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The Decisive Difference

This page: Lange & Söhne movements are almost instantly recognisable, partly due to the artistry of Lange's finisseurs and partly to the dedication with which they finish each individual component (such as the tourbillon bridge pictured top) by hand. This devotion to detail is rooted in Lange's quest for perfection, which is transferred to every Lange movement in even the smallest, easily overlooked details. For instance, when chamfering a component, they make sure that the edges are filed at the same angle and across the same width. And when creating a perlage pattern, the talent of the finisseurs determines how regular the pattern is – if it is set too deep or outside the circle being stippled, the respective part has to be discarded.

When most people think about luxury watches, they picture a little white-haired man in a lab coat bent over a workbench against the backdrop of the snowy Alps, busily filing away at watch parts. *QP* examines what defines a handmade mechanical watch in the modern world. **Elizabeth Doerr**

The Alpine image is a lovely picture, but not very representative of the modern – or even necessarily traditional – watch industry. While that picturesque watchmaker might have existed two or three hundred years ago, chances are he was not making an entire watch, but rather specialised components for one.

The watch business was – and is – predominately a cottage industry, which means that watchmakers were generally specialised in one component or set of components. Our wizened, white-haired watchmaker would then deliver his components to another specialist, who would assemble them into one ticking whole.

Thanks to the importance of the term *manufacture* and general corporate restructuring during the past decade,

This page: Inspired by the legendary 'souscription' watches, Breguet's Tradition timepieces feature dials that accommodate horological complications in trim. True to the rules of flawless craftsmanship instituted two centuries ago, even their most modest parts receive a sand blasted surface finish, meticulously applied by hand. The Breguet Double Tourbillon **(above left)** features a ring-shaped dial forming a flange in silvered gold. The hour hand is an extension of the bridge supporting the two tourbillon carriages. Engine-turned by hand, a center plate featuring two apertures for the tourbillons rotates in step with the passing hours.

things have changed. The melding of companies – including takeovers and merging – that has occurred over the course of the past 20 years has resulted in consolidation and blurred lines, at least for the large name brands. And where parts were once made by hand, CAD/CAM – as well as associated technologies such as spark erosion – has delivered better quality and precision than can be achieved by hand.

Computer age

Base plates, bridges, levers and other flat parts are easily made by numerically controlled machinery, the biggest challenge of which is correct programming. This is why one can almost say that today such parts are often made by engineers and programmers rather than by actual watchmakers. For example, Roger Smith's little workshop on the Isle of Man employs five technicians: four watchmakers and one engineer to run the CNC machine. One of the 15 talented technicians at work at Tutima's new Glashütte factory is Holger Raupach, a CNC operator who came from outside the watch industry and is described by production head Rolf Lang as "a most creative engineer". Lang says Raupach's problem-solving ability allowed the small *manufacture* to work with smaller tolerances and end up with better results for the brand's celebratory, ultra-high-end, minute repeater.

The same can be said for turned parts such as pinions, pivots, and stems – miniscule components that can only be made by a lathe. Automatic long lathes, which can be programmed to draw the steel tubes, cut them into the proper lengths and turn and thread them appropriately, are run by operators, rather than watchmakers, and tirelessly work day and night. Again, the expertise involved here is in setting up the lathes correctly.

Another important catalyst removing the industry from the strictly 'handmade' was the world of new materials beginning with nickel-phosphorous LIGA – the process components as outlined in *QP*44 – and Mimotec's easy access to the technology, which suddenly allowed for components with tolerances that are almost imperceptible and parts that no longer necessarily need lubrication. Then came silicon, which is already changing the face of escapements and allowing for much higher frequencies since neither wear nor lubrication is any longer an issue.

Watchmaker Martin Braun recently explained this point very succinctly, "For years, I had thought about improving the standard Swiss lever escapement for my own movements. What I was envisioning was simply not possible with conventional materials and production methods. It was the advent of silicium [silicon] for watchmaking that allowed me to finally realise the solution I imagined."

In short, this had to do with the Swiss lever escapement's angles, which in his opinion have represented a compromise between effectiveness and the capillary effect (which keeps oil in its proper place). "This no longer needs to be adhered to since an escapement predominately comprising silicium components functions without oil," he commented. His new brand, Antoine Martin, debuted at Baselworld with a perpetual calendar movement containing a silicon escapement.

