

F.P. JOURNAL

2023 EDITION

From a unique watch to an exclusive series

INSIDE THE HEAD OF A WATCHMAKING GENIUS

Watchmakers who revolutionise their art do not appear in great numbers every century. You can count them on the fingers of one hand. When you are lucky enough to know one of them, to be able to ask him questions in order to try to understand what drives him and what has led him to create timepieces that have set milestones in the history of watchmaking, you don't miss out.

I met François-Paul Journe in 1999, the year he created his Tourbillon Souverain, which revolutionised this complication patented in 1801 by Abraham-Louis Breguet (1747-1823). The year also when he gave me his first interview. Following him over the years, listening to him recount his latest inventions, his temporary stops or his backward steps that allow him to move forward...

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F.P.JOURNE FFC: SWITCHING TO DIGITAL TIME

In anticipation of the production of a small series of a time-piece inspired by the FFC Blue prototype, a unique piece for Only Watch 2021, it seems useful to revisit its genesis and its unique way of reading the time, made possible by a hand whose fingers come to life as the hours pass.

The story of how the FFC Blue was created is like a fairy tale and for this reason deserves to be told again for those who do not know it. It began in 2009 when Mrs. Eleanor Coppola, Francis Ford Coppola's wife, gave her illustrious filmmaker husband the Chronomètre à Résonance, which she found chic and elegant. Delighted with the gift, he immediately sent an invitation to its creator to come and meet him at his "Inglenook" winery in the Napa Valley. When they met in 2012, they discussed the...

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Editorial François-Paul Journe

The second-hand market and its implications!

For the past few years, the watch market has been very pressing for several watch brands. F.P. Journe is part of this small leading group, indeed, the results of the sales of (earlier) watches that are no longer in production have reached truly extraordinary prices. For example, a Tourbillon Souverain Souscription that I sold for CHF 27,500 in 1999 has happily exceeded CHF 2,000,000 while the Chronomètre à Résonance N°1 made in 2000 was sold for CHF 3,000,000. The models that followed, for example those of 2004, have minimum values of about CHF 300'000.

Regarding the watches we donated this year, the Chronomètre Optimum for the "Ball in Monaco" in Singapore surpassed CHF 1,000,000 and more recently, the Octa Automatic for Action Innocence was sold for CHF 1,000,000.

These results create a real worldwide market for F.P. Journe watches, which now includes newly manufactured models! The small limited editions are mainly affected by speculation, so after 2024, I will stop making limited series.

Since I don't want to move from our building in the Old Town of Geneva, there is no question of changing our way of working. It is even less conceivable to double the production, which would only lead to a lower quality. As a result, speculation is on the rise.

What to do about it? We are trying to better control the distribution by drastically reducing the number of independent retailers in favor of our Boutiques, the next one being located in London.

In spite of this, it still happens that collectors sell their watches secretly. We manage to find them sooner or later. The penalty is not too severe, this person finds himself at the end of the waiting list with the impossibility of buying a new watch for a few years.

A word of advice: if you want to dispose of one of our watches, go through us directly if you want to stay in the family.

Finally, let's move on to something more exciting! This year, I decided to launch the FFC, a watch made in collaboration with our friend Francis Ford Coppola. Of course, with a different aesthetic than the Only Watch prototype. Since we're on the subject, 2023 will bring us the new Only Watch creation, for which I'm preparing a little surprise.

Here I will finish with a phrase I am particularly fond of: As you know, and because I know you appreciate us for who we are, the limited production of F.P. Journe watches will never change - because the excellence of our work requires it.

François-Paul Journe



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Inside the head of a watchmaking genius

BY ISABELLE CERBONESOHI

In a long interview, the master watchmaker explains the origins of four founding timepieces of his brand: the Tourbillon Souverain, the Chronomètre à Résonance, the Sonnerie Souveraine and the Astronomic Souveraine. In a series of four chapters, he explains the genesis of these four models, their *raison d'être*, but he also reveals his creative process, the work in progress and his ultimate quest.



Tourbillon Souverain
Ref. T

Watchmakers who revolutionise their art do not appear in great numbers every century. You can count them on the fingers of one hand. When you are lucky enough to know one of them, to be able to ask him questions in order to try to understand what drives him and what has led him to create timepieces that have set milestones in the history of watchmaking, you don't miss out.

I met François-Paul Journe in 1999, the year he created his Tourbillon Souverain, which revolutionised this complication patented in 1801 by Abraham-Louis Breguet (1747-1823). The year also when he gave me his

first interview. Following him over the years, listening to him recount his latest inventions, his temporary stops or his backward steps that allow him to move forward, it is difficult not to grasp the uniqueness of the character, and consequently, of his creations. This is due to his perfect mastery of his art, his scientific mind, his deep knowledge of watchmaking history, his thoroughness, but also to his intellectual availability, which allows him to find uses for unexpected discoveries.

François-Paul Journe is a hard-working watchmaker but for him, the creative process does not depend solely on the hours he spends

with his pencil in his hand and the drawings that result. Things are also born of flashes of inspiration, of intuitions that can happen anywhere, at any time.

Some of his creations have advanced the world of watchmaking, even if he denies it: the Tourbillon Souverain (1999), the Chronomètre à Résonance (2000), the Sonnerie Souveraine (2006) and the Astronomic Souveraine (2020). After all these years, I wanted to understand the *raison d'être* of these creations, their genesis and above all their spirit, during a long interview. The result of this conversation is a four chapters story, each dedicated to a watch.

This series is aimed at enthusiasts of fine watchmaking but also at history lovers. To explain his approach, François-Paul Journe places his creations in their historical context. An object is not born by chance and a watch is much more than an object...

The first chapter is dedicated to his tourbillon with a "remontoir d'égalité", named Tourbillon Souverain and created in 1999. Sold by subscription as Abraham-Louis Breguet did before him, the 20 models quickly found takers. But François-Paul Journe's watchmaking is evolutionary: just because he has created a model that works does not mean he will keep it as it is: he always tries to make it evolve. In 2003, he therefore created a new generation of Tourbillon Souverain with a deadbeat second (*the hand remains stationary until the second has elapsed, editor's note*) which makes a jump, like on a quartz watch. Then in 2019, it launched a new version: the Vertical Tourbillon Souverain, with a regulating organ placed not horizontally but in a vertical position. But back to the original model... It was in 1999 that he launched his first tourbillon wristwatch with a "remontoir d'égalité", a device that "equalises" the energy sent to the escapement.

Before even beginning the interview, François-Paul Journe warns: "Watchmaking, even the one I make, is a fossil science, because we no longer need it. We're playing with completely useless concepts from the 18th and 19th centuries, but which make people dream." And so, with absolute calm, the master watchmaker affirms that what he

has been working on passionately since 1983, when he completed his first tourbillon pocket watch with a "remontoir d'égalité", is a flamboyant art of the useless...

EPISODE 1

THE TOURBILLON SOUVERAIN

Why did you choose to create a tourbillon with "remontoir d'égalité" as your first wristwatch? I always start with a historical base and then develop it further. It's like cooking: you mix ingredients that will improve the result. There had been tourbillons before, but not with a "remontoir d'égalité" and even less so on a wristwatch. This timepiece was an evolution of the tourbillon.

In order to obtain a more constant force that reaches the escapement, why didn't you choose an alternative: the fusee or the stopwork? Because these solutions are archaic. The day we made good springs, we stopped using fusee.

Did you create this model to continue the adventure of your first tourbillon pocket watch with a remontoire from 1983? No, not at all: if I had had to miniaturise that pocket watch, it would have been a Chronographe Souverain with a tourbillon. When I created the Tourbillon Souverain, the fashion for pocket watches had passed. During the 1970s and 1980s, watch collectors were collecting 16th, 17th, 18th and 19th centuries pocket watches. In 1980, they would not have wanted a Patek Philippe wristwatch with triple complications. At the time, they found it uninteresting. Collectors liked pocket watches because they could hold them in their hands and the time was visible.

How did collectors' interest in wristwatches evolve? They started to appear at auctions under the impetus of Osvaldo Patrizzi (co-founder of the auction house Antiquorum, editor's note) around 1985, because he was looking for an alternative to pocket watches: their price was starting to fall. Shortly afterwards, I made my first wristwatch. The world was changing and



Chronomètre à Résonance
Ref. R

I adapted. My technique had also improved: when you start in this business, you gain valuable experience by working on a larger format.

My 1983 pocket watch was fully influenced by Abraham-Louis Breguet, as was George Daniels'. The 1991 watch was a tribute wristwatch, with the tourbillon cage according to Dunand, the Breguet hands, the way of placing the small hour dial on the plate in the style of Ferdinand Berthoud's marine chronometers, a remontoir d'égalité which represents the Grail of watchmaking, because it aims at making the oscillations isochronous. But the real Grail is the constant force, the real one, where each impulse is of the same quantity.

Is the absolute constant force attainable?

No, because it all happens in the escapement and the parts that have to be added to the escapement to achieve it will create friction that will alter the movement. Anthony Randall created a clock with a true constant-force escapement, but he couldn't have done it on a watch scale.

Several watchmakers - Jobst Bürgi, Thomas Mudge, George Daniels and others - have interpreted the principle of the remontoir d'égalité in their own way. What is your own interpretation?

When I made my first watch, George Daniels had just created a tourbillon with a remontoir d'égalité. A collector in Basel, who was angry with him, came to me and asked me to create a tourbillon with a "remontoir d'égalité" to annoy George. I went away for the weekend, looked at a picture of George's watch, I thought his winding-mechanism was too complicated as it didn't reset itself, but I couldn't find an alternative. On Tuesday, as I did every Tuesday morning, I went to the Arts et Métiers Museum in Paris to wind the clocks and suddenly a small regulator with a "remontoir d'égalité" gave me an idea. Immediately I had a flash and I found the solution to create my own. I went back to the

workshop, drew my project in five minutes. The collector came, I showed him the drawings and he ordered the watch.

What was that solution?

The one I have adopted on all my watches: a lever that resets itself with a spring. I liked that because it was simple. And it couldn't fail due to a shock. There are a lot of "remontoir d'égalité" that disarm themselves when they reach a weakness in force and the timepiece doesn't start again. My self-winding system was ideal and I put it everywhere.

How many movements have you designed so far?

I have never calculated all the movements I have designed. Since I started, I've launched almost one a year. In my opinion, there are about 21 calibres plus the variations on the 1300 (automatic) and on the Résonance.

Why did you give the name "Souverain" to this tourbillon?

It was 1998, I was leafing through a watch magazine at the watchmaker Jean-Pierre Jaquet, in La Chaux-de-Fonds and I was reading the headlines: "Imperial Tourbillon by Franck Muller", "Royal Tourbillon", etc. I suddenly said to myself that I was going to call mine "Souverain" because a sovereign is above everything! (laughs).

EPISODE 2

THE CHRONOMETRE
À RÉSONANCE

In 1999, François-Paul Journe presented two watches in Basel: a tourbillon chronometer with a "remontoir d'égalité" and a resonance chronometer with a double movement, in order to achieve unequalled precision. "When

worn, it loses less than a second a week," said François-Paul Journe.

Something magical happens when two balances resonate. And yet magic has nothing to do with this process, which is based on physics: every object emits and receives a vibration. When two moving pendulums are placed together, one adopts the rhythm of the other. They resonate, harmonise and balance each other. The result is synchronised oscillation, which leads to better performance. The first physically visible research on this phenomenon was carried out by Antide Janvier (1751-1835) and Abraham-Louis Breguet in the 18th century.

In the autumn of 2001, François-Paul Journe acquired one of Antide Janvier's three resonance regulators at an auction conducted by Antiquorum, for the sum of CHF 1,488,500. The second was bought by the Patek Philippe Museum and the third is the property of the Paul-Dupuy Museum in Toulouse.

Can you explain in your own way this physical phenomenon of resonance, which, for a neophyte, is like magic?

It took me a long time to find a way to explain it: when I speak to you, your ear is in resonance with my voice, which is a vibration. When you listen to a watch, you hear it ticking. The ticking is the dispersed energy of the watch that vibrates the eardrum and escapes as noise. In the chronometer, it's the same thing: the two balances are in resonance because they are set to the same frequency. They absorb the energy of one and the other and resonate naturally, but in order to do this, all the components of the escapement must be perfectly finished, otherwise it doesn't work.

How do you explain the fact that since Abraham-Louis Breguet, so few watchmakers have been interested in this phenomenon?

It was Christian Huygens (1629-1695) who

first noticed this phenomenon and explained it, but there is no trace of an object he had made. The first watchmaker known to have made a resonance regulator was Antide Janvier, in 1780. He was brilliant but not a very good manager. After the French Revolution, he fell into disgrace and sold part of his workshop to Abraham-Louis Breguet, who helped him a lot. Breguet, who had seen his work, began working on resonance around 1810-1815, 30 years later than Janvier. He made three pocket watches and two resonance regulators, one of which was for King George IV of England and is kept at Buckingham Palace, and the other created for Louis XVIII. This one is at the Arts et Métiers Museum. It was while revising it that I was fascinated by the phenomenon of resonance, in the 1980s. At the time, it was at a standstill and was called a "double regulator". We thought it was pretty but we didn't know what it was for. When I had it serviced, I understood the system and became interested in it. The first order I received from a Parisian client in 1982 was for a resonance pocket watch. I made it but I was not sufficiently skilled to make it complete: it resonated a little, but not enough. I told myself that one day I would take up this project again. The trigger was in 1996 when Philippe Dufour brought out his Duality, which included a double regulator. It wasn't a resonance but it reminded me that I had this job to do and that's when I started to design the watch.

How would you describe it?

In 2002, George Daniels came here to the Manufacture. He asked to see my Chronomètre à Résonance and he said, "You had a lot of courage to do that. I think that's what best describes this watch: courage. He wanted to buy me one. I suggested that we exchange watches. I would have liked the one he was making at the time: he had made a series of 50 automatic calendar watches with a coaxial escapement. We hung out together, and in 2003 I suggested that we meet, but he replied that he was no longer working and the exchange never took place.



Sonnerie Souveraine
Ref. GS

Your first resonance watch of 1999 had two springs. In the latest model launched 20 years later, you have kept only one mainspring for both movements. Why did you do this?

