history of the Jaeger-LeCoultre *manufacture*, which celebrates its 180th anniversary this year, is inextricably linked to the history of a place: the Vallée de Joux. It was in this cold and, at the time, inhospitable place, situated at an altitude of over 1,000 metres and populated by bears and wolves, that a certain Pierre LeCoultre settled in 1559. He was a Huguenot refugee who had fled from religious persecution. It was in these glacial lands that he set up a small community that spawned descendants. His son built a temple in 1612 that marked the birth of the village of Le Sentier.
Almost two centuries later, in 1803, one of his direct descendants, Antoine LeCoultre, was born. His family ran a small forge and, working alongside his father, the young Antoine discovered a passion for metallurgy, inventing new alloys, perfecting the vibrating blades of music boxes and having a go at producing razor blades. The young man had ideas of progress and tried to reconcile his experience with the burgeoning growth in scientific knowledge. And so he turned to the most noble expression of metallurgy and mechanical art: watchmaking.

1833 is the key date. Antoine LeCoultre had just invented a revolutionary machine that could cut pinions for watchmakers. He therefore decided to open his first workshop, naturally in the village founded by his ancestor, Le Sentier. Methodically, scientifically, he learned the main watchmaking skills.
In order to produce a watch movement rationally, he invented a number of machines, including the Millionomètre in 1844: the first instrument in history capable of measuring the micron. This was a giant leap in the field of precision and, in 1866, the workshop became the first watchmaking *manufacture* in the Vallée de Joux. For the first time, all the skills that had hitherto been spread across hundreds of small producers based at home were brought together under the same roof. Knowledge, trade secrets and techniques were swapped and people fed off each other's ideas, which helped to bring about the first partially mechanised procedures for producing complicated movements. When he died in 1881, his son Elie took over the reins of what was henceforth known as "La Grande Maison" ("The Big House"), where some 500 people worked. From 1860 to 1900, the *Manufacture* created over 350 different calibres! Half of them included complications: 99 different repeaters, of which 66 were minute-repeaters, 128 chronographs, 33 calibres that combined a chronograph and a repeater. And from the 1890s, the Manufacture started manufacturing its own grand complications, comprising three major horological complications: perpetual calendar, chronograph and minute repeater.

AN ACCELERATION IN INNOVATION AT THE START OF THE 21ST CENTURY

Today, the Grande Maison, still located in the same place, employs over 1,000 people, masters 180 different watchmaking skills and over 20 different advanced technologies. The list of its accomplishments is much too long to feature here. Having become Jaeger-LeCoultre at the turn of the 20th century, following a meeting between the Parisian naval watchmaker Edmond Jaeger and the grandson of the founder, Jacques-David LeCoultre, it added further to its pioneering and avant-garde pieces: the world's thinnest watch, fitted with the LeCoultre 145 calibre (1.38mm thick), the Duoplan watch (1925), the calibre 101, the smallest mechanical movement ever produced (1929), the

Atmos perpetual pendulum (1931), the Reverso, which needs no introduction (1931), the Memovox self-winding watch with alarm (1956), the first self-winding divers' watch with alarm, the Memovox Deep Sea (1959), the Master Control line, which is submitted to 1,000 hours of the most rigorous tests (1992)...
This uninterrupted flow of horological milestones has even accelerated since the start of the 21st century: to this day, over 75 new calibres have been produced since the year 2000 and over 80 new patents registered: grand complications, tourbillons, minute-repeaters, chronographs, perpetual calendars, 15 days power reserve, the first lubricant-free calibre etc. Ultra-complicated watches, high jewellery creations, so many different references from the great watchmaking of the 21st century, such as the Atmos Mystérieuse (2003), Gyrotourbillon 1 (2004), Reverso grande complication à triptyque (2006), Master Compressor Extreme Lab 1 (2007), Reverso Gyrotourbillon 2 (2008), Duomètre à Grande Sonnerie (2009), Master Grande Tradition Grande Complication (2010), Reverso Répétition Minutes à Rideau (2011), Duomètre Sphérotourbillon (2012).

THE JUBILEE COLLECTION, IN TRIBUTE TO ANTOINE LECOULTRE

With the year 2013 marking 180 years since the start of this incredible saga and the incessant quest for watchmaking excellence, it was only natural for the brand to produce a special "Tribute to Antoine LeCoultre" jubilee collection.

This collection offers three watches featuring exceptional characteristics highlighting three fundamental fields of expertise cultivated by the *Manufacture*: absolute innovation in the field of grand complications, with the Master Grande Tradition Gyrotourbillon 3 Jubilee watch; perfect execution dedicated to serving performance, with the Master Grande Tradition Tourbillon Cylindrique à Quantième Perpétuel Jubilee; and pure performance under the most demanding constraints, with the Master Ultra Thin Jubilee, the thinnest mechanical manually-wound watch in the Jaeger-LeCoultre collection.