Dufour's movement blanks are crafted in German silver, like those of vintage masters and, like them, he attaches great importance to the shape and layout of the bars and bridges, which are executed with an attention to detail that most of his contemporaries have abandoned. He calls his approach respecting the ethic of the traditional movement. In his own words, "the true high end of the range is a matter of what you can't see". In the Grande Sonnerie **(top left)**, the repeating work is on the front side of the calibre, fully visible through a sapphire crystal dial – the first time that Dufour has extended his inventiveness to the exterior of a watch. The white gold piece has a highly-polished, rounded case and cambered, soldered horns. An unusual feature of the case work is the hinged outer bezel; this swings

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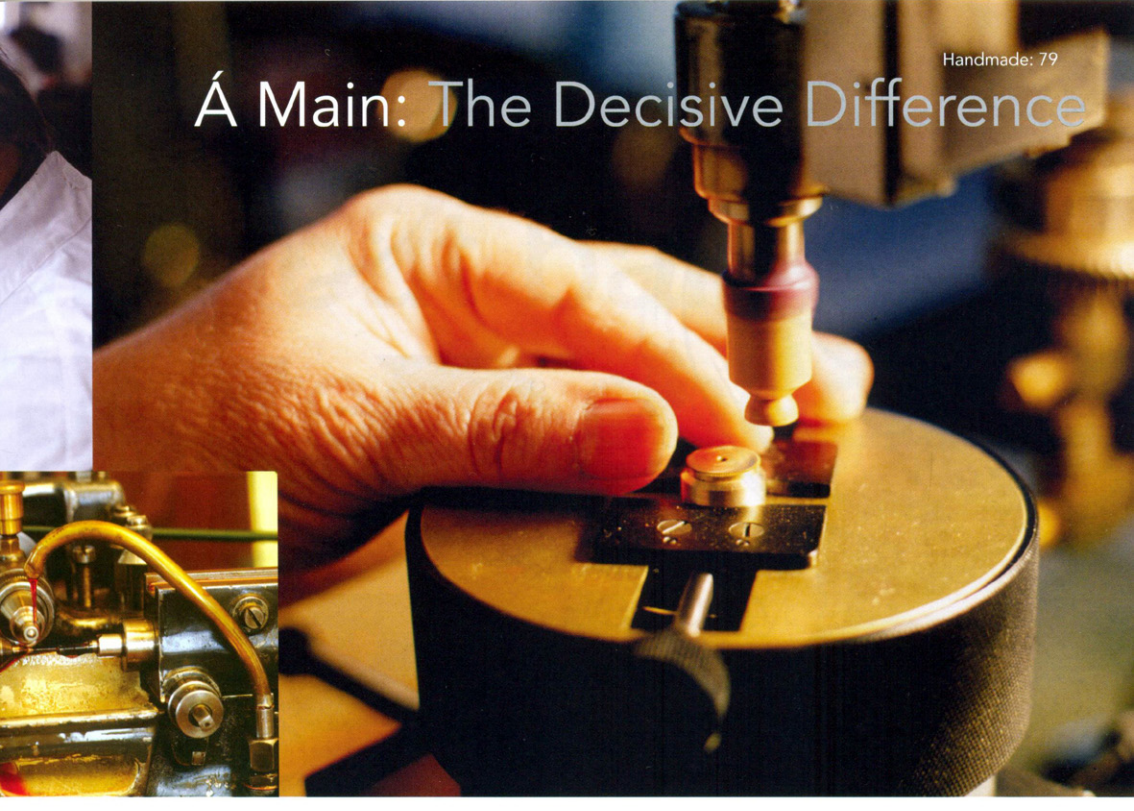

The perceived ideal

One place where that picturesque little watchmaker in his time-honored atelier has lived on in recent history is doubtlessly George Daniels' workshop. Daniels, who restored and curated antique pieces for Sotheby's auction house in his early days on the scene, hasn't worked much differently in the most recent moments of his active career than he did at the beginning of it. His workshop displays a visible love of his craft and the traditional execution of it, filled with what would today be considered vintage tools and treasures more likely to be found at auction or second-hand markets.

Along with some younger indie makers, Philippe Dufour, is the flag bearer for handmade, but even Dufour receives his base plates from a supplier who manufactures them by CNC – and other components as well. The difference is that Dufour spends much more time and effort on the handcrafted parts of his watches than just about anyone else: handmaking parts he cannot get supplied, filing and perfecting those that are supplied and, above all, finishing every piece by hand in his fastidious way. The few watches that emerge from Dufour's workshop every year are indeed about as close to handmade as the watch industry is capable of producing in this day and age.

"[Today's companies] are not seeing the big picture; the handmade watch has much more elegance – like nature, it is proportional. It is important to make it flow, otherwise it is just a box of gears," Daniels told me a few years back. And like Dufour, Daniels puts particular emphasis on finishing. "Finish reflects perfection," he said.

It's all in the finish

The finishing is, therefore, what we are really talking about in modern handmade watches since all mechanical watches must be assembled by hand. And here is where the lines really do blur and the consumer is easily misled or confused.

