

# ASCENT TO THE SUMMIT

Fine timepieces, some of them with elaborate complications and in limited editions, are built under Montblanc's aegis at the time-honored Minerva Manufacture in Villeret.







**A** ROMAN GODDESS, patron of the sciences and skilled crafts, will no doubt come to the mind of a classical philologist when he hears the name of the name “Minerva,” but aficionados of mechanical watches will be more likely to think of fine chronographs. This type of time-measuring device was surely not on the minds of Charles-Yvan and Hippolyte Robert when they began their entrepreneurial careers in the village of Villeret in Switzerland’s Jura region in 1858. The original plan for their business was to assemble watch movements from ébauches manufactured by Robert’s Fabrique d’Horlogerie de Fontainemelon (FHF). Charles and Georges Robert began following in the footsteps of the founding generation exactly 20 years later, and their brother Yvan joined them in 1885. The trio registered the name “Minerva” and an appropriately designed trademark in 1887. The letters R, F and V, positioned in a V-shaped arrangement and separated by an arrow, stood for “Robert Frères Villeret.” The manufacturing of their own cases, as well as exclusive *manufacture* calibers for pocketwatches, probably began in a newly built building in 1902. The series began with 18-ligne Caliber No. 1 with cylinder escapement, which was manufactured until 1941, and 18- or 19-ligne Caliber No. 2 with Swiss lever escapement. Caliber No. 3, which boasts very meticulous craftsmanship, followed in 1903. The chronograph era began in 1908 with the debut of Caliber 19/9 CH. The “19” stands for the diameter (19 lignes or nearly 43 millimeters) and the “9” is the number of the movement as listed in the company’s sample books. The family business was renamed Fabrique Minerva Robert Frères S.A. in 1923. This probably coincided with the start of production of a wristwatch chronograph containing hand-wound caliber CH13/20, which was collaboratively developed with the specialists at Dubois Dépraz and manufactured until the 1960s.

The global economic crisis triggered by the crash of the New York Stock Exchange on October 24, 1929 also took a toll on the Robert Family’s enterprises. The watch technician Jacques Pelot and the machinist Charles Haussener took the reins from the Roberts in the 1930s. Their entrepreneurial skills were evident, for example, at the Olympic skiing competition in 1936 in Garmisch-Partenkirchen, where Minerva was the official timekeeper. The firm’s new directors also initiated a well-targeted widening of the range of calibers. The watch engineer André Frey, a nephew of Pelot, joined the team of managing directors in 1940. Decades later, the third generation of the Frey Family would sell the traditional brand in 2000 to the Italian financier Emilio Gnutti, who subsequently accepted a purchase offer from the Richemont Luxury Group in the autumn of 2006.

This most recent change of ownership turned out to be a stroke of good fortune. Richemont had acquired more



A Minerva advertisement from 1964

than a prestigious name. The package also included a nearly-150-year history, the rights to all calibers, a remarkable trove of unassembled kits for watch movements, the distinctive building in Villeret, machinery, tools and a storeroom full of spare parts. Charting the future course of the small business required lengthy deliberations and plenty of diplomatic sensitivity. The “wedding” with Montblanc was celebrated in 2007. It soon became apparent that Minerva’s philosophy was a perfect match for the principles as practiced, for example, at the Artisan Atelier in Hamburg, where very exclusive editions of Montblanc’s writing implements are manually crafted with utter disregard for time pressure. Strictly limited editions of elegant fountain pens — and noble chronographs à la Minerva — preclude the use of industrial production methods. The Institut Minerva de Recherche en Haute Horlogerie, as it is now known, is where research, development and production of the finest timepieces enjoy the same high priority as the well-planned fostering of next-generation artisans. It serves a bridge between two seemingly separate worlds. Talented watchmakers can con-



Chronograph caliber 19/9 CH from 1927

tribute their chronometric ideas as freelance collaborators and, far more importantly, financial support from the institute enables them to transform their concepts into reality.