MASTER GRANDE TRADITION GYROTOURBILLON 3 JUBILEE

The third Grande Complication model to be equipped with a Gyrotourbillon movement, the Master Grande Tradition Gyrotourbillon 3 Jubilee watch boasts two world-first achievements: a new balance-spring that is no longer "only" cylindrical, but spherical; and the first time that a Grande Complication model is equipped with an instant digital-display chronograph controlled by a single pusher!

◁ All indications and functions of the **MASTER GRANDE TRADITION GYROTOURBILLON 3 JUBILEE** are harmoniously and legibly accommodated inside a case that is just 15.5mm thick and 43.5mm in diameter. Directly inspired by the grand historical tradition of pocket watches from the *Manufacture*, this case made from extra-white 950 platinum (950o/oo platinum and 50o/oo ruthenium) clearly belongs to the Master Control line, but has been rethought in all its details so as to endow it with an even higher degree of aesthetic refinement. Its bezel has been slimmed down and its curves are accentuated. Its sides are satin-brushed and its bezel and lugs are polished. The same decorative care has been lavished on making its movement. Inspired by a movement made by Jacques-David LeCoultre in 1898, this new Jaeger-LeCoultre Calibre 176 (21,600 vibrations per hour, 50-hour power reserve) is made from nickel silver. Its bridges and mainplate are hand-hammered – a long and accurate process calling for expertise and dexterity and conducted in harmony with the highest traditional watchmaking criteria.

The cylindrical balance-spring in the Reverso Gyrotourbillon 2 watch was already a major feat both in technical terms and because of the workmanship it involves. However, the new and unprecedented spherical balance-spring used in the Gyrotourbillon 3 movement is a genuine achievement.
It is an unprecedented technical accomplishment that required over two years of development. And when one considers that two full days are required to make a single spherical balance-spring, that gives a better idea of the extreme difficulty of the task that calls for unique expertise exclusively developed by the *Manufacture*. Crafting it involves progressive coiling of the spring around a metal sphere that will give it the required shape. Yet the whole difficulty then lies in removing the cylindrical balance-spring from the sphere without touching or spoiling the shape of the coils themselves… Equipped with two terminal curves ensuring perfectly concentric and regular "breathing", it guarantees exceptional performance, comparable to that of the cylindrical balance-spring, while also putting on a spectacular show. Blued to accentuate its beauty, it is fixed to the centre of a 14-carat gold balance-wheel that is also given the same hue by means of a very special treatment. Gold is first PVD-coated with a thin (less than 5-micron) layer of iron that is then oxidised in a kiln to create its remarkable colour. The blued balance-spring and balance-wheel enliven the double spherical carriage of the Gyrotourbillon 3 movement. The two carriages are made from a new type of aluminium. While the great advantage of aluminium lies in its extreme lightness and the performance of a tourbillon is directly influenced by the lightness of its carriage, it is also a metal that only dimly reflects light in darkened surroundings. To eliminate this flaw, a new procedure has been developed using a PVD treatment to coat the aluminium with a very fine layer of palladium, followed by a galvanic treatment that adds a layer of rhodium – resulting in unprecedented brilliance. The appealing visual effect is further accentuated by the transparent context within which it is positioned. In the absence of a bridge, this flying Gyrotourbillon 3 movement creates the impression of being suspended in mid-air and of rotating in an apparently weightless state.

The second feature of this Master Grande Tradition Gyrotourbillon 3 Jubilee watch is its instantaneous digital-display chronograph – a first in the field of Grande Complication models. The minutes are displayed in a broad aperture (4.5 x 3mm) on two instant-jump discs: one for the units and the other for the tens. The aperture appears inside a subdial at 9 o'clock indicating the chronograph seconds. Above it, one can clearly see the integrated column-wheel chronograph governing the chronograph function. Its activation and the starting, stopping and resetting of the digital chronograph functions are all controlled via a single push-piece at 2 o'clock. Meanwhile, a day/night indicator at 3 o'clock orbits inside a circular 24-hour graduated scale. On the upper level, above the Gyrotourbillon 3 movement, two blued hands indicate the hours and minutes on an opaline dial.

MASTER GRANDE TRADITION TOURBILLON CYLINDRIQUE
À QUANTIÈME PERPÉTUEL JUBILEE

MASTER ULTRA
THIN JUBILEE

MASTER GRANDE TRADITION TOURBILLON CYLINDRIQUE À QUANTIÈME PERPÉTUEL JUBILEE

In 1889, at the Universal Exhibition in Paris, Jaeger-LeCoultre (known at the time as the Manufacture LeCoultre) was awarded a gold medal. It rewarded the company "for the use of cutting-edge equipment and the impeccable production of its complicated calibres, chronographs and repeaters".

