





WORLD OF ENAMEL

MARTON RADKAI

The essential power of artists and artisans is to be able to transform the most basic, banal materials into something noble, something that will move us. One of these materials is enamel, which, over the centuries, has become a most durable companion of watchmakers.





1

1 Versatile enamel powder, from telephone dials to miniature painting.

The history of enamel goes back a long way and is quite fascinating. The annals of the art do not reveal why but at some time in the thirteenth century BC, goldsmiths in ancient Greece started crushing glass or some vitreous material, mixing it with pigments, painting it on a metal substrate and then baking it in a hot oven where it melted to form a hard, brilliant surface. What remains from those days are jewels and some religious artifacts that already show why enamel is such a beloved material. It is durable and the colors hardly ever fade, if at all. In addition, despite its lowly origins, it always looks stylish, even opulent, when done well.

Thanks to endless experimentation by dedicated artisans like goldsmiths, working as, and later with, chemists, the possibilities offered by enamel were expanded. Specialized techniques were devised to apply it in different ways. Jewelers found myriad ways to use this humble product to enhance their products. On a mass scale, the Industrial Revolution saw a boom in affordable household enamelware, with items like basins, pots, pans, ladles, flatware, vases, mugs, even bathtubs, and more, which have become collector's items in their own right.

That watchmakers should turn to this material was no surprise. Dials covered in enamel appeared in the second half of the seventeenth century, their brightness contrasting nicely with the watch hands, which allowed the user to read the time even in diminished light. But even before then, artisans had been enameling watch cases. One example is Geneva's jewelers, who had been forced by Jean Calvin to cease producing what the Protestant leader considered filthy lucre. They subsequently turned their attention to manufacturing watches (which had a function and were therefore acceptable) and then decorating the cases, often with enamel.

THE BASICS

Enamel is a fairly lowborn substance, but it is not easy to work with. To begin with, each enamel is made up of various compounds that each have specific functions, like fluxes, that help the melting process, or refractories and opacifying agents. These mixtures have different properties, like melting points, transparency, and colors, when processed. In addition, some of the compounds are now being demonized by governmental agencies



RALLY

ITAY NOY

Independent Timepiece Maker | www.itay-noy.com | studio@itay-noy.com







because they contain poisonous elements, like lead and arsenic. Unfortunately, they are crucial to the quality of the final product and enamelers haven't found any substitutes yet, in spite of much experimentation.

Claude-Eric Jan, manager at Donzé Cadrans in Le Locle, Switzerland, knows all the difficulties. His company, which is owned by Ulysse Nardin, is a partner to some of the most prestigious brands. In one room stand three barrels filled with all sorts of dials, the ones that didn't pass muster. He gives a guffaw: "Seventy percent of the things we make have to be rejected, and some brands [he names a high-end German company -Ed] are so finicky we make a loss trying to work to their standards."

THE PROCESS

Before even making a dial, the bulk enamel has to be prepared. One step involves separating the enamel from a light silt-like dust, which is used to cover the gelatin stamp for printing on the dial. Donzé Cadrans only does "grand feu" (great fire) enamel, a technique dating back to the sixteenth century and involving baking the dial at over 800°C (over 1,400°F). This makes the enamel more resilient. But even the simplest dial requires great care to be made without faults, because there are dozens of factors that must be taken into account, mostly having to do with the action of heat onto the enamel and the substrate below. To get the dial to the right thickness and right hue requires multiple firings. Each time the enamel will melt and resettle. So a lot of testing must be done beforehand. An opalizing enamel powder, for example, contains a compound that will oxidize a silver blank (the dial base), so it can only be used on a gold-nickel blank.