#### **ELEGANT, NOBLE AND GOOD**

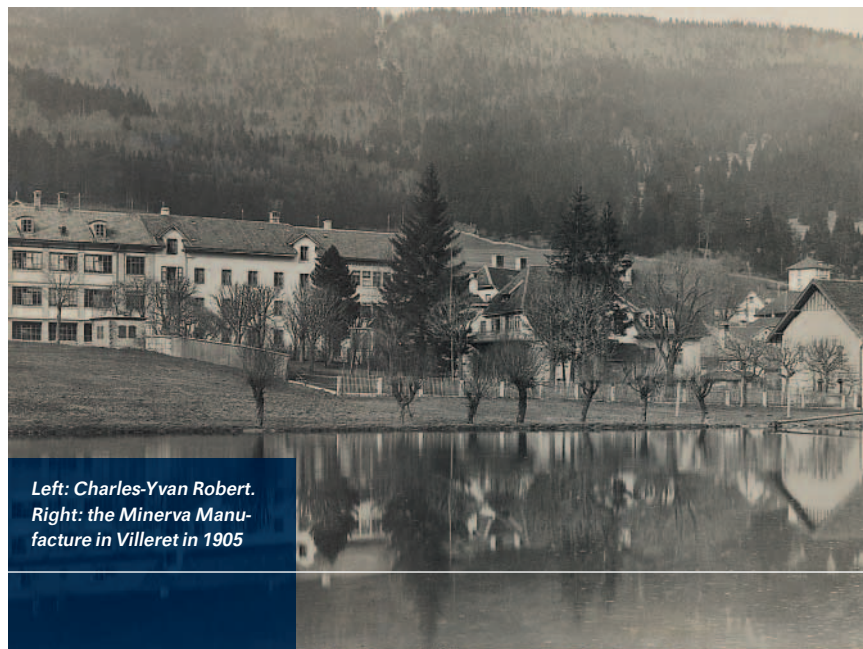
Minerva joined the elite circle of genuine chronograph *manufactures* in 1908. Atop this firm foundation of immensely valuable experience stands the modern building, in which noble time writers with the traditional elements of a classical column wheel and horizontal wheel coupling continue to occupy a large volume of space. The balance's unhurried frequency of 18,000 hourly semi-oscillations (2½ hertz) enables these chronographs to measure elapsed intervals to the nearest 1/5 second and makes it unnecessary for the wreath of strokes around the dial's periphery to deviate from the traditional number of subdivisions. In a lengthy and laborious process, each of the large, majestic-looking screw balances is united with its matching balance spring. Afterward, watchmakers meticulously poise each movement to minimize the ill effects of the Earth's gravitational attraction and to achieve outstanding rate results, in spite of the balance's leisurely pace. Such an enormous

## ***SUPERLATIVE CRAFTSMANSHIP IN STRICTLY LIMITED EDITIONS***

amount of fine adjustment couldn't be lavished on modern serially manufactured calibers, whose balances typically oscillate at a rate of four hertz (28,800 vph). With this in mind, the traditional 2.5-hertz pace can be regarded as a true luxury. The balance's slow but steady to-and-fro, the regular pulsing of the hairspring (which is remarkably similar to the beating of a human heart) and its manually upturned terminal curvature, as well as the elegant aesthetic of the swan's neck fine adjustment mechanism for the index: it would be difficult or impossible to imagine a more beautiful way to measure time by mechanical means. In Montblanc's Collection Villeret 1858, horological tradition enjoys the status it deserves.

With such an attractive movement ticking inside the case, it has become tradition to insert a transparent pane of sapphire into the back of each of these wristwatches. Anyone who has peered through a watchmaker's loupe and witnessed the mechanical ballet that ensues when the start, stop and return-to-zero commands are triggered will no doubt comprehend the importance of mechanical chronographs in the broad spectrum of horological complications.

Craftsmanship of the highest quality, which naturally goes hand in hand with strictly limited quantities, is as *de rigueur* in Villeret as it is at the Artisan Atelier, where writing implements that rank among the world's finest are manufactured. The number of units produced refers to 1858, the year when the *manufacture* was established. Depending on the particular model, there is either only



Left: Charles-Yvan Robert.  
Right: the Minerva Manufacture in Villeret in 1905



one, a group of eight, or, at most, 58 watches with cases made of platinum, white gold or rose gold. The high percentage of manual craftsmanship makes each of these watches unique.

#### HIGHLY DETAILED WORK

Each watch in the Collection Villeret 1858 embodies a synthesis of the arts, so masterful craftsmanship is by no means restricted to the movements. All cases are polished by hand. The curved bezel securely holds a similarly domed sapphire crystal. A convex hinged cover arcs above the threaded viewing window in the back and can be opened with the aid of a patented concealed mechanism. The outer engravings “Montblanc Villeret 1858,” “Edition Limitée” (limited edition) and “Fait main à Villeret” (handmade in Villeret) are visible evidence of authenticity, as is the individual serial number. Inside the back cover, the engraved signature of “Demetrio Cabiddu Maître Horloger” (Master Watchmaker Demetrio Cabiddu) confirms that the technical director of the Institut Minerva de Recherche en Haute Horlogerie personally guarantees the outstanding quality of each and every watch movement. Montblanc’s characteristic logo deserves special attention: crafted here from genuine mother-of-pearl, it symbolizes the six tongues of glacial ice that ring the summit of Mont Blanc, Europe’s highest mountain. The logo graces either the top of the winding crown or the upper surface of the chronograph’s button, which is integrated into the crown.

The dials also merit appreciative scrutiny. The elegance begins with the materials: nothing but genuine enamel or solid gold will do. A spiral pattern of manually cut guilloché adorns the centers of the metal dials. The number of artisans who know how to operate one of these time-honored machines is even smaller than the number of timepieces in the strictly limited Collection Villeret 1858.

Montblanc goes to even greater lengths on the dials for one-of-a-kind timepieces, where the guilloché embellishments are augmented by inlays of precious mother-of-pearl. The Roman numerals that mark the hours are manually applied piece by tiny piece. In this way, each dial forms the perfect background for the leaf-shaped and elaborately curved hands. To reduce its weight, the chronograph’s elapsed-seconds hand has an especially slender shape. Montblanc’s stylized star is impossible to miss on the short end of this hand, where it ensures perfect balance by functioning as a counterweight. The concept of “L’art pour l’art” is foreign to the Collection Villeret 1858, in which each detail has a deeper significance all its own.