A reproduction of this finely engraved gold medal appears on the oscillating weight of the new Master Grande Tradition Tourbillon Cylindrique à Quantième Perpétuel Jubilee. It thereby serves as a vivid reminder of the pioneering role played by the *Manufacture*, as well as symbolically reaffirming the extraordinary continuity of this innovative spirit that has been its driving force throughout its 180 years of watchmaking history.

This new watch is the perfect epitome of this proud heritage. Directly inspired by the splendid pocket-watches made by the *Manufacture* in the late 19th century, it now appears in a new 42mm diameter, 13.1mm thick case made of extra-white 950 platinum.

The slimmer bezel provides an optimally broad scope for its extremely classic grained silver-toned dial: a slender traditional minute circle, baton-shaped hour-markers, a date subdial at 9 o'clock, month and year subdial at 12 o'clock, and a day subdial surrounding the moon phase at 3 o'clock. All these indications are clearly and easily readable above the tourbillon visible at 6 o'clock. The latter is a flying tourbillon, meaning without any upper bridge, a feature that endows it with exceptional transparency and depth. This transparency enables an unobstructed view of the extraordinary beating of the rare cylindrical balance-spring at its heart. Nonetheless, however refined and subtle, this is merely the visual expression of a greater technical reality.

Thanks to its perfectly isochronous development ensured by its two terminal curves, this cylindrical balance-spring, which involves an extremely complex production process, ensures the high-precision rating of the new automatic Jaeger-LeCoultre Calibre 985 equipping this Master Grande Tradition Tourbillon Cylindrique à Quantième Perpétuel Jubilee. Despite its technically innovative nature, the classic and beautifully balanced appearance of this timepiece makes it look as if it has quite simply always existed.

MASTER ULTRA THIN JUBILEE

In 1907, Jaeger-LeCoultre developed LeCoultre Calibre 145. At just 1.38mm thick, it is still the thinnest mechanism ever made by the *Manufacture*. Although produced right through to the 1960s, this movement was manufactured in a total run of only 400 – eloquently illustrating the complexity of the task it represents.

To mark the brand's 180th anniversary, it was entirely natural for Jaeger-LeCoultre to celebrate in a special way its pioneering role in the field of ultra-thin watches and movements. As thin as a knife-blade, the water-resistant case of the Master Ultra Thin Jubilee watch is just 4.05mm thick and 39mm in diameter. Inside it beats manually-wound Jaeger-LeCoultre Calibre 849. Composed of 123 parts and measuring 1.85mm thick, the latter is equipped with a bridge-free barrel and an extremely small escapement. It is thus one of the world's thinnest movements and above all, beating at 21,600 vibrations per hour, it has consistently demonstrated exceptional rating qualities and excellent reliability since 1994. Its assembly, adjustment and extremely fine rating also call for particular care.

This exceptional movement is given a new showcase in the Master Ultra Thin Jubilee watch made of extra-white 950 platinum. Radiating absolute stylistic purity, the watch features an immaculate grained silver-toned dial bearing slender and elegant baton-shaped hour-markers swept over by two slim baton-shaped hands. Beneath the Jaeger-LeCoultre signature, the transferred date "1833" offers a discreet reminder of the founding date of the *Manufacture*. ■

Discover more on Jaeger-LeCoultre at www.watch-aficionado.com

TAG HEUER – WAVES AND MAGNETISM IN THE SERVICE OF REGULATION

TAG Heuer is the first to explore new avenues for regulating mechanical watches.

MIKROGIRDER

It's 1747, ten years before Thomas Mudge adapts the lever escapement to portable watches. Jean le Rond d'Alembert, a famous French mathematician and encyclopaedist, published his theory on "vibrating strings"... What is that exactly? In mathematics, it was the first wave equation. It describes "the variation in time and space of an undulating quantity", for example a length of string that starts vibrating. Or, to take another – well-known – example, this equation is used to measure the effects of the wave generated by a troop marching in time across a bridge. The bridge starts to vibrate rhythmically, triggered by a wave that can lead to its destruction.
But what has this equation got to do with mechanical watchmaking?

Although it found no practical application for a long time, d'Alembert's equation found an important use in civil engineering. It paved the way for the development of "vibrating string extensometer" gauges, which can measure the deformations in concrete caused by variations in constraint in large buildings, towers, dams and nuclear power stations. It is also used to calculate the movements that could disturb the cables on a suspension bridge, the catenaries of a railway line, or, quite simply, the strings of a guitar.
It only started being used in watchmaking in 2012, having been taken up by the rational intuition of Guy Semon, Head of Research and Development at TAG Heuer.