Many traditional movement decorations and finishings that were always the mark of the finest timepieces can be reproduced today by automatic or semi-automatic machinery. *Guilloché*, for example, is the broad term used by every watch company under the sun for the geometric patterns cut into a dial or flat movement parts such as rotors. While *guilloché* was historically achieved by use of rose engines and straight cutters powered by crank or foot pedal, today this term can also encompass machine stamping and pantographs – an automatic 'tracing' system that sees a 'finger' transmitting a pattern it 'feels' on a larger template to the smaller component.

The price of the watch will generally determine the origin of the *guilloché*, though not always: Audemars Piguet and Ulysse Nardin use pantographs to produce their luxurious dials. Thanks to the time and skill involved in applying it, authentic *guilloché* is only found on various examples of limited quantity watches such as those that emerge from Smith's and Daniels' workshops, De Witt's factory (whose largest department in the new building is dedicated to handmade dials), Patek Philippe (who employs a lone craftsman) and various other small, exclusive and mainly independent companies. There are few suppliers left – such as Jochen Benzinger in Pforzheim, Germany

open to reveal the repeater slide-bolts and their hand-engraved and enamelled titles, set in the caseband beneath. The hands are original Dufour hands in polished, blued steel and are tiny works of art. With the Duality, Dufour's challenge was to create the world's first double escapement wristwatch, to compensate for errors in the rate of the watch, produced by the effect of gravity. The two balance wheels **(opposite page, centre)** operate completely independently of each other. The differential system alone, without the regulating organs, has 21 parts, yet the entire assembly is only 30mm in diameter, and 4mm high. It fits neatly into a 34mm watch.

– capable of producing this almost lost art. Breguet is doubtless the largest producer of handmade *guilloché* with its own facilities and even a training center in the heart of Switzerland's Vallée de Joux.

Formatting

But finishing goes beyond *guilloché* and engraving, and Giulio Papi, head of Audemars Piguet Renaud et Papi (APRP), has been an adamant proponent of helping consumers to understand the difference between an 'industrial' finish and a movement that has been completely finished by hand. To Papi and others at Audemars Piguet, this is a big part of the art of high watchmaking.

According to Papi, it is beveling that is so powerful in revealing the handmade quality of a wristwatch. "The expert eye will be able to recognise this as such by identifying the technique that has been used," Papi has said. Beveling, also known as chamfering, is a meticulous finish that contributes to the mechanical beauty of the movement by breaking the light, which adds an extra shine. It removes hard edges and any nicks and scratches that may have occurred during the manufacturing process while remaining perfectly regular at a consistent 45-degree angle.

Fine watches have these and other techniques such as côtes de Genève and perlage applied to every single part, including drilled holes and even in between the teeth of a pinion. Less expensive watches will have machine-applied finishes, if they have any at all. From the mid-level on up finishes may be partially machine applied – complication suppliers Dubois Dépraz and La Joux-Perret, for example, own machines that automatically apply perlage and côtes de Genève. For the most part, high-end luxury watches are hand-finished throughout, with the finest examples perhaps achieved by Greubel Forsey, A. Lange & Söhne, Vacheron Constantin, Kari Voutilainen, Breguet, Urban Jürgensen, Glashütte Original, and – of course – Philippe Dufour.

"A high-end watch takes an above-average amount of time to create," says Papi. And this is precisely what makes the difference in the end: it is the amount of time and expertise put into a watch that differentiates the handcrafted from an industrial-level piece. Many times it will also be the difference between £5,000 watches and those costing much more: a beautiful gold Lange 1 will run you to £20,100 and Benzinger Boutique, also considered a handmade line due to the level of its exquisite finishing, though its base is a Unitas calibre, starts at £25,000. Quite a bargain when you consider the prices of some of the other watches in the upper echelons of what is considered hand-finished.

Top left, top right & centre right: Roger Smith runs Britain's only fully handmade watch business with wife Caroline and exports his works to a global clientele. Each of Roger's Series 2 wristwatches has over 220 individual pieces and can take up to five months to make. The watches sell for between £72,000 and £120,000 and, although the case, hands and dials are all made from gold, silver or platinum, 90 per cent of the cost is in the labour taken to make and hand finish every single component of the mechanism. **Above right:** Entirely in tune with Greubel Forsey's philosophy, the Tourbillon 24 Secondes Incliné is totally detached from its gear trains, so the system appears to be moving in complete freedom and may be observed in full from both front and side. The shape of the rounded-off steel tourbillon bridge further broadens the visual access to the mechanism and provides a view of the carriage in titanium and the pillars in Avional. The rotating cage is composed of 88 parts weighing 0.39g.