#### AUTHENTIC CHRONOGRAPHS

Distinctive, utilitarian and 47 millimeters in diameter: that’s the Grand Chronographe Authentique. The mechanisms of the watch’s movement alone measure a stately 38.4 mm in diameter, but rise only a moderate 6.3 mm high. This means Montblanc doesn’t need to insert bulky spacers into the cases of the Collection Villeret 1858 or to leave lots of air-filled space inside. Hand-wound Caliber MB M16.29 is a pure and unadulterated mechanical chronograph movement, composed from 252 painstakingly finished components that fully uphold the promise spelled out in the lettering on the dial. Viewed through the glass caseback, the coupling, the switching mechanism, the 14-mm balance with gold and platinum screws, the brand’s own Breguet hairspring, and the elegant fine-adjustment mechanism seem like performers on a stage. Three of the 22 functional jewels are set in chatons.

Only after 55 hours does the mainspring require a fresh dose of energy. The lengthy power reserve is almost regrettable, because manually winding this watch is such a delightfully smooth process. The chronograph button, which is integrated into the crown, triggers the start, stop and return-to-zero functions; a counter for 30 elapsed minutes at 3 o’clock tallies the orbits of the chronograph’s elapsed-seconds hand.

Of course, a wristwatch of such ample dimensions isn’t appropriate for every wrist. With slimmer wrists in mind, Montblanc created the smaller “Chronographe Authentique” with a 41-mm-diameter case. Inside it is hand-wound *manufacture* Caliber MB M13.21, which measures 29.5 mm in diameter and 6.4 mm in height and



*Perfection in every detail: the Grand Chronographe Émail Grand Feu could evolve into an increasingly valuable collector’s item.*





Typical for the watches of the Collection Villeret 1858: a gorgeous chronograph movement is concealed within an officers' case that's made of precious metal and equipped with a hinged cover.





Based on a model from the 1930s: the Vintage Pulsographe with black enamel dial



A platinum case and mother-of-pearl inlays on the dial: the Chronographe Authentique

offers 60 hours of power reserve, single-button triggering of the chronograph's functions and a column wheel to control them. Accordingly, the Glucydur screw balance must make do with a diameter of 11.12 mm. The balance's frequency of 2.5 vibrations per hour, a Breguet hairspring and a swan's neck fine adjustment mechanism are points of honor, as is the superlative processing given to the 239 components. The standards defined by Cabiddu are upheld in all watch movements, regardless of their size and degree of complexity.

These two mechanical treasures boast outstandingly crafted dials coated with genuine enamel. Watchmakers first used this material in the middle of the 17th century, but the costly and highly delicate art of *champlevé* enameling fell out of fashion in the 1920s. Montblanc not only revives it here, but also carries it to the utmost extreme: specialists use a burin to carve so-called "troughs" or "cells" into the surface of a gold platelet. These cells are manually filled with powdered enamel, which is then heated until it melts and then cooled until it freezes into a vitreous state. The small but meaningful insignia, "Émail Grand Feu Suisse", refers to this artistic process. Impossible-to-overlook perfection in all details guarantees that the larger 47-mm Émail Grand Feu chronograph and its smaller 41-mm sister will soon evolve into genuine and, above all, long-lived collectors' items that are likely to maintain their worth, and probably to increase in value, with the passage of time. For each of these calibers, Montblanc offers one unique timepiece with a platinum case and a blue dial. Eight larger and eight smaller white-gold watches are available with white or black dials. And the small series of 58 watches in rose-gold cases all have white dials coated with precious *champlevé* enamel.

## EVERY WATCH IN THE COLLECTION 1858 VILLERET IS CONCEIVED AS A SYNTHESIS OF THE ARTS.

### HELPFUL CALIBRATED SCALES

Chronographs are versatile, especially when the elapsed-seconds hand is used in combination with a specially calibrated scale on the dial. Physicians in the pre-electronic era appreciated the pulsometer scale, which halved the amount of time needed to measure a patient's pulse rate: the doctor simply started his chronograph, counted 30 pulse beats, stopped his chronograph and glanced at its motionless seconds hand, the tip of which pointed to the number on the pulsometer scale that corresponded to the patient's pulse rate per minute. The new Vintage Pulsographe, which is produced in a limited edition of 58 watches with 39-mm-diameter rose-gold or white-gold cases, accomplishes precisely this task. The design of the genuine enamel dial is inspired by a Minerva chronograph from the 1930s. Then, as now, finely crafted and hand-wound Caliber MB M13.21 puts the button that sequentially triggers the start, stop and return-to-zero functions at 2 o'clock.

The treasure trove of dials in Minerva's archive also expresses itself in the Vintage Chronographe, which debuted in 2010. The gorgeous enamel dial bears two helpful scales. The outer scale, known as a telemeter, takes advantage of the unequal speeds of light and sound so that the wearer can quickly determine his distance from an approaching thunderstorm. If the wearer starts his chrono-



The manufacture in Villeret has at its disposal an arsenal of old stamping tools and metal bars to make components for watch movements.