A SHORT STEP BACK

But to get to this stage, we need to take a step back.
It all started in 2003, when TAG Heuer bought the idea of the V4 "concept watch" from Jean-François Ruchonnet. But the development and production of this new type of watch, using transmission belts instead of the traditional gear trains, required know-how and specific technical skills that were beyond those of the world of watchmaking. Having decided to develop and sell this avant-garde product come what may, TAG Heuer called upon consultants from other areas, such as the automobile industry, aeronautics and avant-garde technologies. This was how Guy Semon, physicist, mathematician, engineer, university lecturer and former employee of the French National Defence Department, came into contact with the teams at TAG Heuer. This was in 2004. In 2007, TAG Heuer asked Guy Semon to join the company in order to set up a Research and Development department worthy of the name. Jean-Christophe Babin, at the time CEO of TAG Heuer, was pursuing a very innovative vision of what research and development should be for his brand, which, despite its classical watchmaking, had made a name for itself with technological advances in the field of precision and timekeeping performance.

THE INTRINSIC LIMITS OF THE SPRUNG BALANCE

Guy Semon started work using tools such as theory, maths and physics, that were unusual for traditional watchmakers.
He soon discovered that the traditional pairing of balance and spring, invented in 1675 by Christiaan Huygens and improved by Thomas Mudge a century later, had serious limits when you tried to increase its frequency in order to measure very short time intervals.
At BaselWorld in 2011, TAG Heuer presented its Mikrotimer Flying 1000, vibrating at 500Hz, or the staggering figure of 3.6 million vibrations/hour. At this frequency, the watch could measure and display times down to 1/1000th of a second!
To achieve this spectacular result, TAG Heuer continued its research into the dual chain technology which started the same year with the Heuer Carrera Mikrograph, which could display the 100th of a second thanks to two different regulating organs, oscillating at 28,800 vibrations/hour, for the hours, minutes and seconds, and at 360,000 vibrations/hour, or 50Hz, for the chronograph display to 1/100th of a second.
But at the frequency of 500Hz that the brand has now achieved, where the seconds hand makes ten full revolutions per second, we start to go beyond the boundaries of Huygensian watchmaking: the escapement no longer needs a balance because at this high speed the spring would have to be so stiff (specifically, only four coils, or ten times stiffer than a normal spring) that the balance is no longer needed for the return.
But with this balance-less movement, we reach physical limits: the lever starts to have trouble keeping up, the regulating organ suffocates, the transmission between the barrel and the escape wheel gets out of sync, the amount of energy required per impulse is no longer sufficient. The result is an imbalance in dynamics and energy. For Guy Semon, this was the starting point for looking into a new technology for regulation.

D'ALEMBERT COMES BACK ON STAGE

In theory, the "perfect vibrating string" posited by d'Alembert, with infinite flexibility, constant tension, perfect elasticity and insensitive to gravity, transmits a wave uniformly along its entire length.

△ The MIKROGIRDER 5/10000th microblade regulator

The wave therefore has an isochronous oscillation.
In practice, the closest approximation to this theoretical perfect wave had to be found. The principle chosen for this seems simple and combines three "vibrating beams": an exciter beam attached to the lever and an oscillator consisting of a thin "beam" are united by a "coupler" that is itself also a "beam". By exciting the oscillator so that it gets as close as possible to the "perfect wave" of the theory, it begins to vibrate at perfectly defined frequencies. It can be adjusted using an eccentric that lengthens or shortens the vibrating beam, a little like tuning a guitar. This new type of "non-Huygensian" oscillator is therefore linear – like a string!
But, as in any classical movement, the mechanical power is transmitted in a non-constant way to the escape wheel pinion. In order to compensate for this non-constant transmission of energy, the angle of escapement must be as low as possible. (...)

Read the full article on www.watch-aficonado.com

AUDEMARS PIGUET
THE BEST OF BOTH WORLDS

Audemars Piguet took inspiration from a 200 year-old design to combine the advantages of the Swiss lever and detent escapements for ultimate precision

Almost at the same time as Omega introduced its co-axial escapement, Audemars Piguet was perfecting its own new type of escapement. It was based on a design first produced by Robert Robin in 1791 that aimed, just like the Daniels co-axial escapement but two centuries before it, to combine the benefits of the Swiss lever escapement and the detent escapement. Unfortunately, despite its advantages, the design shared the same inherent weakness of the detent escapement in that it was extremely sensitive to shocks. Of little use in a mechanical watch, the system was therefore quietly forgotten…

Until the dawn of the second millennium, when Audemars Piguet was attracted by the advantages of this design when it was looking to develop a new escapement. Giulio Papi, of Audemars Piguet Renaud & Papi, thus took up this two-century-old problem and looked for a solution to bring shock resistance to the escapement that would allow him to exploit the system of direct impulsion offered by Robin's design.