I wanted to improve the watch. Thanks to a differential placed on the first wheel visible in the centre of the dial, the force of the mainspring is transmitted independently to the two secondary gears, each of which is equipped with an equal winding mechanism. As a result, the force received at the escapements is linear and isochronism is assured for 28 hours. I wanted to add a special escapement, which is currently under development, but fortunately I didn't because the watch wouldn't have been released (laughs)! When everything is new in a movement, it's like trying to jump an obstacle with sand under your feet. In order to jump, you need a lead foot. By using the same escapement as the first resonance watch, I had my take-off foot: I know it, it works very well, so I wasn't taking too many risks.

Do you intend to launch this new special escapement soon?

If it works, yes, if it doesn't, no (laughs). I am testing it with a Chronomètre Souverain. If it works, it will be used in all the watches. It is too beautiful!

What is its principle?

It is a free escapement, like a trigger, but without a spring. The detent escapements found in marine chronometers, without oil, with direct impulse, are great, but you need a lot of force to make them work. I made a lot of them: my first pocket tourbillons are all with detent escapements. But it works less well on a wristwatch. Watchmaking has to work with very little energy and the most creative solution, which works without oil and with little energy, is the Atmos clock invented by Jean-Léon Reutter. When

there is almost no friction, there is no need for lubrication. When you make watches, you have to go in that direction.

EPISODE 3

THE SONNERIE
SOVERAINE

It took François-Paul Journe six years to create his Sonnerie Souveraine and a lot of rage to complete this watch that gives a sound to the passing of time. He stopped producing it in 2019, but he has not closed the file...

The master watchmaker showed me the first version of his grand sonnerie in 2005. "But I was not happy with it. I took it apart and redid it. It took me a year to stabilise it", he confided a year later when presenting the final model. This piece, which he was reluctant to allow to be photographed, and not only because of its price of CHF 650,000 at the time, was the culmination of a long quest: six years of research and ten patents registered!

The result was of incredible elegance and finesse - 42 mm x 12.25 mm - while it carried one of the most difficult complications to achieve: a grand strike that must give 812 hammer blows during 24 hours, while a minute repeater gives 32 at most, by arming their respective springs. This is where the difficulty lies: in the phenomenal energy that must be found to achieve this. But the most astonishing thing about this piece, which could also be put into minute repeater mode, was the ease with which it could be handled. "The specifications were simple: for an 8 year

old", he confided. It is at the moment of winding and setting the time that things get complicated with grand strikes, at this precise moment that one risks a false operation, that there is breakage and that the watch ends up in the after-sales service.

How did you solve the problem of the risk of breakage when winding?

Instead of two springs and two barrels, as on the traditional grand strikes, which allow you to adjust the energy of the movement or of the striking-work as you wish, I only put one spring for the two functions and it can only be wound up in one direction. By a system of securities, at the time of the setting of the time, the striking is blocked and when the striking is engaged, there is no possible resetting. As for the power reserve, it takes into account the overall energy loss, thanks to a differential calculation. There is 24 hours of power reserve in grand strike mode and 5 days for the hour indication if the strike is not used. And when there are only three revolutions of the barrel left - about 24 to 30 hours - the striking mechanism is blocked to leave 24 hours of power reserve for the movement so that the hours continue to run.

When you first presented the Sonnerie Souveraine to me in 2006, you said, "This piece is a great lesson in humility." What did you mean by that?

Sometimes you have to keep your anger to yourself when things go wrong. There are great moments of loneliness. The most difficult part was the 2% that remained to be perfected. You have to work subtly to get a watch to strike 812 hammers a day! There is no other great grand strike that meets all our criteria.

Why did you stop it? To do the Astronomic?

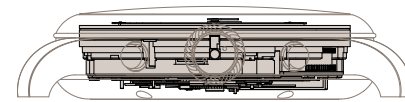
Yes. I didn't have enough hands. But I didn't give up: I'll do another one!

So we'll wait, knowing that it took you six years to create the first one...

Six years, but not forgetting the experience I accumulated when I developed a grand strike for Piaget in 1996. Piaget had made a book in 1993 and on one page there was a photo of a minute repeater under which it was written "Grande Sonnerie" (Montres et Merveilles de Piaget, ed. La Bibliothèque des Arts, page

58, editor's note). The brand's marketing department therefore decided to make a genuine grand strike. They put out a call for tenders, I won the contract and created 10 pieces. It was a watch with two barrels. The hammers were already positioned on the dial side and this model was the precursor of mine. In the 2000s, clients asked me to create a grand strike. I started to design one by eliminating all the mistakes I had made on the previous one, while improving it. The one I made for Piaget was supposed to wind both ways, but the customers didn't know how to use it and broke everything. I decided to launch mine only if it was unbreakable. Mine has only one spring for both functions - the grand strike and the hour display - and you wind it like a normal watch.

It has been patented no less than ten times! Yes, including a patent for not being able to wind it while it is striking and vice versa.



42 mm diameter steel case
overall movement height: 7.80 mm
movement diameter: 35.80 mm

It strikes hours, quarters and minutes. It gives 812 strokes of the hammer for twenty-four hours. How did you manage to save all the energy needed in the heart of a wristwatch, which, because of its small size, has a limited energy reserve?

It doesn't need a lot of energy: it needs enough energy. The secret is a whole composition: it's the gear paths, the size of the racks, the bigger they are the more precision you have... It's not the striking force that counts, but its inertia.

How has this watch improved the science of time measurement?

It has not improved anything: it has improved me! (And he bursts out laughing).



Calibre 1505
in 18K rose Gold, manual winding,
10 registered patents, number of components: 408 pieces.



Astronomic Souveraine
Ref. AST

EPISODE 4

THE ASTRONOMIC SOVERAINE

The Astronomic Souveraine is of noble lineage: it is the daughter of the Astronomic Blue, a tantalum prototype that François-Paul Journe created for the Only Watch auction in November 2019, the proceeds of which are used to finance research into muscular dystrophy. This unique piece was sold for CHF 1,800,000.

François-Paul Journe had foreseen that this prototype would be followed by a model that would join the Classique Collection. Thus in November of the same year appeared the Astronomic Souveraine in steel, a watch of apparent simplicity, despite its complexity, which combines no less than 18 functions and complications, including a tourbillon with a "remontoir d'égalité", a minute repeater, sidereal hours and minutes, a second time zone, the phases of the moon, a complete annual calendar encircled by the signs of the zodiac, an equation of time, indications of sunrise and sunset at 12 o'clock, and a natural deadbeat second.

It is quite unusual to see the sunrise and sunset indications in a single arched window at 12 o'clock. Usually, we find them on two distinct dials. François-Paul Journe opted for a metal curtain that shows the lengthening or shortening of the days. The reason for this choice is not only a question of watchmaking art but also of affection. The idea originated with a drawing by a teenager, Charles, the son of François-Paul Journe, who had depicted a watch with a curved window through which the course of the sun could be observed. The master watchmaker worked to bring this drawing to life.

After listening to François-Paul Journe explain the genesis of four founding models, identifying what makes him unique seemed obvious. And this is due to his creative process. He starts by searching in his mind for the solution to his problem, namely the fundamentals that will enable him to create a new watch that will bring something new to his collection first, and then to the world of watchmaking. It is usually a timepiece with a movement that runs as lightly as possible, even if his watches have a host of complications, and that comes as close as possible to his Holy Grail: ultimate precision.

In his mind, there is a knowledge of the history of watchmaking, of what has been done by his predecessors but also by his contemporaries, and a know-how that has been refined over the years and through challenges. But the solution is not always found there. This is where his genius comes in: François-Paul Journe knows how to listen to the sounds of the world. What does that mean? He listens, he looks, he gathers everything that comes to him. And in the midst of this new library of information, which may contain both his son's drawing or a regulator he restored when he lived in Paris, the solution appears, because he has known how to open himself up to it by going down other paths. The last episode of this series is dedicated to a watch, the Astronomic Souveraine, where he put everything he knew, everything he had done in the past and everything he let come to him...

For thousands of years, the sky has served as a time reference for humans. What prompted you to bring it down to earth?

If only I could do that! Like Patek Philippe's Sky Moon Tourbillon and models from other brands, we were missing an astronomical watch. I wanted to do something aesthetic.

What was your source of inspiration?

I had found a drawing of a watch my son had

made in 2003, with the sky passing through an aperture, but for years I couldn't find the solution to make this model. Initially I wanted the watch to be powered by the Octa automatic movement, with much simpler astronomical indications. I drew endlessly but it didn't work.

So I asked myself what I had done best in my life that I could use as a basis. And I remembered a pocket watch with a planetarium, a commission for a Parisian collector of scientific objects, which I had made in 1987. It showed the sidereal time, the equation of time, a complete calendar and a power reserve. From that moment on, the ideas came in! What other complication would work best with an astronomical watch? A minute repeater. And with it? A tourbillon with a "remontoir d'égalité" so as not to disturb the precision of the watch, because of all that the movement has to carry. I started to draw and followed my train of thoughts.

When looking at your creations, many words come to mind but the most obvious is "lightness".

This is the golden rule of watchmaking! The Astronomic works with the same barrel as the Chronomètre Souverain, in this watch there are two barrels, with a slightly stronger spring. Everything works well, with a lot of lightness. It is a large complication, but it remains fluid.

Unlike the Grande Sonnerie, you have not filed any patent. Why not?

Because I'm tired of giving anyone else ideas (laughs). I give the solutions, and others take them up and twist them slightly, as one brand did once with its pseudo Grande Sonnerie which never worked. In my patent it said "the rake in the centre of the watch" and they moved it by a millimetre so that it was not in the centre. If I had written in the claim "within 10 mm of the centre of the movement", they could never have built theirs the way they did. Now I make fake drawings and send the others on the wrong path (laughs). Even in anima-

tion, you see things that don't exist, but as no design office is going to buy an Astronomic to dissect it, no one can really see what I've done and so I don't need a patent.

In the first interview you gave me in 1999, you said that you had set yourself a challenge for the future: "to surpass the precision of quartz with a mechanical watch". Do you consider that you have succeeded?

No. I can beat a very bad quartz (laughs). My goal is to make the most accurate mechanical watch in the world. To achieve this, you have to eliminate two things: the oil and the imperfection of the balance spring, which cannot be completely isochronous. But I haven't yet figured out how to replace them. I have lots of ideas for replacing the balance spring. Perhaps we should go back to 16th century watchmaking, when the balance spring did not exist, combined with 21st century technology. This is basic research. One day I may catch a wire and pull it...



Isabelle CERBONESCHI
Editor-in-Chief
of ALL-I-C magazine

F.P.Journe FFC: switching to digital time

BY VINCENT DAVEAU

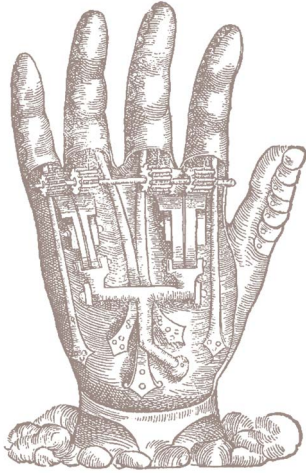


Illustration of Ambroise Paré's artificial hand.

In anticipation of the production of a small series of a timepiece inspired by the FFC Blue prototype, a unique piece for Only Watch 2021, it seems useful to revisit its genesis and its unique way of reading the time, made possible by a hand whose fingers come to life as the hours pass.

The story of how the FFC Blue was created is like a fairy tale and for this reason deserves to be told again for those who do not know it. It began in 2009 when Mrs. Eleanor Coppola, Francis Ford Coppola's wife, gave her illustrious filmmaker husband the Chronomètre à Résonance, which she found chic and elegant. Delighted with the gift, he immediately sent an invitation to its creator to come and meet him at his "Inglenook" winery in the Napa Valley. When they met in 2012, they discussed the different principles of representing the passing of time and the filmmaker asked if a watchmaker had ever considered displaying the hours in the way the ancients used to give them, by counting them on their fingers. The idea of ticking the 12 digits of the hours with 5 fingers had appealed to François-Paul who, in 2014, wanted to take up the challenge of inventing an animated hand capable of displaying it in the same way. His motivation led him to start prototyping the FFC Blue watch the same year, which was supposed to go on sale at Only Watch 2021.

HISTORY IN MOTION

After having found, with Francis Ford Coppola, how to present the 12 digits of the hours with a single hand and 5 fingers, François-Paul set out to design a mechanism capable of adequately transcribing these digits into digital signs. To avoid falling into naturalism, this artist, who is known to have a passion for history, like one of his

sons who today is a professional historian, chose to draw his inspiration from a drawing of a prosthesis made by the famous French barber-surgeon Ambroise Paré (1510-1590).

For those not familiar with him, he is the one to whom we owe, thanks to his competence and understanding of the human body, undeniable progress in medicine. The mechanised hand found on the front of the FFC Blue is inspired by the one developed by this Renaissance physician.

Initially thought in bronze by its inventor, the final hand for the watch was made of engraved titanium, used to reduce the weight of the moving components so as to not affect the energy consumption of the caliber, the Octa 1300.3 launched by the Manufacture F.P.Journe in 2001.

MANAGING THE AVAILABLE ENERGY

In order to use only the energy coming from the barrel, which ensures a power reserve of 5 days for the piece (but with a torque that guarantees 7 days of operation in total), the choice was made to install a "remontoir d'égalité" between the primary gear train and the display, as is done in the clocks of buildings when the hands to be moved are long and heavy. Every hour, and for 40 minutes, the "remontoir d'égalité", formed by a spring blade enclosed in a kind of barrel, a trigger and a sort of anchor mounted on one side on a wheel with an eccentric in its center, is re-wound by the movement.

On the hour, the mechanism described by François-Paul as a sort of escapement acting once an hour, is released so that the energy accumulated from the main barrel can, through the intermediary of this tangentially acting fork, set in motion the series of 10 cams whose purpose is to control the movement of the fingers of the hand. Placed on the left side and visible between the rotating minute ring mounted on a micro ball bearing with a fixed cursor placed at noon, they make one revolution in 12 hours, each one activating a series of springs and toggles acting on

the rise and fall of the 4 fingers, but also the translation of the thumb. The shape of the cams, associated with the teeth of each one, acts on the fingers which are mounted on a steel sling and which move then, practically without friction, like a loom shuttle. Thanks to this ingenious system, the energy required to operate one finger, four fingers between 5 and 6 o'clock as well as between 9 and 10 o'clock, is always the same and calibrated so that it is done in complete safety and, above all, without affecting the chronometry of the regulating group.