Montblanc Manufacture  
after its renovation in 2008



*The chronograph's "little sister": at the push of a button, the seconds hand of the Grande Seconde au Centre Retour-à-zéro returns to its zero position.*

aboard slower-moving vehicles. If the average speed is less than 60 km/h, the chronograph's hand has enough time for two or even three rotations. The elapsed-minutes counter shows which round it is currently passing through.

The handmade grand feu enamel dial is installed above the large hand-wound MB M16.29. This excellent ensemble is surrounded by a 43.5-mm rose-gold or white-gold case. In both instances, the production ceases with the 58th timepiece. In these models too, Montblanc remains rigorously loyal to its principles.

#### THE LITTLE SISTERS

The chronograph has a little sister, a watch with a zero-return function. Here, pulling out the crown triggers the center-mounted seconds hand to jump to the vertical position — a trick that's appreciated by connoisseurs who are fanatical about to-the-second accuracy because it facilitates synchronizing the timepiece with a standard time signal. The instant the wearer hears the signal, he presses the crown, thus restarting the timepiece. Watchmakers have devised various mechanisms for this purpose. Montblanc opted for the most complex version, which is almost as complicated as a chronograph's control mechanism. Here, the central seconds hand is mounted on the shaft of the chronograph's center wheel, and wheel coupling creates a permanent connection to the fourth wheel. Extracting the crown first disconnects this train and then presses the heart-lever against the zero-return heart, which causes the seconds hand to jump to the vertical position. Pressing the crown inward triggers this sequence

## TRANSFORMATION ON COMMAND: THE *METAMORPHOSIS* CHANGES ITS APPEARANCE AND ITS FUNCTIONS.

graph when the lightning flashes and stops it when he hears the thunderclap, the tip of the stopped seconds hand will point to the storm's distance in kilometers. The spirally coiled scale in the dial's center is called a tachymeter. Many people mistake it for a tachometer and erroneously assume that it can measure speeds, but a tachymeter can in fact only measure average speed over a predefined stretch, e.g. one kilometer or one mile. If the user starts his chronograph when his vehicle passes one milepost and stops it again when he passes the next, the tip of the chronograph's seconds hand will point to the average speed. The spiral shape is helpful for passengers



in reverse. These ticking syntheses of the arts are the Grande Seconde au Centre Retour-à-Zéro with hand-wound Caliber MB M16.18 and the Seconde au Centre Retour-à-Zéro, which contains the smaller Caliber MB M13.18. In coming years, the specialists in Villeret plan to produce only two grosses (two dozen dozens, or 288) of each of these return-to-zero calibers.

#### EXCLUSIVE AND COMPLICATED

The name of the Grand Chronographe Régulateur, which debuted in 2008, tells a great deal about the timepiece. First, this is a chronograph. Second, the special positioning of the hour hand justifies the use of the term “régulateur.” In this type of precision timepiece, watchmakers position the hour hand away from the dial’s center so that it doesn’t hide the seconds hand for too long a time. This unusual wristwatch has two hour hands so

that a traveler can see, at a single glance, the current time in his present location and in his home time zone.

When the wearer crosses the boundary of a time zone, the golden hand can be reset in hourly increments to match the local time, while the blue steel hand continues to show the hour in the home or reference zone. An additional day-night indicator shows whether it’s a.m. or p.m. in the wearer’s home zone. When the traveler returns home, the two hour hands move in unison, one above the other.

But this by no means exhausts the innovative potential of Caliber MB M16.30, which has 304 components and measures 38.4 mm in diameter and 7.9 mm in height. To ensure that jetlag doesn’t lull the watch’s owner into forgetting to wind the watch, which stores enough energy for 55 hours of uninterrupted operation, the “southern hemisphere” of the dial, which is embellished with hand-decorated *guilloché*, offers a new and patented display, beneath which a little planetary gear works to show the current status of the barrel and — in an unprecedented tour de force — conveys the information not merely to one hand, but to two. Only the golden hand is visible if between 12 and 55 hours of power remain. If the watch still hasn’t been wound, the situation becomes critical and a little red



A fascinating performance: one part of the Metamorphosis's dial disappears on command to make space for the hand-type date display.



hand slowly leaves the shadow cast by its golden brother and indicates the gradual decline of the last remaining power reserves. Although as many as 12 hours of running time may still be available at this point, the level of torque in the mainspring is waning significantly, which causes the balance's amplitude to decline accordingly and this, in turn, detracts from the accuracy of the rate. This single-button chronograph, with column-wheel control and horizontal wheel coupling, belongs in the finest category of horological artistry. The Grand Chronographe Régulateur is available only in an extremely limited edition: the one-of-a-kind platinum versions are joined by eight watches in white-gold cases and another eight in rose-gold cases.

#### MUTABILITY PAR EXCELLENCE

Anyone who wants to acquire one of these very innovative, technically and visually unusual, white gold wristwatches would be well advised to hurry: Montblanc intends to manufacture only 28 pieces of the spectacular Metamorphosis. The watchmakers Johnny Girardin and Franck Orny are the godfathers of this creation, which contains the base chronograph Caliber MB M16.29. Not only have they conceived a wristwatch with two functions; they've also designed a matching and uncommonly changeable dial. Mutability itself isn't new among mechanical timepieces, but the innovation in the Metamorphosis lies in the apparently simple alternation between a wristwatch with a hand-type date display and a chronograph with an elapsed-minutes counter. Operating a slide triggers the transformation.