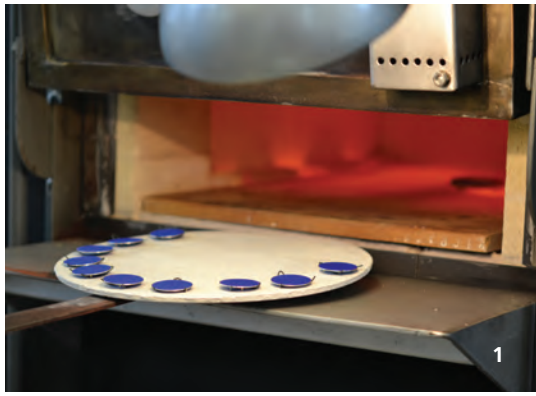
Then there is the impact of physics. "You have to anticipate what is going to happen to the metal base and where the dial feet will be, because the heat will stretch the metal," Jan points out with a revelatory sigh. The dial feet are the little posts that will hold the dial in place on the watch's mainplate. The numerals and other elements are then stamped onto the dial using another enamel, which passes through the kiln once more. At which point the dial undergoes another inspection because the enamel has a life of its own.

Every dial will have to be fired several times to get the right height and texture, and if several enamels are involved, the probability of error increases incrementally. "Some enamels melt at a lower temperature, so now you have to imagine you have enamels with different melting points next to each other," Jan says. "There is never any certainty." If a client suddenly wants, say, a different blue, it can mean having to change all the other enamels to find the one with the closest melting temperature, otherwise the colors may not mix properly.

A CUT ABOVE

There are many different ways of further enhancing the enamel on the dial. One of them is known as *flinqué,* a jeweler's term meaning to scratch a metal substrate to facilitate enamel's





1



2

1 The process of enameling, from mixing the powder to firing the dials.

2 Seventy percent of dials do not pass the quality controls.



Islander

WATCH FEATURES:

- **Movement:** Seiko NH36 Automatic
- **Case:** 316L Stainless Steel, 43mm x 14mm thick
- **Crystal:** Anti-reflective Sapphire
- **Bezel:** Sapphire luminous bezel insert
- **Water Resistant:** 200 Meters
- **Models Shown:** ISL-09 & ISL-10

ISLANDWatch

Affordable Quality Timepieces Online

www.longislandwatch.com • sales@longislandwatch.com







adherence. Instead of just roughing up the surface, though, the dial is actually engine-turned (*guilloché*) to form regular patterns (like sunburst or *clous de Paris*). The effect can be quite spectacular, as the enamel shimmers slightly in the ambient light. Czapek's Quai des Bergues Sapphire Blue, for example, features a special *guilloché* made to look like the harmonizing rings produced when raindrops fall in the water. It is then covered with a rich blue enamel that is particularly effective.

CHANGING COLORS

The term *fumé,* meaning smoked, generally applies to any graduated color scheme. It gives the dial a certain discreet vivacity. When the enamelers at the young Glaswegian brand anOrdain were experimenting with a silver blank, the dial warped to form a slight dome. "When we sanded it back, there was a thinner section in the center and a thicker section on the outside that gave it a gradient effect," says Nicky Faill. They then turned the apparent error into a virtue and tried to replicate the effect by stamping out blanks with a slight dome and finding those enamels that would be lighter when thinner but had a nice rich color when thicker. The process requires upwards of six firings to get to the right thickness, including a coating of enamel on the back (counter-enameling) of the stamp to even out the tensions on the dial.

Another way of mixing hues on the dial is called *grisaille,* which can be traced back to Flemish painters of the fifteenth century. It was taken up by enamelers in Limoges, France, in the sixteenth century. It makes use of the different opacities of enamels and a special white enamel to create an effect of depth. Van Cleef & Arpels applies this technique to great effect on the dial of their Pont des Amoureux.

FINER ARTS

All enamelers know how difficult it is to repeat each process and expect the same outcome. It is almost impossible to achieve perfection, Claude-Eric Jan points out, "but that is why with enamel you have a certain amount of personalization." The tiny fault on your dial might well make it unique. Each firing adds another layer of uncertainty. There are other forms of enameling, however, that multiply the challenges. *Champlevé,* for instance, which translates as "raised field," has been around since Celtic times. It requires the added





1 AnOrdain's typical "fumé" dial was born of an accident..

2 Enameling dials old style.

3 Czapek's Quai des Bergues Sapphire Blue.

4 DuManège's Héritage features a combination of champlevé and grand feu.

5 A tiger in grisaille technique on the Rotonde de Cartier.





THE MILITARY EDITION

Antique American pocket watches built for the US Army Air Corps during World War II converted into limited edition wristwatches aptly named The Military Edition.