REINVENTING HOW TIME IS DISPLAYED

By means of miniaturisation work pushed to the extreme and seven years of incessant labor spent making the whole thing reliable, the

Jean-Léon Reutter did with the Atmos movement, which winds itself in a breath of air and whose mechanics require almost no force to run virtually perpetually. In the end, the Octa caliber is perfect for this approach because it has a constant and linear force and torque for 5 days as the watch is designed to run for 48 hours more. By optimising the friction and using only the smoothest part of the spring, we find a very linear torque that allows adding functions without being afraid that everything will stop. Here's the proof!

"The most important thing in watchmaking is what is least visible. In this case, it was a matter of getting five fingers to move with the least amount of effort"

master, supported by the skills gathered within his manufacture, has managed to integrate all the components of the automatic caliber and this astonishing anthropomorphic mobile into a case measuring 42 mm in diameter and only 10.7 mm thick. As a result, despite the complexity of the whole, this watch is no thicker than another model equipped with the same movement. To achieve this exploit, François-Paul eliminated the dial and replaced the minute hand, which was impossible to use in the traditional way, with a rotating ring mounted on a large ball bearing, as he did for the perpetual calendar of the Astronomic Souveraine. This modification made it possible to gain the few millimeters necessary for the placement of the articulated hand sculpted by a master engraver.

So in the end, what does this high-flying timepiece bring to the table besides its original display? It proves that the best way to make a complicated watch is to think about how to save energy in order to make it work without having to add any. As François-Paul says with humor, this original display mode is a reminder of how light the hand of the watchmaker must be when designing a movement. Ideally, and he used this example to explain his approach to the mechanics of this piece, a watchmaker would think the way



Vincent Daveau
Journalist specialized
in horology



*FFC
Instantaneous digital hours indicated by the
animated fingers of a Titanium hand,
rotating minutes dial, automatic calibre 1300.3
in 18K rose Gold with 22K white Gold
unidirectional oscillating weight.*

Reflections of a dream: In pursuit of high complexity timepieces

BY OSAMA SENDI



Within the large scale of the Swiss watch industry, F.P.Journe remains an independent manufacture, still presided over by its founding watchmaker, François-Paul Journe. Yet since its debut in 1999, the Manufacture has always aimed to produce a small and exclusive annual production of mechanical timepieces, slowly increasing their production year by year. Over the last 12 years and even today, at their peak, their production output remains at an average of 1000 mechanical timepieces per year, a small output restricted entirely by their capacity, not strategic choice.



Ateliers of the F.P.Journe Manufacture, 2001.



Ateliers of the F.P.Journe Manufacture today.

This small-scale relative production linked to its independent status slots F.P.Journe into a very unique segment within the industry, mostly unmatched. In essence, F.P.Journe is the largest of the small artisanal watchmakers, but the smallest of the large independent manufactures. This distinctive positioning makes the brand more accessible than some, yet still personifies the most desirable characteristics of haute horlogerie, which include exclusivity, rarity, and the finesse associated with fine watchmaking, i.e., its complexity, art, and beauty.

For F.P.Journe, an annual production averaging 1000 mechanical timepieces is somewhat like their magic production number which defines this positioning. However, it is often wondered how such a production output

comes to be and how has it not significantly expanded over the years. To better understand this, we have to discuss the complexities of the timepieces the Manufacture produces, and what exactly goes into the making of each watch. In addition and more importantly, we must also comprehend François-Paul Journe's watchmaking philosophy and what his desire is when it comes to producing timepieces under his brand name.

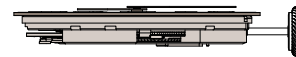
Regarding François-Paul's approach to watchmaking, his most coveted and important characteristic is to create something that does not yet exist, and further to do something that nobody else does. For him, great watchmaking is not copying the work of those before us or around us, but to add something new to the history and lineage of watchmaking. This pursuit challenges François-Paul to constantly pursue new ideas and develop them, despite how challenging they may be.

other manufactures, an F.P.Journe watch is not the result of a team's design concept that follows the financial departments goals, but an F.P.Journe watch is a single watchmaker's creation, that if successful, makes way to fulfil a dream of developing more and better timepieces. As Mr. Journe himself says, *"I am lucky that there are collectors who come to admire and purchase my work, if they didn't I would still create the watches that I like but with a lot less success."* *"Money is not our objective, it is a means to an objective."*

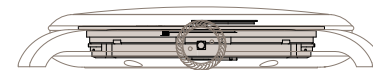
One of the prime examples that highlight this objective is that in 2004, the Manufacture invested a considerable sum into their own CNC machines, allowing them to produce in-house their own signature 18K rose gold movements. One would think that with such a large investment, logically the returns must be worth it, measured by an increase in production. During one of the Manufacture

"For F.P.Journe, it is always about developing ideas and creating timepieces that others do not know how to do, otherwise there is no point to exist"

One must come to appreciate that the Manufacture is an entire reflection and expression of François-Paul Journe's watchmaking, and aside from running and presiding over a successful watch manufacture, François-Paul Journe is first and foremost a talented master watchmaker. His timepieces and creations are purely a result of what he himself desires to create, not influenced by the trends of modern or contemporary watchmaking. Unlike



Movement dimensions:
overall height: 4.00 mm
overall diameter: 30.40 mm



Case dimensions:
overall height: 8.00 mm
overall diameter: 40 mm

1
Calibre 1304

Extra-flat movement in 18K rose Gold, manual winding. The two barrels of this homogeneous movement give the escapement a very linear force for more than fifty-six hours.

tours at the time, a journalist asked how many more watches they foresaw producing now that they have shifted their CNC machines in-house. The answer: “5 more watches.” Indeed a surprise that the increased output wouldn’t come anywhere near the price of the machinery, but the goal was not to pro-

(1); its thinness and the fact that the gear train runs beneath the dial poses a significant challenge to a watchmaker.

One of the well-respected traits of the Manufacture is that each watch is assembled A to Z and regulated by one single watchmaker,

ring into movements with higher complications. It is difficult to say how long it takes to make one watch because there are many factors that can differentiate the answer. That said, the complexity of a timepiece plays a significant role in its production time. Currently, the two most time consuming models are the Répétition Souveraine (RM) (2) and the Astronomic Souveraine (AST). The two models are only worked on by the most experienced watchmakers and still, on average, it takes a watchmaker an entire month to assemble the Répétition Souveraine, most of which is dedicated to tuning the sound of the repeater function. There is no clear timeframe as to when a watch will be completed because the answer is always based on the satisfaction of the watchmaker; adjusting the length of the gongs, encasing the watch, testing the sound, and repeating until satisfied.



2

Calibre 1408
extra-flat, 18K rose Gold, manual winding, overall height: 4.50 mm.

Functions:
hours and minutes, small seconds, power reserve, strikes the hours, quarters and minutes at will.

“
A dream towards a freedom to create what I want without relying on someone else
”

duce more, it was as François-Paul puts it, “A dream towards a freedom to create what I want without relying on someone else.”

Furthermore, throughout the years F.P. Journe has managed to acquire their own dialmakers and casemakers, namely “Les Cadraniers de Genève” and “Les Boîtiers de Genève”. Owning these two manufactures further allows François-Paul Journe the opportunity to design and create without exterior barriers. It is thanks to this ownership that models like the Chronomètre Bleu with its chrome blue dial and tantalum case can come to life. Surely, it is highly unlikely that another exterior manufacture would have allowed such a complicated timepiece to be a part of anything other than a limited edition model.

DEMANDING WATCHMAKING

In being different, and thinking outside the box, naturally every F.P. Journe creation is quite complicated to say the least. Even taking something as simple as a three hand Chronomètre Bleu movement, caliber 1304

a policy that was implemented from the first day and serves to teach the watchmakers to be responsible in their work, guaranteeing the timepiece throughout the warranty period.

Unlike other manufactures which operate on a stage assembly i.e., a watch goes through stages with each watchmaker specifically working on one part of the assembly before passing it to the next, F.P. Journe’s watchmaking policy is clearly not focused on an increased and efficient output but rather one of fine execution. A watchmaker receives nothing more than a kit of parts and an assembly guide of the movement. It is then up to the watchmaker to put their skills into play in understanding the movement, and further adjusting each component so it fits to function perfectly within the movement. For them, each watch is an experience A to Z, not merely the addition of a component.

Today, the Manufacture employs around 25 watchmakers distributed between the production of the entire F.P. Journe collection. Most watchmakers start working on caliber 1304 (Chronomètre Bleu/Souverain) before matu-



François-Paul Journe in the Manufacture’s ateliers.



3
Quantième Perpétuel
 Instantaneous perpetual calendar.
 Each date, leap year included,
 jumps in 0,016 of a second.

Still, the most complicated timepiece, the Astronomic Souveraine, houses 758 components, squeezed into a remarkably compact caliber (for its genre), and its entire production is the responsibility of two watchmakers. It takes each watchmaker an average of 3-4 months to produce one watch, ultimately resulting in a very limited production which again, is not by choice but rather by capacity. It takes a significant amount of time to fine tune nearly every single component to make sure the movement functions, before the watchmaker must disassemble everything, finish the parts, and then reassemble all 758 components again.

FINISHING IS TIME

It's not uncommon that when one observes an F.P. Journe timepiece, much of the thought is caught up with the finesse associated with the watchmaking itself. However, while 25 watchmakers work to assemble an annual production of complicated timepieces, they are supported by a small group of only 7 talented artisans, responsible in finishing all the components. While we can somewhat find an average timeframe as to how long it takes to assemble a specific model, the question of time is impossible to answer when it comes to decoration.

Certain small components are finished in batches, for example, the steel ratchet spring for caliber 1304, a small but visually attractive component. An artisan might receive 20 parts in one batch that must all be mirror polished. It can take anywhere between 5 minutes and 45 minutes to mirror polish just one part, and while the range is tremendously large, it is not uncommon either. There is no real answer as to why such a range exists within parts in the same batch, but each part has its own

unique characteristics beyond control. There is a certain element of surprise and mystery when it comes to finishing which adds to the savoir-faire of the artisan's approach.

Under the umbrella of larger components, a steel remontoir bridge has to be angled uniformly across all edges, before receiving its final mirror polish; a process which takes, on average, over an hour to complete... for one component! However, it is this style of crafted watchmaking that differentiates haute horlogerie from horology; a differentiation greatly appreciated by tasteful collectors and enthusiasts.

A FOCUS ON COMPLICATIONS

In recent years, there has been a significant increase in demand for F.P. Journe timepieces and this has sparked some conversation with Mr. Journe regarding perhaps increasing his production to meet the rising demand. For François-Paul, the Manufacture is always most importantly a dream-come-true rather than a business, and therefore, it is no surprise that he has reassured collectors on a yearly basis that since the Manufacture was built with respect to rarity, he has no desire to increase production.

Instead, the more recent exploded success has allowed him to shift focus towards creating complicated timepieces of quality that are distinguished for being uniquely that of F.P. Journe know-how.

As an example, instead of increasing the production of a highly demanded Chronomètre Souverain, the production has instead prioritized to shift more watchmakers to create timepieces like the Quantième Perpétuel (3), Centigraphe, and Chronographe Rattrapante,

which are more complex, and are more demanding to produce both in terms of resources and specifically time.

If the Manufacture were to solely produce the Chronomètre Souverain, perhaps they would make 3000 pieces a year. On the other hand, a Centigraphe might take three times as long to produce, leading to smaller quantities. A limited production averaging 1000 mechanical watches is simply the average number of timepieces the Manufacture can produce, splitting all their resources across a collection of complicated watches. The more complicated the production is, the less pieces they can produce.

“I am living, a dream right now.
I have no desire to turn
my passion into a business”

FRANÇOIS-PAUL JOURNE

The combination of François-Paul Journe's watchmaking philosophy combined with the craftsmanship and complexity in producing his creations attribute equally to the relatively small production of timepieces the Manufacture makes. While it may not be the financially logical approach to a business model, for François-Paul Journe, F.P. Journe is not a manufacture that compromises quality for numbers. It is, and always will be a reflection of his dream. A small, recognizable, and distinguished brand known for paying respect to the history of watchmaking, whilst also advancing history into modern achievements and standing out above the rest.



Osama SENDI
 F.P. Journe Collector
 and expert

Maison F.P.Journe

New York

BY OSAMA SENDI



Present in New York since 2009, F.P.Journe has moved from Manhattan's elegant Upper East Side to 53 Mercer Street, in the famous SoHo district. This 550 square meters showcase offers collectors and watch enthusiasts a unique meeting place based on a common passion, the love of Haute Horlogerie.

For more than 40 years, François-Paul Journe has been inventing and manufacturing precision timepieces. His watches reveal a singular vision of watchmaking that is uniquely his own and enchant admirers of authentic watchmaking. To reach this level of excellence, and in a constant quest for independence, he set up a vertical organization to control all the stages of production of the components, the assembly, but also the distribution of his collections in his own international network of Boutiques. And so it was that the first F.P. Journe Boutique opened its doors in 2003, in Tokyo.

Whether in Hong Kong or Paris, collectors will find the same thread running through an exclusive watchmaking universe with a refined, intimate and warm décor.

In keeping with the brand's identity, the new New York Maison is built around a large bar with small, cozy lounges, a library containing numerous books on watchmaking, and of course, sleekly designed display cases showing the collections of this extraordinary creator.

In the exhibition space, the visitor's gaze is naturally drawn to a large opening decorated with a magnificent chandelier created by Mexican-Brazilian artist Carolina Fontoura Alzaga, similar to those in the Los Angeles Boutique and the Miami Maison. Upstairs, the New York Maison takes the art of entertaining a step further. One discovers a

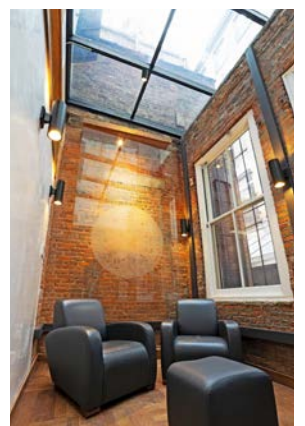
Just as he creates a watch, François-Paul Journe thinks and develops the design of these spaces, infusing them with his philosophy, ethics and the "A.R.T." values of his Geneva-based Manufacture (Authenticity, Rarity and Talent), which go beyond the world of watchmaking.



Large chandelier crossing the second floor.