Papi's solution was simple in its execution and elegant in its design, taking the form of a so-called "safety finger" – an elaborated form of dart or guard pin that prevents accidental movements of the fork. Guard pins are nothing new to horology, but their usual upright configuration on a lever escapement could lead to the guard pin getting bent, which in turn leads to the dreaded "overbanking" (the irregular movement of the pallet fork between the two banking pins). In the Audemars Piguet design, a straight safety finger protrudes beneath the fork and, in combination with a safety cylinder mounted on the balance staff, maintains the lever in place while the escape wheel is locked. (...)

Read the full article on www.watch-aficionado.com

JULES AUDEMARS CHRONOMETER WITH AP ESCAPEMENT

GIRARD-PERREGAUX
BUCKLING TOWARDS CONSTANT FORCE

Girard-Perregaux's Constant Escapement exploits the phenomenon of a blade buckling to provide constant-force impulses to the balance.

By happy coincidence, Mr Girard-Perregaux's first name of Constant lends itself well to the revolutionary type of escapement that the brand presented in a functioning commercial timepiece for the first time at this year's BaselWorld watch fair. Because the Girard-Perregaux Constant Escapement addresses one of the main deficiencies of the configuration of a conventional mechanical watch – the problem of ensuring a constantly stable impulse to the regulating organ to maintain the same level of precision over the entire power reserve of a watch, in spite of the fact that this power reserve, by the very nature of the movement's construction, gradually reduces as the springs in the barrels unwind.

Girard-Perregaux has addressed this problem in a unique way, working over the past five years to perfect its constant escapement, which was only made possible with the use of silicon for watch components and the arrival of DRIE technology (deep reactive-ion etching) for manufacturing the small and complex components for the regulating organ of a timepiece. The theory behind this new escapement comes from that of "buckled blades", essentially a form of spring, which, when compressed, approaches a state of instability before buckling. (...)

Read on at www.watch-aficionado.com

OMEGA
GEORGE DANIELS'S LEGACY

Omega claims that its co-axial is "the perfect mechanical watch". Here we take a look at the co-axial escapement's history

I I have a special interest in Omega's co-axial escapement, since I was working at the company when the first limited editions were produced and as Omega's official translator and writer I was given the unenviable task of accompanying George Daniels on his visits to ETA. Unenviable for a translator, that is, because not only were the two parties speaking different languages at a highly technical level, they also came from worlds that were diametrically opposed – Daniels famously producing every single component in his watches by hand, selling only a handful of watches in his lifetime (the first of his pocket chronometers to feature the co-axial escapement was recently sold by Sotheby's for £362,500), while ETA was mass producing millions of mechanical movements per year.

Despite the numerous difficulties in adapting Daniels's design to mass production for an entirely new kind of movement, it was clear that Omega was not about to give up on the co-axial escapement, as several big watch brands had done before it. But the risks were clear. In his autobiography, George Daniels himself mentions 200 known examples of attempts to find a more suitable escapement than the lever escapement invented by Thomas Mudge in 1754, not one of which managed to supersede Mudge's design. Daniels had been working on his co-axial approach since the 1970s, aiming to combine the benefits of the lever escapement with those of the detent escapement, specifically to use the tangential impulse of the detent escapement to reduce friction and eradicate the need for lubrication.

Daniels's first designs used two escape wheels arranged side by side that engaged a single lever to impulse the oscillator. But the version he invented in 1976 and patented in 1980 used two wheels on the same axis, a lever with three pallet stones and a balance roller with its own pallet stone. Crucially, the impulse angle was reduced from the 52 degrees of the lever escapement to 30 degrees in the co-axial escapement, allowing for a lower-friction sliding action to the impulse. (...)

Read the full story on www.watch-aficionado.com

◁ The latest incarnation of the Omega co-axial escapement, with the distinctive spokes on the co-axial escape wheel and a balance and balance spring made of silicon.

URBAN JÜRGENSEN
INNOVATION IN THE SERVICE OF TRADITION

Urban Jürgensen adapts the detent escapement to the wristwatch

W We owe the invention of the detent escapement in large part to the Longitude Act passed by the English Parliament on July 8, 1714, which offered a reward of £20,000 to anyone who could find a method of determining longitude to an accuracy of half a degree. A similar prize was offered by the French Academy of Sciences four years later. It is therefore no coincidence that the names associated with the development of the detent escapement and the marine chronometers it was used in are either English or French: John Harrison, George Graham, Thomas Mudge, John Arnold, Thomas Earnshaw, Pierre Le Roy and Ferdinand Berthoud.