## IN THE EXOTOURBILLON, THE BALANCE IS LARGER THAN THE TOURBILLON CAGE.

This transformative mechanism is sui generis and based on chronograph Caliber MB M16.29. The spectrum of modifications begins with an off-center hour hand below 12 o'clock. This hand turns above a dial marked with Roman numerals. In the middle, the minute hand moves in retrograde fashion above a 270° arc, and the large seconds hand turns continually in circles. A hand-type date display completes the dial at 6 o'clock. The slide on the case's left-hand flank triggers the metamorphosis from a watch with a date display to a chronograph. This fascinating ballet transpires in 15 seconds. Its final act consists of an elevator-like alteration in the southern half of the dial, where the date display morphs into the chronograph's counter for 31 elapsed minutes. The cadrature that's needed to accomplish this change contains 80 components and is a mere 4.3 mm thick. The entire Metamorphosis includes 567 elaborately crafted parts: 252 components for the base chronograph Caliber MB M16.29 plus 315 parts for the additional functions. Incidentally, the rights to the intellectual property of these technical achievements belong to the two watchmakers, who can take those rights with them to use as starting capital for their newly founded business, Télôs Watch SA, which is headquartered in La Chaux-de-Fonds.

#### MYSTERIOUS WHIRLWIND

The tourbillon, which literally translates as "whirlwind" and was invented in 1801, performs the important task of compensating for the adverse influence that the Earth's gravitational attraction exerts on the precision of a mechanical watch held in the vertical position. For Montblanc's Grand Tourbillon Heures Mystérieuses from the Collection Villeret 1858, a team of thoroughly qualified artisans renders homage to the noble principle of deceleration. Handcraftsmanship in the tradition of their forefathers is a matter of honor for this team's members. The use of electrically powered machines is prohibited for the beveling and polishing of steel parts. Human hands guide old-fashioned tools, some of which are made or modified by the watchmakers themselves. Thus, each component is already unique when it's manufactured. From a technical point of view, master watchmaker Demetrio Cabiddu has conceived a device endowed with numerous exceptional features that set it apart from other contemporary tourbillons. Its rotating steel cage is 18.4 mm in diameter. Inside this cage, the completely handmade duo of balance and Breguet hair-spring swings at a leisurely pace of 18,000 semi-oscilla-



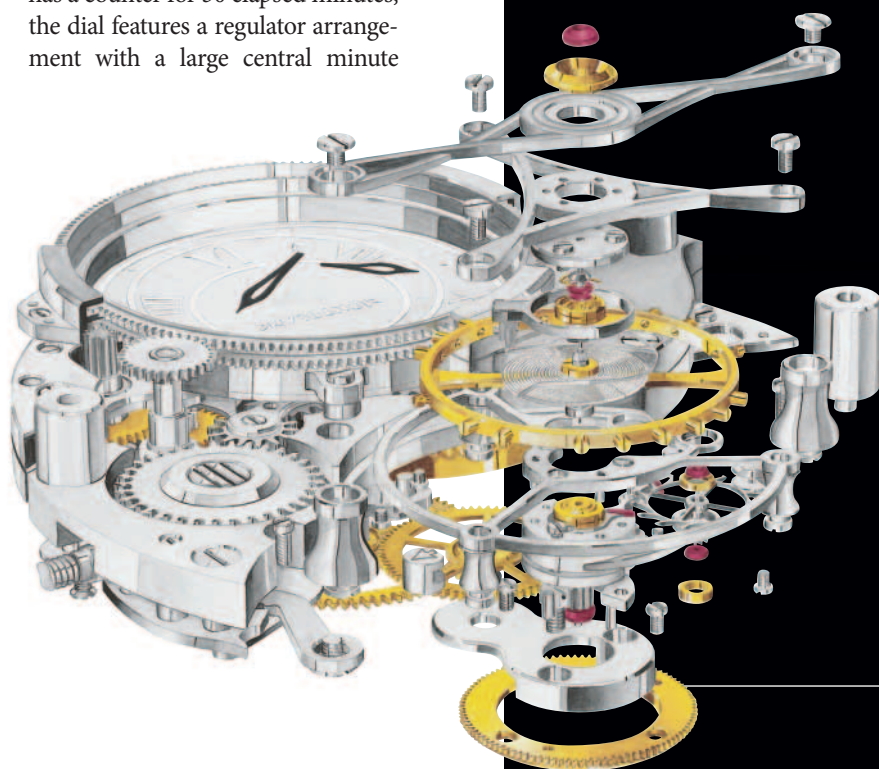
Unique tourbillon: the diameter of the balance of the ExoTourbillon Chronographe is larger than the rotating cage.



tions per hour. The time display causes laymen's jaws to drop because the hands for the hours and minutes rotate with seeming weightlessness in front of a mirror. But this isn't actual magic: the hands are printed on two thin disks of sapphire that are propelled via fine teeth cut around their peripheries. It's understandable that this return to chronometric tradition is manufactured in very small numbers. There are only eight watches in white gold and another eight in rose gold. Each case is 47 mm in diameter.