Ground floor including the bar, showcases and various lounges.



Cigar lounge.

welcoming kitchen, a wine cellar, as well as a large room punctuated by a succession of comfortable sofas and tables where dinners and receptions can be organized. A particularity of the place is that some red brick walls with a slightly aged look have been preserved, recalling the industrial history of the SoHo district.

The Maison concept, inaugurated in 2019 in Miami, offers a memorable immersion into the F.P.Journe universe. When visitors enter the New York Maison, they will be able to benefit from the seasoned expertise of the New York team, imbued with the passion and philoso-

phy of François-Paul Journe. Throughout the year, experiences around subjects dear to the brand will be organized, such as gastronomy or the discovery of rare spirits, not to mention watchmaking events whose carefully selected themes will echo the values of F.P.Journe.



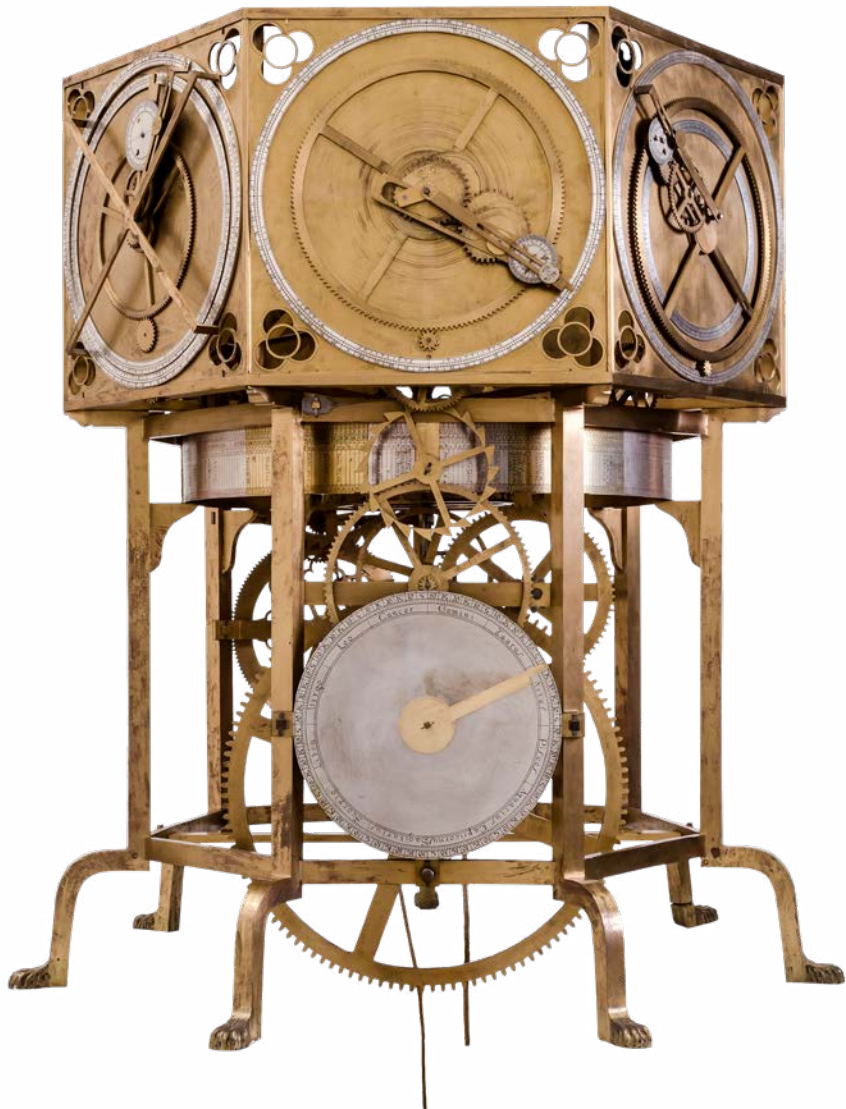
*Maison F.P.Journe
53 Mercer Street, New York.*

From weight to spring

1ST EPISODE

From the origins to the 17th century

BY AUDREY HUMBERT



1
The Astrarium of Giovanni de Dondi
completed in 1375.
Reconstruction by L. Pippa in 1963,
height: 110 cm, diameter: 90 cm.
Photo: Museo Nazionale Scienza e Tecnologia
Leonardo Da Vinci.

INTRODUCTION

“From weight to spring” is a series of 3 articles - each one covering a particular period - which will take readers to the heart of horological invention. The title immediately evokes the theme of constant force, which will be familiar to all lovers of fine horology. In their quest for precision, horologists sought to provide their mechanisms with constant force. But it cannot be dissociated from all the other parameters that influence the rate of a timepiece and are responsible for its precision. Since this subject deserves to be examined, we have taken a look at the history behind these inventions. Our aim is to re-examine these horological developments, concentrating on the various aspects that led to progress in the area of constant force, and their impact on the evolution of horology. The first period we will explore begins with primitive horology, observed as early as the 13th century, which lasted until the 17th century. The second period is that of the 18th and 19th centuries and the third period continues until the present day.



Audrey HUMBERT
Expert in horology
and specialist
in collectible watches

FUNDAMENTAL MECHANICAL PRINCIPLES

Horology is a complex mechanical art. To master it, one needs technical skills and a willing attitude to bring those skills to fruition. Its practitioners have developed a specific lexicon devoted to its techniques and specificities. Sometimes one word can have several different meanings. Sometimes, as well, several words can be used to describe similar operations, but with subtle distinctions due to local usage. Therefore, it seems necessary to recall here several elementary notions that will allow us to understand each other and avoid any possible confusion. We also wish to draw readers' attention to the fact that the various inventions here described concern different types of timepieces - sometimes clocks, whether with foliot or pendulum, and sometimes watches or other kinds of timekeeping devices. The basic principles and scientific laws apply to all these devices, but their application depends on procedures that may greatly differ.

THE ROLE OF CONSTANT FORCE

Constant force, which is the focal point of this article, plays a major role in the display of the correct and precise time. The latter is obtained, mechanically speaking, by the transmission of a driving force to a regulating organ. In order for it to count out time precisely, the regulating organ must move in a uniform fashion. This is where the escapement comes in. Its role is to make the regulator's rhythm independent so that it does not depend on the torque transmitted by the driving force. In order to function correctly, the escapement must possess a certain amplitude. One may consider that a horological mechanism is comprised of four different parts: the engine, the gear train, the escapement and the regulator.

Constant force means that regular and uniform energy is provided to the escapement. The latter transmits that energy to its final destination, while avoiding certain pitfalls that would prevent isochronism. Indeed, the isochronism of the oscillations - that is, their equal duration - is subject to disturbances due to the influence of the force that is necessary to maintain the movement.

In short, the internal factors that can affect timepieces' precision:

- isochronism - position - the materials used
- friction - lubrication

the external factors:

- temperature - atmospheric pressure - shocks
- magnetic fields.

Since these factors are numerous and diverse, the horologist must remain attentive to the equilibrium of the mechanism to be constructed. He or she must anticipate the repercussions of each element composing the watch, and the manner in which they might impact the entire movement and its performance.

MAJOR DEVELOPMENTS AND THEIR INCIDENCE

The history of horology is marked by a series of great inventions. Each major invention, which came about through the need for progress, required the re-adjustment of the entire mechanism, which led to new inventions being made. These successive inventions made it possible to attain the level of perfection that we know today.

Since this article deals only with mechanical timekeeping mechanisms, our inquiry must begin in the second half of the 13th century, when the first weight-driven clocks appeared. They were fitted with a hand indicating the hour. This mechanism would soon be improved by the use of toothed wheels. Toward the end of the 15th century, the first domestic clocks - as opposed to public clocks - appeared. While they were initially regulated by a foliot, by 1657 Huygens had invented the pendulum. Later, scientific progress allowed time displays to be made smaller.

In order to adapt to this new state of affairs, the weights that provided the driving force were replaced by a spring placed in a barrel. The energy produced by the spring was more difficult to master, particularly given the materials then available. Solutions had to be found to compensate for the irregularity of the power provided by the mainspring. It was then that the fusee appeared; it will be discussed in the next article.

THE INVENTION OF TOOTHED WHEELS

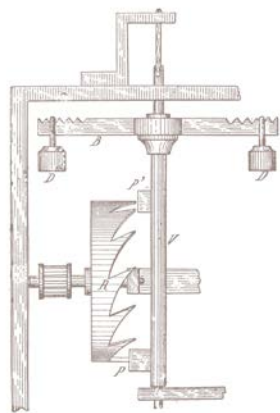
Little information is available regarding the invention of the toothed wheel. The oldest mentions of toothed wheels appear well before their application to horology. One example that must be cited is the Antikythera mechanism, from circa 200 B.C. It is considered to be the first antique analog calculating

machine, allowing astronomic positions to be determined. Its bronze mechanism contains dozens of toothed wheels. One notes, however, that their early uses in horology influenced the developments that were to follow.

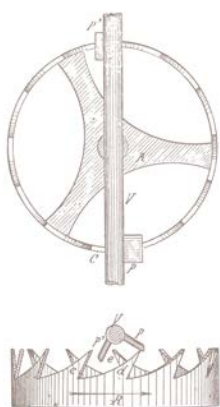
At the same period, the first astronomic displays appeared, including the moon phases and the position of the Sun in the Zodiac. Around 1330, striking became diversified to give a more detailed indication of time. Reconstituted in 1963 thanks to a manuscript left by its creator, the monumental astronomic machine known as the Astrarium (1) is one of the rare pieces that remains from this period. Giovanni de Dondi completed it in 1375, but it disappeared sometime during the 16th century.

CLOCK WITH WEIGHTS AND RECOIL ESCAPEMENT

For over 2000 years, men have constructed mechanical clocks. The earliest were driven by water. It was during the 13th century that weight-driven clocks became popular. One finds recoil escapements in these clocks. They owe their name to the retrograde movement they impose on the final wheel of the gear train while at rest. These escapements were simple in construction, as may be seen in the drawing below. These early clocks were regulated by a type of balance known as a foliot. With this device, the period of oscillation varied greatly, causing a degree of error so great that a minutes display was not possible.



La verge, placée verticalement, est suspendue, par son extrémité supérieure, au moyen d'un cordon ; l'extrémité inférieure se termine par un pivot qui se loge dans un pont. L'axe ainsi installé, possède une assez grande liberté de rotation ; il porte, à sa partie supérieure, deux bras B, B' appelés *foliots*, servant à ralentir les mouvements de la verge et à les régulariser. On augmente ou on diminue la durée des oscillations du régulateur, au moyen de deux petits poids ou *régules*, D D, susceptibles d'être déplacés le long des foliots ; plus les régules sont éloignées de l'axe, plus les oscillations sont lentes.



Extract of "Échappements d'Horloges et de Montres" (p.11) by Charles Gros, [1926].

The manuscript left by Frère Paulus Almanus, who settled in Rome in 1475, is a precious source of information about 15th century clocks, and illustrates their diversity. Among the thirty clocks described, eight had a going spring, the others were weight-driven. Those with a going spring were equipped with a fusee, as can be seen in the 3 drawings, including the clock described in folios 21v-22v.

The weight, whose movements are caused by gravity, has the characteristic of providing constant force naturally. When clockmakers replaced weights with a going spring to make clocks more portable, they had to develop new concepts in order to ensure a steady flow of energy.

JUST BÜRGI AND THE FIRST GRAVITY REMONTOIRE

Jost Bürgi (1552-1632), Swiss clockmaker, was an ingenious creator of scientific instruments, astronomer and mathematician.

In order to create more precise instruments, Jost Bürgi experimented with a new type of regulator with a gravity remontoire. Its crossed arm escapement, comprised by two arms with a median pivot, oscillating in opposite directions, and thus neutralising all exterior influences. In principle, one observes a close similarity to the escapement that Harrison used for his chronometers H1 and H2, with the main difference being the energy source.



Observation of the Heavens. © Zentralbibliothek Zürich.

The "remontoir d'égalité" uses a small secondary spring that feeds the balance and the escapement mechanism of a garde-temps. The "remontoir d'égalité" is itself periodically wound by the force of the going spring.

In Bürgi's time, clocks were driven by weights whose vertical motion was due to gravity, itself a constant force. However certain mechanical inefficiencies took on great importance in the wheel train, due to the materials used, the finishing, the lubrication, etc.

Bürgi introduced a gravity remontoire that compensated for these inefficiencies: the additional spring in the wheel train is periodically wound by the weight as it falls. It compensates for the previously mentioned inefficiencies, due to its position near the escapement and because it is the only component that applies force to it, thus furnishing a more constant torque because of its winding and unwinding.

After Bürgi and Harrison, horological progress largely condemned the remontoire, for it was no longer indispensable due to the progress made in the area of chronometry. It nevertheless remains a feat of technical prowess that can be executed by only the most skilled horologists.



Cross-Beat escapement and Remontoire by Jost Bürgi - Prague, around 1625. Rosewood and ebony case, glazed on three sides with a brass vase on top as a winding system. Dimensions: height 50.5 cm - base 26.5 x 26.5 cm.

© Mathematisch-Physikalischer Salon, Staatliche Kunstsammlungen Dresden, Photo by Jürgen Karpinski.

GALILEO AND THE LAW OF ISOCHRONISM

Galileo was the first person to study the properties of the pendulum. According to the legend, he observed a chandelier swinging in the Pisa cathedral. He was intrigued by its regular motion and noticed the swings remained of equal duration, even if their oscillation diminished. If the pendulum was forced to swing faster, it always returned to its original speed! He formulated the law of isochronism as follows:

- A pendulum always maintains a constant period,
- And its period does not depend on amplitude.

In other words, a pendulum always swings at the same rhythm. That rhythm does not depend on the amplitude of the swing.

It was later discovered that this law only holds true for limited amplitudes.

While carrying out his research, Galileo had an inkling of its possible application to timekeeping. He had the idea, which was given form in a sketch, of making a clock that used a pendulum as its regulator. And Huygens was responsible for the construction in 1657 of the first true clock with a pendulum.



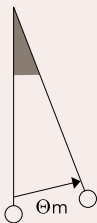
Galilée - (1564 - 1642) Italian mathematician, geometrician, physicist and astronomer. Photo: BME, Dis. Vol. H n. 18, Ottavio Leoni, Ritratto di Galileo Galilei, disegno.