Le Roy is credited with first inventing the detent escapement in the mid-1700s, although all of the above-mentioned watchmakers produced their own configurations in the race to produce a marine chronometer accurate enough to win the substantial prizes on offer. The main objective of the escapement was to allow the balance wheel to oscillate as freely as possible, without being affected by friction from the gear train. The resulting design used a detent to provide an impulse directly to the balance from the escape wheel, doing so only once for each oscillation of the regulating organ, rather than twice in the case of the lever escapement. While this gives obvious benefits in terms of precision, the detent escapement itself was much more prone to shocks than the traditional lever escapement. No problem for a marine chronometer mounted on gimbals in a solid wooden case, but impractical for use in a smaller pocket watch or wristwatch.

△ A close-up of the pivoted detent

For Helmut Crott, the owner of Urban Jürgensen, the detent design was the natural choice when looking for a new type of escapement for the brand, for two main reasons. "We know the detent escapement is the most precise, because the balance is free, but there is the problem of shock resistance. But the detent escapement is also part of high-precision watchmaking history. It is a link between the past and the present but we wanted to take it a step forward rather than just copying an old design."

The sensitivity of the detent escapement to shocks means that there is a risk of "tripping", the unwanted release of the escape wheel, which can damage the movement or even stop it. Urban Jürgensen's elegant solution to this problem is a specially designed detent that has a perfectly balanced counterweight to the pallet jewel positioned at the other end of the lever. (...)

Read the full article on www.watch-aficionado.com

BRAND BOUTIQUES – **PROS AND CONS**

Watch brands of all sizes continue to open up monobrand boutiques around the world. Europa Star investigates this trend and talks to opinion leaders on both sides of the issue.

This autumn, Bovet will open its first boutique in the USA, in New York City's Ritz-Carlton Hotel, the fourth in the world for Bovet (after Moscow, Baku and Berlin).
On June 20, 2013, Carrera y Carrera opened up a new boutique in Beijing, China, marking the Spanish brand's 40th around the world.
In January 2013, eight watch boutiques opened at the same time in Bonifacio High Street Central, Manila, Philippines.
Brands are opening boutiques in never-before-seen numbers, and the jury is still out on whether the emphasis on boutiques is good or bad for the watch industry or, for that matter, the watch consumer.

WHY BRANDS OPEN BOUTIQUES

There are a number of reasons why brands open their own boutiques. First off, given the premium for counter or display space in independent retailers, a boutique is a way to showcase their watches exactly as they want, and to have as complete a selection as possible.
At the same time, it's a way for the brand to completely control the message. Independent retailers have their own sales staff, directed by the retailer, so the brand has to depend on the sales associates saying and doing the right thing. With their own boutique and their own people, they can be assured that their message will get out the way they want it to.
Also, in the traditional retail concept, the relationship with the end consumer has always gone through the retailer. Now that the Internet has opened up direct connections with the end consumer, the brands want more. Having a brand boutique means that the brand interacts directly with the end consumer. No middleman.

Carrera y Carrera, Beijing

A boutique is also about raising awareness for the brand. Even if consumers have never heard of the brand, the immediate reaction is that the brand must be something special if it has its own boutique.
Some brands open their own boutiques when they can't find the right retailer in a city, or they are unhappy with the retailers currently carrying them. It's an extreme step, but not unheard of.
And, finally, the brands stand to make more money when there is no independent retailer with whom margin must be shared. The company line is that boutiques increase sales in the independent retailers – some retailers echo this, while others dispute it. In many cases, the brands develop special timepieces that are developed exclusive for and sold ONLY in the boutique.
Some brands, for example Patek Philippe, only open boutiques in partnership with their existing retailers, but the current trend is to open boutiques in direct competition with retailers, or to close down their existing retailers and replace them with boutiques.

Here's what the brands have to say about boutiques:

Patrik Hoffmann, president, Ulysse Nardin:
"A big part of opening monobrand boutiques is to bring the end consumer closer to the brand and to provide a kind of concierge experience. Many times retailers are restricted in the depth of the collection they can display. In a monobrand boutique the consumer will feel like entering a showroom and showplace.
"Image and brand awareness certainly play an important role in opening a boutique, and in certain instances and certain marketplaces, maybe even the majority role. In the case of Ulysse Nardin, we see the independent retailers as the cornerstones of our distribution and most of our monobrand boutiques are run in cooperation with our independent retailers. It is our goal to support our retailers with the opening of monobrand boutiques and provide an additional platform for them.
"Today's consumers are very brand-conscious and the boutiques will help to enhance the brands' awareness amongst consumers and retailers, particularly now as the market place has become global. We have been very successful in doing so. Our Geneva boutique is a perfect example where we have put our synergies together with our long time partners Kunz Chronometrie. Ulysse Nardin has a lot to offer in terms of product innovation, global image and marketing, whereas our partners are most familiar with the market."