### THE EMANCIPATION OF THE TOURBILLON

There have been countless inventions throughout the 700-year-long history of watchmaking. Many that delight today's aficionados already existed in one form or another decades or centuries ago. But Montblanc's ExoTourbillon Chronographe, which was launched in 2010, is another story altogether. Its tourbillon is unique and unprecedented because the diameter of the balance is larger than the diameter of the rotating cage. This is made possible by positioning the former outside the latter. The chronograph has a counter for 30 elapsed minutes; the dial features a regulator arrangement with a large central minute



Only 16 pieces: the Grand Tourbillon Heures Mystérieuses. Left: a technical drawing of tourbillon Caliber MB M65.60





*Demetrio Cabiddu has directed the manufacture in Villeret for the past 10 years.*

hand, off-center hour indication, small seconds and depiction of a second time zone, including a day-night display. Inventive technicians have positioned the balance above the tourbillon's cage, which completes one rotation every four minutes. This sandwich-style architecture produces three advantages. First, the balance can oscillate 18,000 times each hour without being influenced by the rotations of the cage. Second, the balance's maximum diameter is no longer limited by the dimensions of the rotating carriage: the heavy balance, which is borne on two jewels, can be noticeably larger than the tourbillon, which is visible only in the background and borne from below at two points. Third, and finally, this intelligent construction consumes about 30 percent less energy than conventional tourbillons, which leaves more power for the classical single-button chronograph with column-wheel control and horizontal wheel coupling. Assembly and fine adjustment are performed entirely by hand. In this time-consuming procedure, watchmakers conscientiously scrutinize all sequences through their loupes. In meticulous manual labor, the contact surfaces where the chronograph's levers touch the column wheel and the heart cam are gently abraded with 1/100-mm precision. Only small numbers of watches can be produced by such labor-intensive methods. Thus, there will be only one ExoTourbillon Chronographe in a platinum case, plus eight in white-gold and eight in rose-gold cases.

### BREATHING TOWERS

Without their tiny hairsprings, mechanical watches would be lifeless creations. If the balance spring is removed from the movement, the balance wheel swings

only until it reaches the end of one arc, where it stops and remains motionless. Not solely for this reason, watchmakers devote great attention to this component. For example, in the 18th century they experimented with cylindrical, spherical or conical hairsprings which were intended to ensure that the amplitude of the balance exerted no influence on the duration of each vibration. Specialists use the term "isochronism" to describe this state.

The English watchmaker John Arnold is the father of the tower-shaped balance spring, which he developed in 1782 for use in highly precise marine chronometers. The height of the spring is more or less irrelevant in a large, seagoing clock, but it mustn't be too tall if it is to be inserted into a pocketwatch or wristwatch. Montblanc's Tourbillon Bi-Cylindrique successfully squares the proverbial circle: inside this large, hand-wound movement, two tower-shaped hairsprings with unequal diameters collaborate to achieve an ideal rate performance. As far as their functionality is concerned, there's no fundamental difference between flat and cylindrical hairsprings. In the former, the coils are coplanar and progressively larger in diameter, which can cause a miniscule but nonetheless noticeable eccentricity in the spring's center of gravity. In contrast, the diameters of the coils of a cylindrical hairspring are all exactly identical, which efficiently counteracts center-of-gravity errors. Furthermore, the "breathing" of tower-shaped hairsprings is almost perfectly concentric and symmetric. This concentricity and symmetry are essential prerequisites for isochronism. In the Tourbillon Bi-Cylindrique, Montblanc uses two cylindrical hairsprings with unequal diameters but identical torque. The pair is positioned concentrically, with one spring inside the other. The inner spring dilates and the outer spring contracts during the first

"breath," then the inner spring enlarges and the outer one shrinks during the next "breath," and so ad infinitum. This system is a world premiere in wristwatches.

Like its counterpart in the Grand Tourbillon Heures Mystérieuses, the nickel-silver plate has a stately diameter of 38.4 mm. It needs this ample size in order to accommodate the large tourbillon, which is 18.4 mm in diameter, rotates once each minute and has 95 individual parts, but weighs only 0.96 gram. The big Glucydur balance measures fully 14.6 mm in diameter and has a moment of inertia of 59 mgcm<sup>2</sup>. The hand-wound caliber consists of 284 components. Curious connoisseurs can clearly see exactly how the two disks that indicate the hours and minutes are propelled. Along with one watch in a platinum case, there will also be eight in white-gold and eight in rose-gold cases.