Scientific
Complement



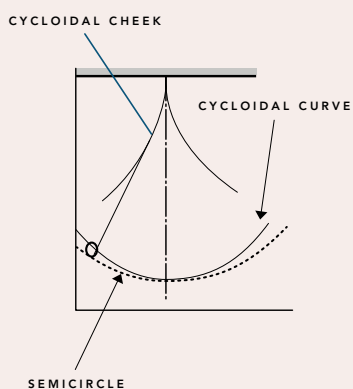
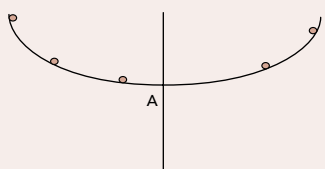
Galileo showing the Medician stars to the personifications of optics, astronomy and mathematics.

A simple pendulum is not isochronous. The concept of isochronism, theorised by Galileo, but invalidated by Huygens, holds true in theory for small amplitudes only. In fact, the period varies in function of the amplitude. $T = T_0(1 + \frac{\Theta^2}{16})$ therefore the greater Θ_m (maximum amplitude), the greater the increase in the period of the movement. It would therefore have to be shortened, in order for there to be no variation due to amplitude. The value of the maximum amplitude is noted Θ_m .



Explanations:

To be isochronous, the pendulum must not move in a semicircle, but must rather trace a cycloidal curve. In that case, the pendulum will require the same amount of time to travel to point A, whatever its starting point. In order to modify the natural arc of the pendulum, which, from a fixed point of oscillation will form a semicircle, cycloidal cheeks are applied, imparting a new curve to the pendulum.



Source: Musée du Temps in Besançon

CHRISTIAN HUYGENS
AND THE REGULATING ORGAN

A contemporary of Galileo, Huygens is considered to be his alter ego, largely due to his important discoveries regarding the solar system. The question of longitude is a natural corollary to astronomy. Guided by this quest, Huygens introduced two major innovations to the field of horology.



Christian Huygens - (1629 -1695)
Dutch mathematician, astronomer and physicist.
© Collection Haags Historisch Museum, The Hague

THE PENDULUM
REGULATOR

The first pendulum was constructed by a clockmaker in 1657, based on a design by Huygens. Salomon Coster, then a clockmaker in The Hague, is often cited for his collaborations with Huygens. Sebastian Whitestone notes that Huygens had his earliest clocks constructed in Paris by Thuret. The two are thought to have met in 1655, when Huygens stayed several months in Paris. The gear train controlling the hands was driven by a pendulum. This led Huygens to discover the errors in the law of isochronism as formulated by Galileo. He corrected them by applying a cycloidal curve that limits the amplitude of the pendulum's movements.

In 1673, Huygens published "Horologium Oscillatorium", a work in which he explains the functions and the construction of a pendulum clock.

THE GOING SPRING

It was toward the late 15th century that the first domestic clocks appeared. The invention of a tightly wound band of metal, the going spring, to provide the driving force of a clock, was the most notable change in horological mechanisms during this period. The important progress represented by the use of a spring in place of weights was guided by the need to miniaturise clock mechanisms. It also made it possible to use watches in several positions instead of just on a vertical plane, which had formerly been the case.

However, the spring had one disadvantage: the energy it delivered was not uniform, becoming weaker as the spring unwound. Clockmakers therefore had to search for new solutions in order to ensure that the energy transmitted to the wheel train did not damage the mechanism on the one hand, and ensured the isochronous functioning of the regulating organ on the other.

CHRISTIAN HUYGENS AND
THE BALANCE SPRING

Less than twenty years after the invention of the pendulum, Christian Huygens made another great discovery. In 1675, he invented the balance spring. Although the pendulum is the regulating organ of certain clocks, the balance spring is the regulating organ of a watch.

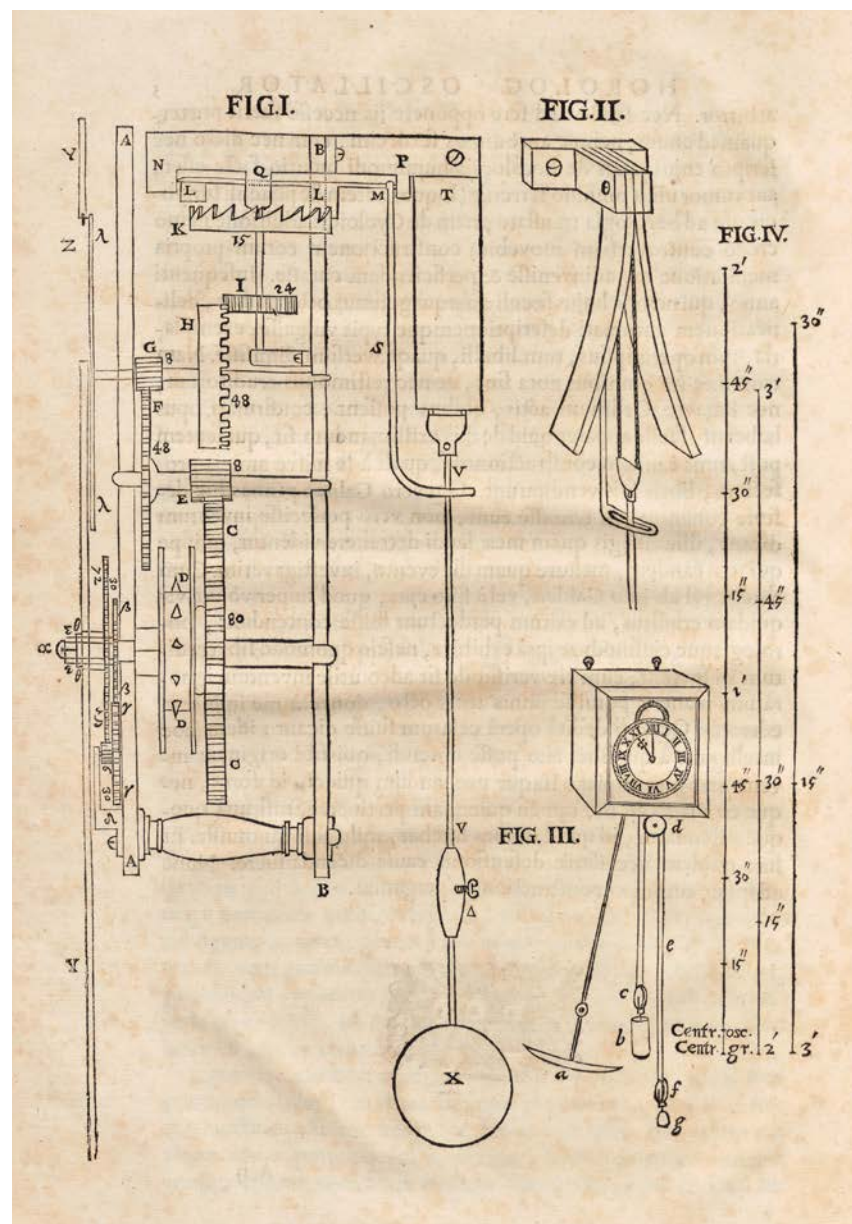
The quest to determine longitude drove horologists to develop a solution that would allow them to produce precision timepieces. However, to remain precise while at sea, the notion of dimension is important. The earliest marine chronometers with weights soon proved to be of little use aboard sea-going vessels. Cumbersome and difficult to move, they were not practical to use and were subject to disturbances caused by the elements.

It was within this context that Christian Huygens considered the question of precision in watches.

The balance spring is a flat metal spring that is wound until tightly coiled; it unwinds in a regular fashion, thus dividing time into regular intervals. This meant that watches ran with a difference of only a few minutes, whereas they had previously shown a lag of over an hour each day. Unlike the pendulum, which is vertical, the balance spring has the great advantage of functioning in any position. This advantage allowed the development of ship's chronometers, for in marine chronometers a horizontal plane is preferred to increase precision and limit any external influences on the chronometry. By the end of this period, the foundations of scientific horology had been put into place. However, the objectives in terms of precision had not been attained. The following period, from the 18th to the 19th century, is probably the one that elicits the most passionate horological debates. It was a time of abundant invention, driven by intense competition between countries and between horologers, all of whom were seeking a solution to the question of longitude.

DICTIONARY DEFINITIONS

- Any horological piece that has a pendulum is called a "pendule" in French. If it is a precision clock, it is called a regulator.
- Any horological piece that has an annular balance is called a clock. A precision clock is called a chronometer.
- A watch is a portable, wearable timepiece.



Mechanism of a clock after Huygens, including the principle he discovered and described in his treatise "Horologium Oscillatorium" in 1673. FIG II shows the blades known as cycloidal cheeks.
© Bayerische Staatsbibliothek München, Res/2 Math.a.43, p. 4

A masterpiece in the heart of the Manufacture

BY AUDREY HUMBERT

Since 2007, the majestic astronomical regulator made by Constantin-Louis Detouche (1810-1889) has stood in the heart of the F.P. Journe Manufacture. Made especially for the first Universal Exhibition held in Paris, from 15 May to 15 November 1855, this regulator is a remarkable demonstration of the technical skill of the Maison Detouche. At the close of the exhibition, it was placed in the window of a Paris boutique, where it remained for many years until it was finally given a complete restoration.

LUXURIOUS ORNAMENTATION

Its imposing case is adorned with sculpted bronze mounts and ornaments that invite contemplation. It is impossible to fully take in this work at just one glance; each element requires individual attention. One may admire the putti, then examine the regulator, and finally return to the dials. And one should not forget the depictions of the heavens in midnight blue enamel...

This remarkable regulator, executed by Detouche in 1855, accomplishes the notable achievement of offering time indications that were useful and necessary for contemporary scientists. The luxurious case that houses these indications is a fitting sign of the importance of the clockmaker's accomplishment.

THE COMPENSATED PENDULUM

The pendulum of this clock is fitted with a lever-type compensation. Its goal is to cancel out the effects of the dilation and contraction of the metals it is composed of, when exposed to variations in temperature.

Since the two outer rods of the pendulum are made of a material (yellow copper) that is more susceptible to dilation than the middle rod, which is made of steel, the latter constantly returns the bob to the starting point, at which time the dilation of the other two rods comes into play, causing it to move forward. The result is greater accuracy and precision. The small enamel dial indicates the compensation and dilation by means of a blued steel hand.

In the literature, this novel device is regularly attributed to Constantin-Louis Detouche. However, it seems that Jacques-François Houdin (1783-1860) was the true inventor of the system. Houdin, who participated in the construction of the regulator, as can be seen in an engraving hidden behind some gears, had worked with Detouche since 1845.

“
As a workman,
M. Houdin
was extremely skilful
and had a remarkably
delicate touch,
which can be seen in
all his work.

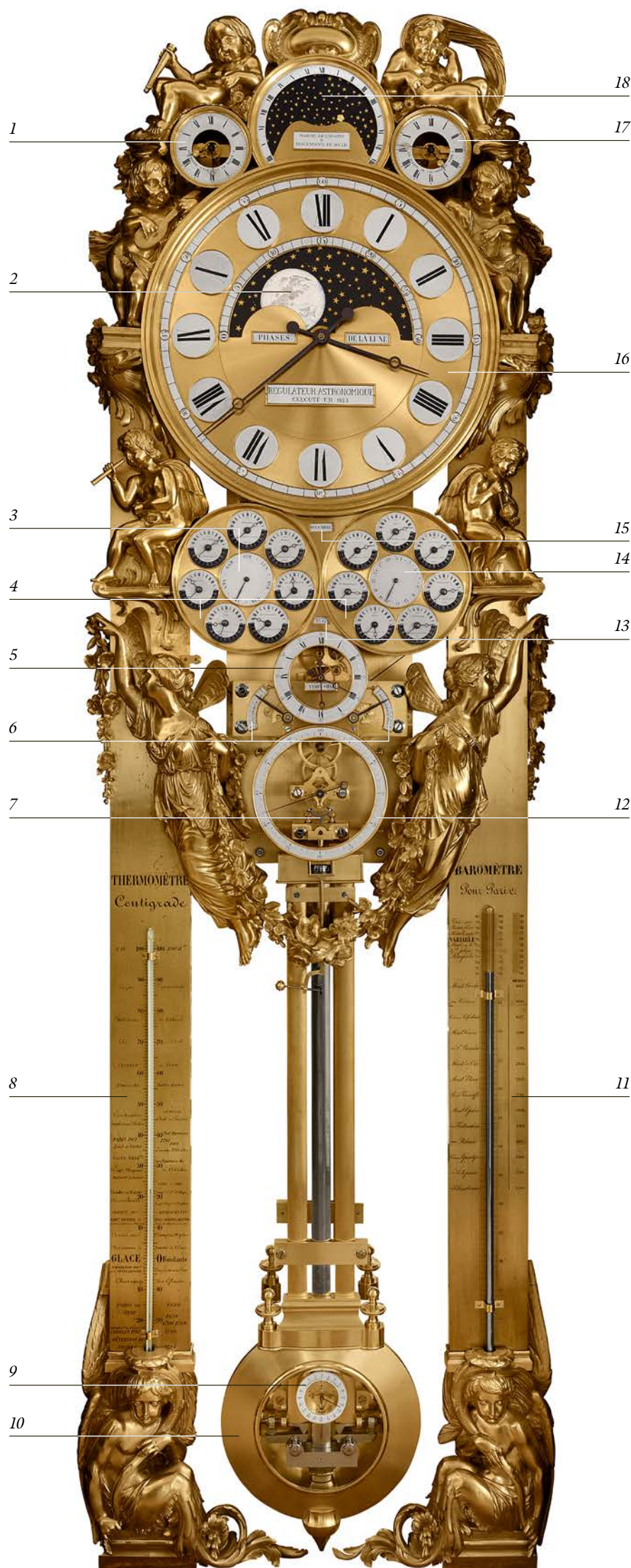
As an inventor,
he had a remarkably
fertile imagination.
No one could guess
the exact number of
machines and precision
pieces that his
prolific brain imagined.

”
*Revue Chronométrique, 5th and 6th year, vol. III,
June 1859 - June 1861, “Nécrologie. J.-F. Houdin”,
Paris, 1860, pp. 229-231.*

A biographical notice written by his son-in-law Robert-Houdin praises his remarkable skill and his talent as an inventor in particular.