"Today's consumers are very brand-conscious and the boutiques will help to enhance the brands' awareness amongst consumers and retailers, particularly now as the market place has become global." – Patrik Hoffmann

Maison Patek Philippe, Shanghai

Larry Pettinelli, president, Patek Philippe North America:
"We are not retailers by nature. We know how to make watches, retailers are much better equipped to sell them. We don't want to undermine the partners who helped build the brand. Our retailers are the best retailers in the country.
"I know a lot of the brands would like to go to the brand only presentation. I think that's very difficult. In the US, you'd have to open a boutique in the top 20 cities to have a full presentation, and even then you will miss people who won't drive to the bigger cities.
"We have some great local accounts who service people who wouldn't otherwise hear about Patek. We do a lot of advertising and PR, but at the end of the day, we count on the retailers to talk about Patek as a third party endorse-


Corum Boutique, Miami

ment. Retailers can point things out that others cannot. We can only get that with partners we have had a relationship with for a long time."

Ehren Bragg, Managing Director, Devon:

"Like anyone, brands open a boutique because they see the potential for profit. By trading off the cost of paying a fixed overhead every month, they get the ability to work both sides of the deal and collect all the revenue on retail sales. The direct exposure to the market and control of the customer experience are other major advantages they enjoy.

"There really is no doubt that brand-owned boutiques cannibalise sales from independent retailers, the question is to what extent. If done right, the brand boutique should increase awareness in a marketplace thereby drive business into independent retailers, but there will certainly be customers who choose to do business with a brand boutique rather than an independent retailer because of the cachet it affords their purchase and the direct access they have to the manufacturer of their new timepiece.

"Since a high tide raises all boats, there can be passive benefits to retailers by having a company store in their area. After all, its presence will bring more attention to the brand and can help create desire in end consumers who may not have paid attention otherwise. Aggressive retailers can take advantage of this situation by competing on price - a game manufacturers don't want to play.

"A brand boutique within a retailer's existing footprint is a much cheaper alternative. Once again, this is a complicated decision with a lot of moving parts. It depends on the trust established between the two, the market's impression of the retailer and what you're trying to accomplish. Studies have shown that consumers are programmed to accept higher pricing in a boutique atmosphere than in a normal multi-brand environment - thereby benefitting both the manufacturer and the retailer." (...)

"There really is no doubt that brand-owned boutiques cannibalise sales from independent retailers, the question is to what extent." – Ehren Bragg

Read more views from the brands on www.watch-aficionado.com

RETAILER PUSH BACK

Some retailers are not bothered much by brand boutiques, but the majority of retailers are at least concerned. After all, retailers spend time and money developing a brand, only to face competition from the brand itself or to lose the brand to a boutique.

Doesn't seem fair, does it?

Boutiques are often a losing proposition for the independent retailer – they will certainly lose sales to boutiques and the retailers can't get product the boutiques can.

Probably the best way to approach boutiques is to welcome the challenge and the competition, seeing it as a way to better your own operation.

Here's what the retailers have to say about brand boutiques:

Greg Simonian, president of Westime (Los Angeles, USA):

"Major markets, like Los Angeles, are where the brands do a lot of business, so it is in their interest to build their presence in these important locations through standalone boutiques.

"We have a front-row view of this trend of boutiques, since we run Hublot and Richard Mille boutiques just steps from our Westime Beverly Hills store, and both brands are also sold at Westime. A very different shopper is drawn to the monobrand stores versus the multi-brand location. Those heading straight to the brand boutiques already have an affinity for that particular brand, while those shopping at a place like Westime are interested in seeing what's new in the market from a wide range of brands and perhaps discover something they had never heard of before. The fact that many monobrand boutiques create limited edition watches exclusively for their brand boutiques helps drive traffic into those stores without taking any business away from nearby independents. Also, at least for a company like Westime, our salespeople have very loyal relationships with their clients based on decades of good service. Those clients stay for a reason.

"On the other hand, every new watch boutique helps spread the word about watches in general, and potentially brings new fans into the fold. Some will shop at branded boutiques and some will shop at the independents, but more for everyone is still more. (...)

Jeremy Oster, co-owner, Oster Jewelers (Colorado, USA):

"More and more, I feel the brands are looking to dominate the retail market and go direct to the important collectors. It is an opportunity to hold a customer captive without any competition from competing brands as one would expect in a multi-brand independent retail store

"At the end of the day, it is the retailer who convinces the customer what to buy, and has the ability to switch them from one brand to another." – Greg Simonian

"Brand boutiques will take sales away from independent retailers. The only benefit to independent retailers is an elevated image of the brand.