### A VERY HUMAN AFFAIR

Mechanical wristwatches of the highest level would be inconceivable without the contributions of experienced, extremely competent human beings. Cabiddu, a boss without affectations, conducts the carefully chosen orchestra of artisans in Villeret. A native of Sardinia, Cabiddu's resume is extraordinarily impressive. He came to Switzerland at age 15. After completing a classical watchmaker's apprenticeship at Lémania, he remained loyal to his alma mater for 10 additional years. Starting in 1981 and partly in collaboration with professors at the school of watchmaking in Vallée de Joux, he developed various tourbillons. Five years later, the path of his career led him back to Lémania, where he was responsible for the prototype department. He became director of Gérald Genta's small and very fine atelier for watch movements in 1991. When Cabiddu was offered the position of technical director of the time-honored Minerva Manufacture in 2001,

he didn't hesitate for long. His life-long dream came true in Villeret because there he could develop and build watch movements in the traditional manner. The greatest possible range of manufacturing has always been cultivated there, including in-house production of hairsprings. The uncompromising methodology continued in 2006, when Minerva became part of Montblanc. The master watchmaker had always been waiting for the opportunity to devote himself to the finest chronographs, superlative tourbillons and unconventional combinations of these additional functions. As director of the Institut Minerva de Recherche en Haute Horlogerie, Cabiddu has been in top form for the past five years. He has achieved his long-cherished professional goal: "Everything is made here, and we can make almost everything here. Our degrees of horological freedom are unique. This is a once-in-a-lifetime opportunity. I count myself exceedingly fortunate that I, of all people, have been given the chance to take advantage of such extraordinary possibilities."

This viewpoint is shared by Hugo Lopez, who directs the technical of-

fice. Lopez and his colleagues' work forms the basis for all new items. "Whatever leaves our computers and heads toward the workshops must not only function in practice as a one-of-a-kind piece, but also as a small-series product," Lopez explains. A native of Spain, he developed the innovative power-reserve display for the regulator chronograph. "We wanted to create something unique with our indicator, which depicts both the entire energy reserve and a genuine power reserve before the watch stops running. To accomplish this, we consciously accepted the necessity of greater technical and horological complexities." Specifically, these involve a little differential gear train, which is coupled to the barrel. The idea is derived, of course, from automobiles, which remind their drivers when it is time to refuel. "For more than three months, I intensively occupied myself with the technical realization of this innovative principle. There were no predecessors for me to rely on," Lopez re-

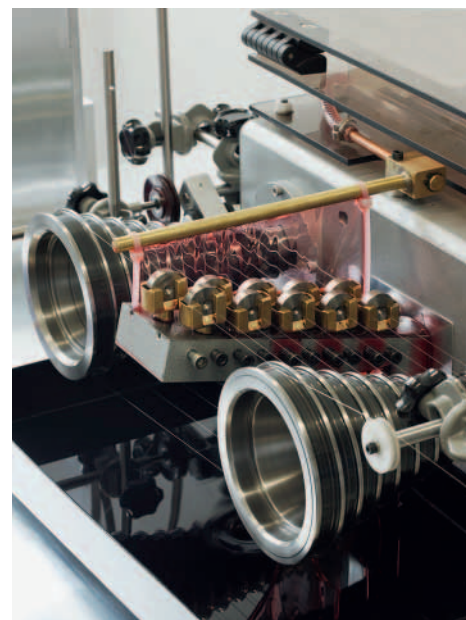
calls. When everything functioned as desired on the computer monitor and the team had savored every detail of the well-conceived solution, the data were conveyed via electronic interface to the in-house prototype-makers, who quickly proved that they are scrupulous sticklers with a decidedly practical viewpoint. Questions, critiques and constructive suggestions were soon forthcoming. "The ongoing dialogue between theory and practice, along with several optimizing steps, ultimately resulted in a reliably functioning mechanism with genuine added value."

Anyone who peers over the shoulders of Anaïs Hamel and Leïla Ruffieux when they're seated at a computer monitor or a drafting table will quickly understand the visual perfection of all watches from Villeret. These young but experienced designers give an attractive face to the technical creations. Each of these women inspires the other in her creative and artistic métier. "It's

*Below, far left: Jean-Paul Goidet bevels a chronograph's zero-return lever.*

*Below, center: Monique Wyssmueller gives an upward bend to the end of one of the Breguet balance springs that Montblanc produces in-house in Villeret.*

*Below: The diameter of the spring's end is a mere 0.05 mm — thinner than a strand of human hair.*







*Squaring the circle: two tower-shaped hairsprings interact to improve the rate performance of the Tourbillon Bi-Cylindrique.*

## ***SOME PARTS, LIKE DIALS, CAN BE INDIVIDUALIZED ACCORDING TO CUSTOMERS' REQUESTS.***

very valuable to be able to quickly consult with the person sitting opposite me,” the ladies explain in unison. The highly diverse requirements constantly keep them on their toes. Projects such as the innovative Metamorphosis pose unique challenges far from the beaten paths of conventional watchmaking. “Our work sometimes involves very lengthy processes,” Ruffieux says. And Hamel agrees: “It often happens that I find myself thinking about my work in the evening or during the night. Some tasks simply won’t release their hold on me. And then there suddenly comes the moment when I shout, ‘Eureka!’” A large box with a broad palette of aquarelle pencils testifies to the duo’s dexterity and artistic talent, both of which are indispensable when designing the materials that accompany every Montblanc wristwatch from Villeret. The hand-colored graphics that these two designers create are veritable works of art suitable for hanging in any living room. Customers who buy small-series models receive elaborately manufactured prints, and each one-of-a-kind watch is sold along with a valuable original graphic. Montblanc and Minerva strongly prioritize individuality; no customer is obliged to settle for “off the rack” merchandise. For example, if they so desire, customers can have the dials specially designed

according to their personal tastes. While this option is rather expensive, many find that the unique character it gives to the timepiece is well worth it.