THE DISPLAYS

The main dial, 610 mm in diameter, indicates the hours and minutes of mean time. The moon phases are in the centre of this dial. Below two other dials, each one composed of 7 smaller sub-dials, indicate the world time. The date indications are also found on these two dials. The equation of time has its own dial, placed just below. The upper portion of the clock is devoted to the display of solar indications, including sunrise and sunset, and the ascension and declination of the sun.



1 Sunrise dial 2 Moon phases 3 Days of the week 4 World time
5 True time 6 Development of the weight 7 Escapement 8 Thermometer
9 Dial indicating temperature compensation 10 Pendulum 11 Barometer
12 Seconds dial 13 Year 14 Date 15 Month 16 Mean time dial
17 Sunset dial 18 Ascending and descending trajectories of the sun

Louis-Constantin Detouche Clockmaker. "Mécanicien". "Breveté"

Detouche was a supplier to the Emperor, Princess Mathilda, the Conservatoire des Arts et Métiers, the City of Paris, and the Rome Observatory. The Maison Detouche was located at nos. 228 and 230, rue Saint-Martin, in Paris. It had spacious workshops in the rue de Saintonge and the rue Vieille-du-Temple, where up to 200 people - artisans, workmen, etc. - were occupied. There, all the horological pieces were made - regulators, watches, clocks, bronze sculptures and furnishings, as well as goldsmith's pieces, ornaments, and jewellery. M. Detouche had the merit of encompassing all the branches of the industry while recognising their distinct qualities. For this reason, he received numerous prizes and medals, both industrial and honorary. M. Detouche has been a staunch defender of renowned French industry. (Excerpt from *L'Exposition Populaire Illustrée*).

The invisible beauty of a watch movement

BY ISABELLE CERBONESOHI



Each manufacturer has its own way of decorating the components of its timepieces. Some watchmakers go to great lengths to decorate parts that only those who assemble the movement can see.

“And beauty? It exists, without its necessity appearing obvious at first glance. It is there, omnipresent, insistent, penetrating, while giving the impression of being superfluous, that is its mystery, the greatest mystery.”

FRANÇOIS CHENG

I wanted to start this article with this quote from François Cheng, taken from the “The-Way of Beauty, Five meditation for spiritual transformation”, because that’s what I thought of when I visited the decoration workshop of the F.P.Journe Manufacture.

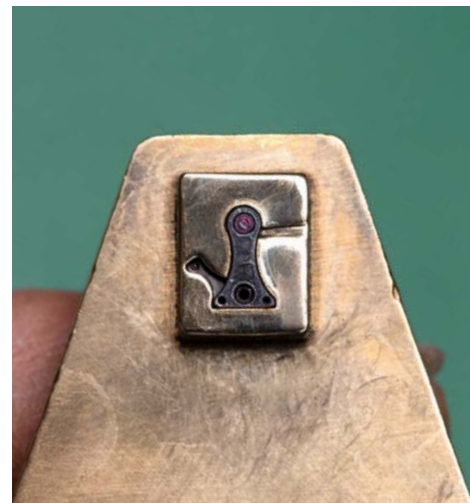
As I met the head of the workshop, watched her freehand polish the plate of an Astronomic Souveraine, and observed another “angleuse” polishing a screw until it was like a mirror, hence the name “mirror-like polish”, “specular polish” or “black polish”, I wondered if the owners of this collector’s timepiece would know that all of its elements have passed through the magical hands of specialised craftsmen or craftswomen who have been able to give them an extra touch of beauty.

On the day of my visit, there are five polishers in the workshop: four women and one man. The latter was trained in the world of watchmaking, as was one of his colleagues.

The other three “angleurs” come from different backgrounds: respectively from watch and jewellery sales, drawing and nail art. “It’s not a job you learn at school”, explains the workshop manager. “Originally, watchmakers decorated their own movements. The demand today is not important enough to set up a training course, a network, schools, in order to nurture this trade. It is passed on from master to pupil. Within the different companies where we work, we learn recipes, which we mix together or improve. It’s a sharing of experiences.”

At the F.P.Journe Manufacture, all the parts to which manual value must be added and which will then be assembled by a watchmaker, pass through the hands of the “angleurs”. They are all masters of circular-graining, chamfering, drawing and black polishing, techniques that are all hand made at F.P.Journe.

A polisher is in the process of making a black polish. Historically, watchmakers used this technique to prevent corrosion: the more polished a surface is, the less likely it is to be attacked by rust. It is also a game with light: the surface of the piece is smoothed until the reflection that passes through it becomes black. “The piece to be polished is placed on a mould, which itself is placed on a tripod to create stability,” explains the workshop manager. “Then the piece is rubbed on a zinc support - a softer material than the one to be polished - on which a white paste is spread, a mixture of 0.2 micron diamond powder that is mixed with an oil. Some houses use sweet almond oil, we use car engine oil. Everyone has their own recipe. The best texture is when it looks like pancake dough and makes threads. I learned to make it like that. But you can always adjust it: if, for example, the polish turns blue, it means that the dough is too full of oil and that you need to add diamond powder. And stretch marks appear when the paste is too full of powder. It must therefore be liquefied. To achieve a black polish on small surfaces you can also use gentian wood, whose pith is very soft. And it doesn’t matter whether the piece is visible or not: the aim is perfection. That is the beauty of fine watchmaking.”



Bridge of the split-seconds wheel ready to be polished, placed in its support.



Mirror polished component after process.



Chamfering a flying "égalité" bridge with a file.



Top left: Satin finishing of the flank of a minute train bridge using a micromotor with a diamond point. Above: Buffing of the angles of a minute train bridge using a micromotor with a finishing rubber.



The day of the visit was a lucky day: the latter was circular graining the plate of an Astronomic Souveraine. A rare moment. To begin with, she clamps it on a fixture that she places on a mobile plate and she evenly applies a rotating eraser attached to the end of a mandrel. This creates small circles on the material and, by overlaying them, she obtains a pretty spiral that reflects the light, like a mini-kinetic work.

The result depends on the rhythm she uses to rotate the piece and press the little eraser on it. "It's a dance," she says. "It takes a certain coordination between our eye and our gesture and that's what sets the tempo. You don't achieve the regularity of a machine but the aim is to make something regular. There can be small variations: this is what will define the hand circular-graining from the machine one and what will give its charm to each watch which will be unique". To complete the circular-graining of a plate, it will take her 45 minutes.



Hand circular-graining of a plate.

Circular graining, like all hand-made decoration techniques, gives the timepiece its uniqueness, because the same gesture can never be reproduced twice. Some houses like a tighter beading, others a wider one. "I use a medium spacing and rubbers with a diameter of 1 to 3 mm", explains the manager.

The result is impressive, but the most difficult technique to master is hand chamfering which requires a certain dexterity to be able to perfectly use the file, the knife, the polishing iron, the cabrons (pieces of wood covered with sandpaper of different finenesses, editor's note), the gentian wood and all the other tools that are often made by the craftsman or craftswoman. "Hand bevelling calls on our finishing skills," explains the workshop manager. "It requires finesse, delicacy and precision. We take a piece, cover it with polishing paste and then rub it with an iron until we obtain a mirror-like polish on the corner. The polishing iron must be made of soft iron. I make my own with old umbrella ribs I found at a flea market."

The last technique to be discovered on this day is the bevelling with a piercer used to rework bridges. This is a completely different technique: the polisher approaches the piece with wheels made of cardboard, leather or wood, which turn on an axis. They have been cut beforehand, depending on the shape of the workpiece to be bevelled. "Learning how

to use the piercer takes much longer because you have to know how to choose your wheels, cut them yourself, and choose a speed of rotation according to the material used and the shape of the part", explains the polisher. Once the timepiece is assembled, all the cleverly decorated elements become partially undetectable. They become the beautiful secret of the watchmaker, the workshops and the owner of the timepiece. Decoration is an art of humility and self-control. And when one observes the "angleurs" at work, one understands that their quest is for an invisible beauty.

"The "angleur's" job is by no means a series of repetitive acts. The slightest variation in emotion, in mood, can be seen in a piece: it is a skill that calls on the feelings of the person. It requires a high level of self-discipline."



Operating lever spring finalised after straight-graining.

A new chapter: relocating Les Cadraniers and Les Boîtiers de Genève

BY OSAMA SENDI

In François-Paul Journe's view, one of the most important, if not the most important element of a watch, is its dial. The dial is the very first part of a watch that catches a human eye, and it further pulls together and binds all of the watch's characteristics. It tells the entire story of a timepiece, portrays the beauty and complexity of what lies beneath it, and most importantly plays a significant role in displaying the time.

picked up, wound, and as it is worn on their wrists throughout their ownership time.

With the great importance to detail that François-Paul puts towards his creations, it is not surprising that in his pursuit to establish a vertically integrated manufacture, F.P. Journe wholly owned their own dial-making and case-making ateliers, "Les Cadraniers de Genève" and "Les Boîtiers de Genève."

same roof, the reason for the move was driven by two major needs: to meet the demanding operational needs of the Cadraniers de Genève, but also to provide better working conditions for employees.

Over the span of 23 years, Les Cadraniers de Genève (CDG) have consistently expanded their team of artisans, including most recently their in-house luminescent numerals and enamel departments. Subsequently, it occurred to both François-Paul Journe and Tony Billet (Director of CDG) that while the building they were operating out of has served them well over the years, their needs have changed.

Moreover, François-Paul was eager to find an independent space, designed entirely to accommodate his dial-maker and case-maker ateliers, rather than having to work around an existing layout. In their exhaustive search, they were fortunate to find a building abandoned for 20 years, with three floors of space, located not far from their location in Meyrin, on the outskirts of Geneva.

The building itself required several upgrades and the first phase of its adaptation was to add a 4th floor and completely redo the interior space in order to benefit from a space specifically developed for the needs of both entities.



New building grouping together the Cadraniers de Genève and the Boîtiers de Genève located at rue de Veyrot 23 in Meyrin, Geneva.

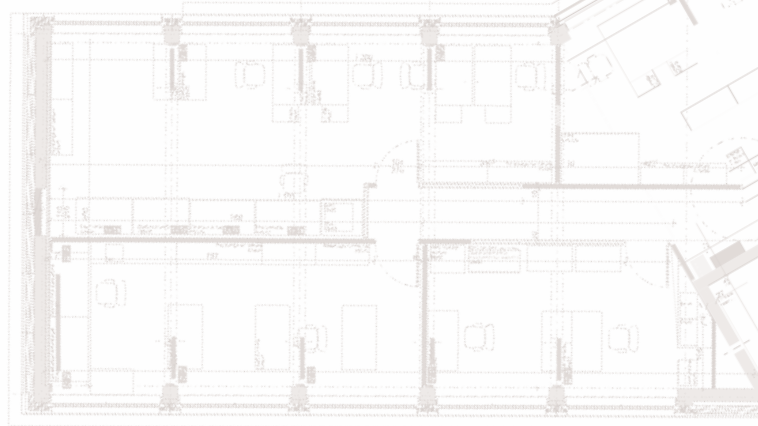
It is for this reason that François-Paul has always chosen to start his designs with the dial first. When he begins to sketch a dial, he is sketching exactly what he wants to accomplish with a watch; how it is going to look and what complications it is going to have. It is only once he is satisfied with his dial will he then begin the more challenging task of designing a specific movement, for that specific dial. This quite uncommon approach to a design is far more complex than dressing up a movement, but for François-Paul, it is the only way with which to harmonise a dial with a movement.

In addition to the dial, a watch's case plays a just as important a role in satisfying our sense of touch. A beautiful dial must be paired and complimented with an equally beautiful case that dresses and combines both the dial and movement. A case, from its elegant lines, its size, its lugs and down to the position of its crown, all come together to establish perhaps the only physical connection an owner has with his timepiece; from the moment it is

The ownership of these two manufactures is a result of Mr. Journe's desire to not only have freedom in controlling the production of his dials and cases, but to further preserve the craftsmanship associated with the art of said crafts.

Much has been covered regarding the ateliers' talented crafts in previous editions of the F.P. Journal, however, this year, the ateliers reached a new milestone in that they have finally completed a long discussed move to a new facility. With both ateliers operating under the

Area of the Manufacture:
Cadraniers: 1200 m²
Boîtiers: 855 m²



As one could imagine, moving two manufactures is no easy task, and the single biggest obstacle for the ateliers was in planning and organizing the shift, in a sense of minimising the interruption to production. Addressing this interruption is not merely concerning the movement of machinery from one place to another, but more in having to recalibrate the machinery for the new environment.

Production of dials is heavily dependant on environmental factors, such as temperature and humidity. In moving the atelier, the first weeks were spent recalibrating the production equipment to the new space; mostly achieved through a process of trial and error.

Unlike the previous facility, the new space's design allows to control environmental factors much better than before. Previously, during certain seasons, the atelier would face several setbacks in making certain dials, causing



Traditional mechanical workshop.



CNC workshop of the Boîtiers de Genève.



Decal by tamponography on the dial.



Dial of the Chronomètre Souverain.



Polishing of a Chronomètre Optimum case.

major delays. The new building grants him the opportunity to create dials without limits.

While the craft of dialmaking is largely based on the tiniest of details concerning colors, prints, and textures, the work of casemaking is considered to be a more "raw" handcraft in comparison. A case is produced through a process that requires demanding organisation, starting with precious and rare metals, and going through various tooling, stamping, assembly and polishing procedures to transform the material into a refined watch case.

As a result, Les Boîtiers de Genève tends to operate under vastly different working conditions. For them, a move was essential in order to make their production process more efficient and adapted to the times. Francis Simonnet, the Director of the atelier, described the previous workspace as outdated and the relocation would be a huge leap in efficiency thanks to the possibility of purchasing new, more modern and efficient machinery.

In addition, while work at the dial-makers was largely challenging the quality of the dials themselves, for the case-makers, Francis Simonnet explained that the move was essential to provide a more comfortable environment for the employees. He used the example of the polishing department and how the polishing lathes would generate a lot of heat in the process, resulting in an uncomfortable workspace in the heat of the summer months.

For him, this new space designed with better ventilation don't change the quality of the cases, but it makes the craftsmen performing their job in a lot more comfortable and better adapted working conditions. The entire relocation process took three years from concept to realisation and is an incredible reward to François-Paul Journe, Tony Billet, Francis Simonnet and the future of the Cadraniers and Boîtiers de Genève. For

them, the ultimate goal in this relocation is to achieve a better productivity and to enhance their creativity with quality work that showcases the artisanship and craftsmanship of dial-making and case-making. Combined, they will be able to uphold their high standards of excellence in this lighting and controlled environment that has been well-thought and organised around the well-being of their artisans.