"Competing with local retailers is not so easy in a small market with a loyal customer base. An independent retailer already has the trust of the consumer. If a brand is seen as trying to take business away from the retailer who built the following it can actually turn off the consumer. And remember, the retailer will replace that brand with the next hot brand that their customer has not yet purchased! An independent retailer also has the freedom of not relying on one brand. One of the pleasures of being independent is that I can be honest and open with my clients and can recommend an ideal selection for each individual based on their own taste. (...)

Read complete views from retailers on www.watch-aficionado.com

EXCLUSIVE

ACCURAT SWISS OPERATION K1

Around 2006, when ETA was taking its first steps to reduce movement deliveries, a small group of people came together, like conspirators. Among them was Andreas Felsl, a German entrepreneur specialised in patents who invented, among other things, Bionicon, a shock-absorber system used in the world's best mountain bikes, and who created in Germany a bicycle company that was elected the best in its category on six consecutive occasions.
There was also Tzuyu Huang, a businesswoman based in Bienne and CEO of Momoplus AG, a blossoming company delivering watchmaking components, cases, dials, hands, straps… in short everything but movements. And it is these very movements that were set to become rarer and cause supply bottlenecks.

They therefore had the idea of starting out on a crazy adventure: what if we designed, constructed and produced our own base movement?! Competitively and produced on an industrial scale! At least 100,000, that's surely a big challenge. A steep north face to climb… hence the name K1 given to this veritable expedition. (...)

See our full report and interview on www.watch-aficionado.com

PRIVATE LABEL BY **VAUCHER MANUFACTURE**

The 100 per cent vertically integrated manufacture in Fleurier is making its entire know-how available to low volume brands for the first time.

That there is watchmaking in Fleurier at all is largely down to one man: Michel Parmigiani. He set up a restoration workshop in the small town in the Val de Travers in 1975, in the midst of the quartz crisis, from which a veritable industrial cluster has grown. Michel Parmigiani founded Parmigiani Mesure et Art du Temps SA in 1990, the Sandoz Family Foundation took a shareholding in the company in 1995, then the vertical integration came in 2001 with the acquisition of Les Artisans Boîtiers (cases), Atokalpa (oscillators and gear trains) and Elwin (profile-turning for screws, pins etc.).

Vaucher Manufacture Fleurier was born in 2003 when Parmigiani Mesure et Art du Temps SA was spun off into two separate entities: Parmigiani Fleurier, for the watch brand, and Vaucher Manufacture Fleurier (VMF) for the movement. Quadrance & Habillage, a dial manufacturer based in La Chaux-de-Fonds, was incorporated into the structure in 2004. Today, VMF operates out of an impressive 6,700m^2 facility in Fleurier, inaugurated in 2009, where 200 people representing 20 different professions produce some 22,000 movements per year for Parmigiani, Hermès (a 25 per cent shareholder in the company), Corum and Richard Mille, among others.

The company has an ambitious medium-term target of 35,000 movements per year, which represents an increase of over 50 per cent compared with current production levels. The new VMF Private Label business unit is expected to contribute to this increase. On the same day that *Europa Star* visited the VMF factory, potential customers from London and Paris had come to discuss the possibility of working with VMF Private Label. It may just be a coincidence that neither of these interested parties are from Switzerland and the fact that they approached VMF even before the new Private Label option was officially announced at this year's EPHJ exhibition in Geneva suggests that interest will only grow.
Florin Niculescu, Head of Business Development at VMF, explained the rationale behind the creation of this new business unit. "Since we launched our 'industrial' calibres, we have been approached by brands producing small volumes (and by this I do not mean small brands) regarding a possible cooperation," he says. "Until now, we had always politely declined. But I thought, why not? It could be a good advertisement for us."

VMF have clearly put a lot of thought into the strategy for their private label division. The promotional material includes a list of the five calibres available for production runs of as low as 25 units and includes something that is almost unheard of in the sub-contracting side of the watch industry: prices. These range from CHF 990 for the basic Calibre 3000 self-winding movement to CHF 1,590 for the extra-flat Calibre 5300 with date and micro-rotor (available from next year).

Mr Niculescu believes that the prices will help customers differentiate themselves on two levels. "With the likes of Tissot and Certina offering mechanical watches for as little as CHF 695 retail, it is becoming increasingly difficult for retailers and brands to justify prices that are several times higher for a watch fitted with the same movement. Our private label customers will have the quality and notoriety associated with VMF and will be able to use brands like Hermès and Parmigiani as a reference." (...)

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