Jean-Paul Goidet knows all too well that nobody’s perfect and that the result of several hours’ work can sometimes end up in the dustbin. With his marvelous hands, he does not produce trash in any noteworthy amount, but accidents can always happen when he’s finely processing tiny steel parts. The coordination between the eye and the hand under the high-intensity beam of a special lamp, and through the magnification of a watchmaker’s loupe, is somehow also dependent on how he’s feeling on any given day. It’s nearly impossible to correct an error on a manually beveled edge. Each stroke of the file must be exactly right. Each one must be identical with the preceding one so that the resulting surfaces will be perfectly smooth and flat. Micromotors with rotating corundum discs are banned from this Frenchman’s workbench. He lords over an array of tools that look as though his forebears might have used them. When he has completed his work, which takes more than four hours if the workpiece is a chronograph’s coupling lever, one can recognize the finely processed component only from its silhouette. “I receive the parts in their raw state, exactly the way they come from the machine. All the rest is my responsibility.” Accurately filing 45° angles is only one facet of his work. Polishing to achieve the special aesthetic of a luxury watch requires five or six different operations. Only afterwards do the reflections of light — which can appear black, gray or white depending

on the orientation of the object — all go in one and the same direction. The satin finishing, also performed by hand, gives the flanks a velvety surface. Needless to say, the finished piece must fit perfectly into the functional geometry of the entire ensemble. For this reason alone, additional material cannot be abraded away if, contrary to expectation, anything has gone awry. The quality criteria, which must be upheld, are stipulated by Cabiddu. “That’s why we’re not under time pressure here. Quality takes precedence over quantity. In the end, nothing counts but perfection.”

#### THE ART OF BENDING A BREGUET HAIRSPRING

Monique Wyssmueller also believes this credo. Ever since she first trained for the career of a *régleuse* (timer), she has lived for the souls of ticking timepieces. And since 2000, Wyssmueller has been the sensitive “soul-maker” at Minerva. She often sits in front of a little regulating device of the kind her grandfather might have used. Mounted inside it is a hairspring, the active length of which needs to be adjusted. She explains one of her favorite activities: “Below, in the drum, an ordinary balance with a hairspring completes 18,000 hourly semi-oscillations. My unadjusted hairspring, the outer end of which I’m holding with these forceps, oscillates along with its balance exactly above it. I have to keep changing the holding point until they both vibrate in perfect synchrony. That’s when I’ve found the right length.” Of course, in today’s computer age, a task like this one could be performed electronically and thus quite a bit more quickly, but as long as Cabiddu’s word remains law in Villeret, no road will lead in that direction. This workplace is located directly alongside the little room where the delicate hairsprings receive their final adjustments. Wyssmueller’s job is to alter and adjust these tiny springs so that, in interaction with their balances, they maintain the correct pace to within a tolerance of 10 seconds. “The remaining fine tuning is for the watchmakers during the final timing.” The spirally coiled springs are as flat as flounders when they first arrive at Wyssmueller’s workbench. She cannot describe in words how she shapes a Breguet balance spring: “The process has become part of my flesh and blood.” The utterance has scarcely left her lips when her skilled hands move at the focal point of her watchmaker’s loupe — and presto! The first upward curve appears. “One never forgets how to do this, not even after years have gone by.”

The diametrical opposite of Wyssmueller’s delicate work is represented by Olivier Hadorn, a by-no-means coarse gentleman tasked with the coarser work. He’s the uncrowned king of his realm, which is populated by 20 well-aged and mostly gray machines whose appearance shows that they’ve been serving the world of watchmak-

ing for many decades. It takes practice to handle these devices. Each of them has its quirks, but also plenty of unique strengths. The latter include high precision and longevity, without which this illustrious team would long ago have been obliged to surrender the stage to computer-guided, fully automated machinery. “Look at this horizontal drilling machine,” the master toolmaker says. Hadorn carefully allows the tip of a slender drill bit to disappear into the flank of a plate. “This hole fits 100 percent. For my former employer, I was responsible for components in which the tolerances were 1/10,000 of a millimeter.” Diversity characterizes Hadorn’s spectrum of tasks. He makes and, naturally, also services the tools that his colleagues use to produce tiny and delicate components. From time to time, he descends below ground level, where martial-looking presses that seem to come from prehistoric times wait

their turn to press tiny components from solid blocks of metal, a task accompanied by deafening noise and tons of pressure. “For these parts, the 1,100th piece is still just like the first one. We’re talking zero deviation here.” On the other hand, Hadorn knows from experience that “computer-guided production machinery must be regularly checked and adjusted, because the set values can change after [making] only 20 parts.” Continuing to use stamps such as these is also a luxury. Each tool costs several thousand Swiss francs. Dividing that sum by the small quantities that are produced here results in rather expensive costs per piece. But that’s not a problem because nothing but the best is good enough for Montblanc’s Collection Villeret 1858. This philosophy is in keeping with the view espoused by the Ancient Roman statesman Marcus Tullius Cicero, who declared, “*Omnia praeclara rara*” — “Everything excellent is rare.” ○

*Only one piece in platinum: the Grande Chronographe Régulateur with second time zone and power-reserve display*