Facade of the building on the parking side.

An answer to a pamphlet entitled “A narrative of facts”

BY AUDREY HUMBERT



*The Green Marine Chronometer
Thomas Mudge, 1777.*

Printed in 1792, this book plunges us into the heart of the quest for longitude and the enormous stakes it entailed. Thomas Mudge Jr. (1760 - 1843), dissatisfied with the negative evaluation of the marine chronometers made by his father Thomas Mudge (1715 - 1794), still hoped to obtain the colossal prize promised by the Longitude Act of 1714.

In a pamphlet entitled “A narrative of facts [...]” he stated the reasons why he felt a revision of that evaluation was necessary. Among the reasons he cited was the lack of impartiality displayed by Astronomer Royal Reverend Nevil Maskelyne (1732 - 1811). Smarting from this attack, Maskelyne responded by writing this book¹.

The texts concerned the first marine chronometer made by Thomas Mudge between 1771 and 1774. It was known as “No.1”, while the subsequent marine chronometers were called “Green” and “Blue” due to the colours of their respective cases.

THE CONDITIONS OF USE

As for any device, certain precautions must be taken when using marine chronometers in order to obtain optimal performance. However, when consulting archival documents, one quickly realises that certain criteria were not respected. In the test rooms, the chronometers were exposed to great variations in temperature. They were also sometimes directly exposed to sunlight, which resulted in considerable disturbances to their compensation systems.



*The Blue Marine Chronometer
Thomas Mudge, 1777.*

Under actual conditions of use - that is, when at sea, marine chronometers were fitted with suspension devices which maintained the timepieces in as horizontal a position as possible despite the rolling waves, while also preserving them from humidity and corrosion by salt water.



*First Marine Chronometer
Thomas Mudge, 1774.*

Theoretically, prior to each use, they would have been prepared beforehand for the prevailing conditions on land or at sea. In practice, however, it is clear that these precautions

were not always taken, often for logistical reasons but perhaps also due to ignorance. Anthony G. Randall is particularly knowledgeable about this question. He is well acquainted with the chronometers, for he carried out the first restoration of the “Green” in 1976. He also serviced chronometer “No.1”, which is currently in the British Museum. Unfortunately, little information is available concerning the trials to which Mudge’s chronometers were subjected under the direction of Maskelyne. We know, however, that the test conditions were constantly changing.

STANDARDISATION OF THE TESTS

Once the tests had been carried out, there remained the difficulty of interpreting the results. The earliest tests, though carried out by scientists, were not entirely rigorous regarding consideration of the parameters that could influence a chronometer’s rate. Standards were lacking to allow comparisons to be made. In England, both John Pond, who succeeded Maskelyne from 1811-1835 and George Biddell Airy, from 1835 to 1881, worked hard to improve and standardise chronometric testing. For example, from 1823 to 1835, Pond introduced “Premium Trials”: each year, the 3 best chronometers received a monetary prize.



Nevil Maskelyne.

In France, Lieussou (1815 - 1858), an engineer and hydrographer, in charge of the special service for watches at the Dépôt de la Marine, made an in-depth study of the influence of temperature variations and the thickening of oils on the rate of chronometers. In 1854, his conclusions made it possible to determine the elements necessary for the standardisation of tests, which would result in a fluid understanding of the test results².

A LONG-LIVED LITERARY DISPUTE

The literature produced by the exchanges between Thomas Mudge Jr. and Reverend Maskelyne, which the latter called a “literary dispute”, illustrates the contestations that rose up concerning the protocols for testing the precision of these instruments.

In England, Harrison and Earnshaw related complaints that were similar to those of Mudge. In France, the situation was hardly different for Berthoud and Le Roy. One must remember that horology was then considered a mechanical art rather than a science. The people entrusted with executing the tests, including Reverend Maskelyne, were scientists and members of the Académie des Sciences or the Royal Society. In order to remedy this situation, Berthoud, in France, spent his entire career describing his work in important and influential books. By adopting scientific procedures, he attempted to bring his art closer to the Académie des Sciences.

A PREFERENCE FOR THE LUNAR METHOD?

In 1766 Maskelyne became the editor of the “Nautical Almanac”, used for lunar calculations. Clockmakers consider this to be yet another element proving the Royal Astronomer’s lack of objectivity, while both “scientific” and “mechanical” solutions were proposed for the same prize.

In the 21st century, these conclusions might seem a bit hasty. While the conflict of interest is manifest, it must be viewed in context. The difficulties clockmakers encountered in being listened to an elite society meant they could not always express themselves freely concerning their inventions.

They nevertheless obtained remarkable results in terms of precision. They had, however, a long way to go in order to ensure their inventions were reliable, to train people in their use, and to develop the necessary literature (as Lieussou and several others did subsequently), to harmonise and structure the entire body of inventions, techniques and processes employed.

¹ Nevil Maskelyne, *An Answer to a Pamphlet ‘A Narrative of Facts’*, 1792.

² Aristide Lieussou, *Recherches sur les variations de la marche des pendules et des chronomètres suivies d’un projet d’organisation du service des chronomètres appartenant à la Marine*, 1854.

New auctions records for F.P. Journe watches



Sotheby's – Geneva 9 November 2022
Octa Divine, 36 mm in platinum with white gold and silver. N°017-04D, 2004
Sold CHF 119'700

< **Sotheby's – Hong Kong 5 October 2022**
Octa Perpétuelle Anniversaire Tokyo, 40 mm in titanium and 6N gold with ruthenium and silver dial. N° 12/99-OP, 2010
Sold HKD 1'575'000



Phillips – Hong Kong 28 september 2022
Automatique Réserve,
44 mm in titanium with yellow dial.
N°022-ARS2, 2018
Sold HKD 529'200



Sotheby's – Hong Kong 5 October 2022
Centigraphe Souverain Black Label, 40 mm in platinum with blackened gold and silver dial.
N° 358-CT, 2013
Sold HKD 1'386'000



Christie's – Dubai 26 October 2022
Tourbillon Souverain, 40 mm in platinum with green jade and silver.
N° 658-TN, 2015
Sold USD 945'000



Phillips – Geneva 6 November 2022
Vagabondage II, 6N gold case with smoked sapphire and steel dial.
N° 47/68-VII, 2011
Sold CHF 302'400



Phillips – Geneva 6 November 2022
Octa Lune Black Label, 40 mm in platinum with blackened gold and silver dial.
N° 425-L, 2011
Sold CHF 189'000



Phillips – Geneva 6 November 2022
Chronomètre à Résonance, 40 mm in platinum with white gold and silver dial.
N° 013-04RN, 2004
Sold CHF 226'800



Phillips – Geneva 6 November 2022
Quantième Perpétuel, 40 mm in 6N gold with silver dial.
N° 346-QP, 2021
Sold CHF 138'600



Sotheby's – Geneva 9 November 2022
Chronomètre à Résonance, 38 mm in platinum with white gold and silver.
N° 028/99R, 1999
Sold CHF 1'071'000

Young Talent Competition 2022

Since 2015, the Young Talent Competition helps discover the next generation of most talented young watchmaking apprentices in the world and supports them in their route to independence by identifying their achievements and putting them under the spotlight.

F.P.Journe organises the Young Talent Competition with the support of The Hour Glass Singapore, luxury watch retailer in the Asia Pacific region. Both Maisons aim to perpetuate and support the art of haute horology and cultivate the appreciation of horological craftsmanship.

François-Paul Journe says: *“It is imperative for me, not only to discover the horological talents of tomorrow but also to secure the continuation of independent haute horology and pass on my savoir-faire with over 40 years of expertise. It is also a real honor to*

encourage these young talents by sharing my authentic horological knowledge, my passion and my determination on a daily basis. And also to support them as I received support at their age.”

The 2022 winner, Maciej Miśnik, received his award on November 11th at the F.P.Journe Manufacture. He received a diploma and a 20,000 CHF grant from The Hour Glass Singapore and F.P.Journe which allows him to purchase watchmaking tools or finance a horological project.

The jury of the Young Talent Competition is composed of key personalities from the international horological scene: Philippe Dufour, Giulio Papi, Andreas Strehler, Marc Jenni, Michael Tay, Elizabeth Doerr and François-

WITH THE SUPPORT OF:


THE HOUR GLASS

Maciej Miśnik, 2022 winner and creator of the marine design pocket watch with tourbillon and pivoted detent escapement.

Paul Journe. Their selection criteria are based on the originality of the concept, the technical complexity, the elegance of the design as well as the quality of the finishing and of the craftsmanship.

Maciej Miśnik
Winner of the “Young Talent Competition” 2022.



Maciej Miśnik Marine design pocket watch with tourbillon and pivoted detent escapement

Age 30 - Warsaw - Poland

Self-taught - Journeyman's certificate in watchmaking - Warsaw, June 2018

Graduate in physics - Gdańsk University of Technology - September 2021



Case, hands and dial

Marine chronometers inspired my pocket watch. For this reason, the case was made of brass, however, for contrast, the pendant and the bow were made of silver. Most parts were made in my own workshop without using CNC machines. Basic machines such as lathes, milling machines and hand tools were used to make the watch. For readability, steel hands were thermally oxidized to blue. In my opinion, blued hands harmonize with black indexes on the silver dial. For added complexity, the hour hand jumps once per hour rather than smoothly, as is the case with most watches.

Technical characteristics of the movement

As in marine deck chronometers, a pivoted detent escapement was used. Oscillation frequency of the balance wheel is 2 Hz. It is well known that detent escapement has good friction properties but it is not shock resistant. Due to this, I decided to make a pocket watch instead of a wristwatch. Additionally, the watch was equipped with a tourbillon thereby reducing the problem of poisoning the balance. Two barrels are used to ensure sufficient torque. A major problem with watches using a tourbillon is the inertia of the cage. For this reason, the tourbillon cage components are very thin and delicate to reduce the inertia. The cage is very heavy, weighing 2 grams, but the problem of inertia was reduced. In the escape wheel, the pinion and the wheel are separated and connected via a bronze hairspring. There is a sleeve with two rubies in the wheel, which runs on the steel axle of the pinion. The hairspring is arranged in such a way that it holds the wheel on the pinion (the wheel does not fall out). As soon as the cage is stationary, the escapement wheel is released. The escapement wheel moves and the cage begins to rotate. When the escapement wheel stops on the ruby, the cage continues to move and winds up the hairspring, losing its kinetic energy, and then slightly backs up. The backing up of the cage results from its high inertia and the reaction force of the hairspring. In most tourbillon watches, the cage stops with the escapement wheel, causing a temporary high force on the escapement elements and undesirable vibrations. In the case of the presented solution, a hairspring absorbs the vibrations, similar to solutions proposed for example by Derek Pratt, Karol Roman etc. The balance wheel is equipped with a Breguet-overcoil spring. There is no regulator on the hairspring due to chronometric properties. Two screws on the balance wheel maintain regulation of the oscillation period. Other screws are used to poise the balance wheel. The tourbillon cage is also poised, by a silver counterweight. Silver was used due to its high density.

Manufacturing of the components

The presented watch is made of raw metals. No elements have been electro painted or plated. Only the hands and three screws were thermally oxidized to blue. Sulphide was grown on silver elements, this is what gives this darker look to the dial and to the small plate with the signature. As previously written, I made most of the parts myself. Every part was finished by hand. In my workshop were not made: the watch chain, glass, 18 ruby bearings, balance hairspring, 2 mainsprings and 28 of 40 screws. I did not engrave the signature; it was made by a professional engraver.

Measurement

Diameter: without hinge and lock, 4.9 cm / with hinge and lock, 5.2 cm **Height:** 7.1 cm - Depth: without screws, 1.55 cm / with screws, 1.67 cm **Weight:** with key and chain, 112.2 g / without key and chain, 100.2 g



Retrospective

Young Talent Competition



Pharos – Anton Subanov
Clock with a triple-axis tourbillon, indication of hours, minutes, seconds, world time and power reserve. 24 pieces in limited edition.

Anton Subanov – Russia - 2016

According to Anton Subanov, the Young Talent Competition opened the doors to the world of Haute Horlogerie and gave him confidence that his projects would succeed. Following a first experience as manufacturing director at Konstantin Chaykin, in 2019 he set up his own watch atelier in St. Petersburg. Having amazed with his table clocks, the Pharos and the Lotus, Anton Subanov more recently presented his first wristwatch, the Racer Jumping Hour GMT, in a limited edition of 20 pieces.

Tristan Ledard – France - 2016

Winner of the 2016 Young Talent Competition, Tristan Ledard has entirely devoted the next three years to the realization of a watchmaking project for which 80% of the components are made in-house and by hand. To raise the necessary funds for this new watch and remain independent, he offers various watchmaking services. He is now in charge of after-sales service, product design and assembly for several brands. To complete this range of activities, he revises and restores all types of watches and clocks, in addition to the watchmaking courses he gives in his workshop or online.

Anna-Rose Kirk – England - 2016

Following her nomination in 2016 for her clock “The Horizon Clock”, Anna-Rose Kirk



Tourbillon Souscription – Rémy Cools
40 mm diameter steel case, hand engraved silver dials, indication of hours and minutes, indication of hours and minutes, 9 pieces on subscription.

decided to create her own business as a freelancer. In her Brighton-based workshop, she offers various maintenance services but also restoration, especially of dials with a mastery of techniques such as silvering, painting or enameling. She is also in discussion with a client to create a new version of her clock, “The Horizon Clock 2.0”, redesigned with her years of experience in the industry.

Rémy Cools – France - 2018

In 2019, at the age of 22, Rémy Cools decided to launch himself as an independent watchmaker with the objective of creating watches under his name. In his workshop located in Haute-Savoie, not far from the watchmaking cradle of Geneva, he creates an exclusive series of 9 numbered Tourbillon Souscription, inspired by his first school watch, whose components are entirely crafted and finished by hand.

Theo Auffret – Switzerland - 2018

Theo Auffret launched his eponymous brand three years ago. In his workshop located in the Paris region, he and his team of three people produce watches in limited quantities for watch enthusiasts. His creations include his first model, “Tourbillon à Paris”, which is available in a subscription of 20 pieces, and his most recent, “Tourbillon Grand Sport”, which was runner-up at the GPHG 2022 in the Tourbillon category.

Tourbillon Grand Sport – Théo Auffret

41 mm diameter steel case, indications of hours, minutes, seconds and torque reserve. 4 pieces on subscription.



Tyler Davies – England - 2019

After winning the Young Talent Competition in 2019, Tyler Davies had the privilege of working on beautiful English clocks by clockmakers of the Golden Age such as Tompion, Graham, and Quare. Other projects, including the reconstruction of complex systems, have allowed him to develop his understanding of 17th century manufacturing techniques. Although most of his time has been spent on restoration, he has also designed a number of clocks that he plans to make when the opportunity arises.

Norifumi Seki – Japan - 2020

At only 23 years old, Norifumi Seki won the Young Talent Competition 2020 with the presentation of his pocket watch “Spherical moon and drum calendar”. Since his nomination, he has been contacted by many people interested in purchasing his creations. He is actively working on building a team with the goal of launching his own watch brand.

Mario Scarpatetti – Switzerland - 2021

Before the Young Talent Competition 2021, Mario Scarpatetti was already working as a watchmaker in his workshop in Parsonz, a town located in the canton of the Grisons in Switzerland. Benefitting from positive media coverage, he has received many orders for new projects to repair and restore old mechanical clocks. Parallel to this activity, he is currently focusing his energy on the design and manufacture of complicated movements.

FOR THE MEMORY OF ENDANGERED CULTURES

F.P.Journe supports the Cultural Foundation of the Barbier-Mueller Museum

THE FOUNDATION SAFEGUARDS ENDANGERED CULTURAL HERITAGE FROM PEOPLE ON THE VERGE OF EXOTINCTION



Large dancing buffalo mask, mimicked by the children. Mourning for Tomé Damoué Gnitono Uuibō, 1995.



Courtyard at the entrance of Oroubobo 2011.

Created in Geneva in 2010, the Musée Barbier-Mueller Cultural Foundation, with the support of F.P.Journe, provides testimony on imperiled cultures around the world. It finances anthropological studies carried out among peoples whose beliefs, customs and ways of life are endangered by the social, economic, and climatic changes they face. The results of the researchers' work are then published by the Foundation.

On the occasion of the publication of the book "Les Winye du Centre-Ouest Burkina Faso. Death, marriage and birth in a border society," a conference led by Jean-Pierre Jacob was held on November 22 at the Théâtre Les Salons. The anthropologist was accompanied by two representatives of this little-known people, Yao Wuobesa Issouf and Tiaho Nou-

masi, who made the trip despite the delicate political situation in Burkina Faso. They were able to exchange with the public to testify about their culture, along with the recent transformations that are taking place within their community. The evening was punctuated by musical interludes performed with brio by the pianist Paloma Manfugas.

From November 15, 2022 to March 15, 2023, the Barbier-Mueller Museum also presented, from its own collection, an exhibition of masks from the Winye region and surrounding area, as well as photographs taken in Winye country by Patrick Darlot.

Why did the anthropologist Jean-Pierre Jacob devote a book to the funeral rites of the Winye? First, to give an example of a society

in which a successful funeral is more important than a successful life. The book, based on fieldwork that has been going on since 1983, documents this subject extensively. It insists upon the fact that the different funeral ceremonies are a series of opportunities to settle the debts of the deceased to the groups that are at the origin of his or her life. The ceremonies also but also to prolong after death the prosperous trajectory that he or she may have known.

Following the rites, the deceased gains the status of an ancestor. The goods used to pay their debts must be interpreted as incentives for the beneficiaries to continue their tasks and activities, to work as their ancestors did. The second reason for this work is the need to preserve a written record of funeral practices

that are in the process of disappearing or have already disappeared. Indeed, these comprehensive approaches towards being and dying as developed by the Winye are questioned more and more by other religious references such as Islam and Evangelism.

These cults, which are becoming increasingly influential throughout the Winye area (and Burkina Faso), offer another vision of what constitutes a good life and a good death. Their advantage is that they offer very simplified funeral rituals that are not very costly in terms of time, money, and social relations, and are therefore in keeping with the growing economic impoverishment of the agricultural world of Burkina Faso.



Juan-Carlos Torres, Marc Blondeau and François-Paul Journe.



Tiaho Noumasi, Patrick Darlot, Jean-Pierre Jacob and Yao Wuobesa Issouf.



Paloma Manfugas playing piano during the evening.



Musical interlude with Mouni Diara on Balafon.

The Foundation young student scholarship

The Foundation also awards grants to young researchers to carry out anthropological observation missions. Every year, the Foundation entrusts an ethnologist or a student wishing to choose an unusual doctoral thesis subject (on the recommendation of a university professor). The researcher will make a first stay of about one month to become familiar with the people. He will then have a few months to prepare for his second stay which should last between two to three months. He will have one year to present the results of his research for the publication of a small book. A very large number of populations scattered throughout the world have never been visited by ethnologists, anthropologists or qualified historians. After the study of the Gan people of Burkina Faso, the Wan, Mona and Koyaka people of Ivory Coast, the Kalasan Batak people of Sumatra (Indonesia) and the Anir Islands in southern New Ireland (Papua New Guinea), the Foundation focused on the Songsarek Garo of Meghalaya in

northeastern India, Tabiteuea Island in the Kiribati Islands, the Na from Lijiazui on the border of Sichuan and Yunnan in China, the Jiye of South Sudan, the Altaians of the Siberian mountains and the Yaure people of Ivory Coast. The Foundation has published numerous studies, including "The Kuya of Côte d'Ivoire, A Forgotten People of The Forest" (2020), "The Kararaô of Central Brazil" (2021) and "The Winye of West Central Burkina Faso. Death, marriage and birth in a border society." (2022).

To purchase the book, you can contact the Barbier-Mueller Museum Cultural Foundation in Geneva at: fondation-culturelle-barbier-mueller.org



Among collectors, François-Paul Journe is considered as the Watch Master and it is with great pride and devotion that a Japanese horological fan created a series of mangas

7TH PART

New watches in 2012

Chronomètre Optimum
This includes both a remontoire mechanism and 9HP escapement with double escape wheels. This is more efficient than standard escapement because there is no need for the escape wheels to be cycled, giving this unique mechanism significant merit.



New watches in 2013

Quantième Perpétuelle
This perpetual calendar model has a total of four rotating display discs including day, month, and two digit large date. The date and day can be set by using a crown, while the month is set by using a specific lever set behind the lug at 1 o'clock.

2022

F.P.Journe around the world in 365 days

Late Afternoon Aperitifs at F.P.Journe F.P.Journe Boutiques

Every first Tuesday of the month, starting at 5:00 pm, the F.P.Journe Boutiques welcome watch enthusiasts for its end-of-day aperitifs. A not-to-be-missed event for watch lovers to meet and discuss themes that are dear to the Maison F.P.Journe.



Watchmaking Class New York / 12 February

On the occasion of Valentine's Day, the F.P.Journe New York Boutique invited couples to a watchmaking training course. Combining theory and practice, they were able to learn the rudiments of watchmaking know-how and discover the complexity of a mechanical movement.



The Great Glitzy Miami / 26 – 27 February

What a weekend! As some collectors shared, "This was the most incredible F.P. Journe event we've ever attended". "The Great Gatsby" themed event at Maison F.P.Journe Miami was a gala evening inspired by the Roaring Twenties, to the rhythm of jazz and the Charleston.



Prix Solo artgenève - F.P.Journe Geneva / 3 – 6 March

For its tenth edition, the contemporary art fair artgenève took place from March 3 to 6 at Palexpo Geneva. On this occasion, the Prix Solo artgenève - F.P.Journe rewarded the best monographic exhibition proposed by the participating galleries. It was awarded to the Urs Meile Gallery, for the Solo Show of Rebekka Steiger.



Bon Voyage Madison Avenue! New York / 25 March

This final event at 721 Madison Avenue marked the departure of the F.P.Journe New York Boutique to a new address in the SoHo district. The theme of the sea was chosen, as a nod to sailors embarking for a new destination.



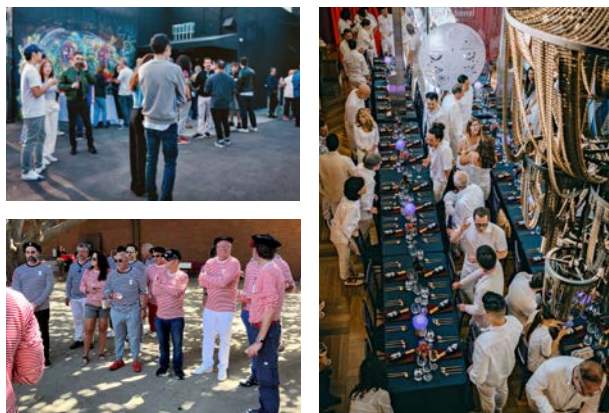
F.P.Journe Golf Cup Geneva / 22 May

120 players met at the Golf Club of Geneva to participate in the Coupe de Golf F.P.Journe. An unmissable moment for the members of the club who played this competition with a friendly formula of play in Greensome, Stableford.



Summer parties Los Angeles / 3 – 5 June

For three consecutive days, the Los Angeles Boutique brought together more than 100 people around three themes: "Urban", "St.Tropez" and "Montmartre". To the rhythm of the different animations, guests were able to share their passion for F.P.Journe watches in a festive atmosphere.



Champagne tasting evening Laurent-Perrier Geneva / 7 June

The Boutique F.P.Journe Geneva and Laurent-Perrier proposed a tasting of the Grand Siècle cuvée, a prestigious champagne which is not based on the vintage, but on the blending of 3 years to create the perfect oenological balance.



Riva Trophy St-Tropez and Monaco / 1 – 3 July

Organised by Madame Lia Riva with the participation of the “Yacht Club de Monaco”, the Riva Trophy 2022 marked several important events: the 180th anniversary of Riva as well as the 60th anniversary of the emblematic Aquarama model. To experience the 14th edition of the event, which was marked by conviviality, F.P.Journe took the legendary route of this nautical race between Monaco and St-Tropez, at the end of which two watches from the élégante collection were offered to the winners of the Riva Raduni.



The Collectors Journey Geneva / 4 – 7 July

The Collectors Journey is a unique initiation into the world of F.P.Journe. For this edition, collectors from Los Angeles were able to learn more about our know-how, between visiting the Manufactures and meeting the talents that bring our watches to life. The trip was also punctuated by many activities, such as a wine tasting at Château Le Rosey, a visit to the medieval village of Yvoire, etc.



F.P.Journe Summer Party Geneva / 8 July

The Summer Party brought together the employees of the Manufacture F.P.Journe, the Cadraniers and Boîtiers de Genève, and the Geneva Boutique for a magnificent dinner cruise on the Geneva Lake. Sarah Höflin, Olympic gold medalist in freestyle skiing and élégante ambassador, was pleased to join us. To conclude the evening, François-Paul thanked the faithfulness of the employees who have been present for 10 and 20 years by presenting them with a diploma.



Prix Solo artmonte-carlo - F.P.Journe Monaco / 13 – 16 July

artmonte-carlo returned to the Grimaldi Forum under the Patronage of HSH Prince Albert II of Monaco. During the vernissage, the Prix artmonte-carlo - F.P.Journe for the best exhibit exposed at the salon was awarded to Florentine and Alexandre Lamarche-Ovize, represented by the Laurent Godin Gallery, for their ceramic dolls. The winning artwork was offered by F.P.Journe to the NMNM, the “Nouveau Musée National de Monaco”.



Bodega Dos Hemisferios Guayaquil / 23 – 25 August

At the initiative of the Maison F.P.Journe Miami, collectors and watch lovers were invited to the Dos Hemisferios winery in Guayaquil, Ecuador. The visit to the vineyards was followed by a unique gastronomic meal accompanied by the 4 emblematic wines of the vineyard.



Grande Réserve Evening Geneva / 6 October

For the first edition of this Geneva evening which was held at the hotel La Réserve, the numerous visitors were able to discover the know-how of several exceptional craftsmen in the same place. Five Maisons d'excellence were present alongside F.P.Journe - Daniel Lévy, Château Seguin, Philippe Atienza, Daniel Bernard and Orfève.



International Fine Watchmaking Salon - SIAR Mexico City / 18 – 20 October

For this new edition of the SIAR (International Fine Watchmaking Salon), many collectors came to Club 51, in the F.P.Journe Espace, to discover our collections. An elegant and friendly experience that was greatly appreciated by all the watch lovers present at this renowned event in Latin America.



Chronomètre Optimum - Prince Albert II Foundation Singapore / 28 October

The Prince Albert II of Monaco Foundation organized the 8th edition of the “Ball in Monaco” at the prestigious Marina Bay Sands in Singapore. F.P.Journe donated a unique Chronomètre Optimum with a burgundy color and ruthenium-plated guilloché Silver dial and Chinese numerals. After a fierce battle among several collectors, it was finally sold for S\$ 1'480'000. The funds collected will be used by the Foundation to support concrete actions in Asia for the protection of the Ocean.



10th anniversary Miami Miami / 11 – 12 November

F.P.Journe celebrated its 10th anniversary in Miami. During a dinner held in a collector's sports car garage, the guests were able to discover the Centigraphe Anniversaire, an exclusive model presented in a limited edition of 10 numbered pieces engraved with the name of the city. The following day, the Maison F.P.Journe Miami welcomed its collectors, friends and their families for a festive brunch themed on the sea.



Young Talent Competition Geneva / 11 November

Organised by F.P.Journe with the support of The Hour Glass, the luxury watch ambassador for the Asia Pacific region, the Young Talent Competition aims to highlight the world's most talented watchmaking apprentices. This year, the prize was awarded to Maciej Miśnik of Poland, for his marine-inspired pocket watch with tourbillon and pivoted detent escapement. He received a diploma and a check for the amount of CHF 20,000 to help him finance the acquisition of watchmaking tools.



End of the year celebrations Hong Kong / November – December

In November and December, the F.P.Journe Hong Kong Boutique invited its most loyal collectors to gastronomic lunches in order to celebrate together the end of 2022. Each location was selected according to the culinary preferences of the guests, from French and Japanese Michelin-starred restaurants to authentic Chinese restaurants that are among the most prestigious tables in Hong Kong.



F.P. JOURNE

Invenit et Fecit

"I invented and made it"



Ref. RQ - Chronomètre à Résonance
The only wristwatch in the world featuring acoustic resonance
Manual winding movement in 18 K rose Gold
Geneva made

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+852 2522 1868

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