VORTICWATCHES.COM | INFO@VORTICWATCHES.COM | 517 N LINK LN UNIT A, FORT COLLINS, CO 80524 | 855-285-7884





1



2

skill of an engraver, who digs cavities into the metal blank to make up a drawing or pattern. The spaces are then filled with opaque enamels, giving whatever drawing appears on the dial a sculptural feel, as each segment will be framed by the metallic ridge.

A variation of *champlevé* is called *basse-taille* (or low cut). It involves cutting some specific shape at the bottom of the field, rather than just roughing, and using transparent enamels, which means that whatever has been engraved will be integrated into the overall design appearing on the dial. A version used by Van Cleef & Arpels is called *vallonné* from the word for valley. The trough of the embossed area is carved with gentle rises to give the enamel fired on top a dynamic look. Another way to achieve an effect similar to this one is by applying the paste in heavier gobs into the fields. The *cabochonné* technique is used by Van Cleef for its Charms Extraordinaire Désir series.

Instead of digging into the blank, the enameler can actually build up little panels that replicate a motif. This technique is called *cloisonné,* and according to one Dr. Panicos Michaelides, it dates back to Crete in the thirteenth century BC. Six rings were discovered in a tomb with enamel melted into compartments (*cloisons,* in French) formed with gold wiring.

The process requires great care and skill on the part of the artist-enameler. It begins with the transfer of the drawing to the dial. A light transparent enamel is poured onto the dial and the gold wire is pasted along the lines of the drawing using a gum. It's not soldered to avoid any deformation when the base expands during the firing. The ends of the fires are gently bent so they can in fact stand alone. "The enamel base melts and then holds the wires," Claude-Eric Jan explains. "If they were without the loops, they would just sink into the enamel." Afterwards, the compartments are filled, fired and any rough edges or excess enamel is then ground down using abrasive powders. *Cloisonné* enamel is a very time-consuming process, but it is particularly rewarding.

A HIGHER ART

Grappling with the various physical properties of enamel and building or engraving compartments to hold the enamel is difficult enough, especially since the results are never certain. The pinnacle art form in this field, however, is miniature painting with enamel. For a while, in watchmaking at least, this art had almost totally disappeared. Driven by the rediscovery of old *métiers d'art* and perhaps by the quest or very rare pieces, it returned and is now a way to create truly unique dials. Besides being skillful at painting, the enameler must choose and prepare the enamels carefully, keeping melting points in mind and then mixing them with oils. Each application of the paint is followed by a drying period and a firing and the hope that the image will not be ruined in the kiln. One can imagine the patience required to complete a piece. Today, the industry boasts just a few of these highly dedicated artists, like Anita Porchet (see page 48-49).

1 Cabochonné enamel produces sculptural petals on Van Cleef & Arpels' Fée Sakura.

2 The wings of Van Cleef & Arpels' Aquila (eagle) are in vallonné enamel.

3 Building up the paneling in the ancient art of cloisonné enamel.





3



1

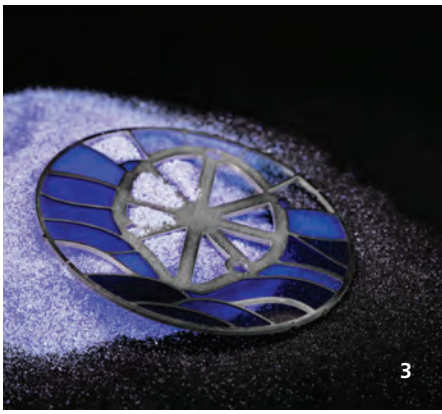


2

FINAL TOUCHES

Enamel continues to challenge those who decide to work with it. Many watch brands and jewelers continue to experiment with new techniques or revive old ones. Every now and then, a brand will produce a special piece, for instance, in *paillonè,* that is with small fragments of gold or some other shiny material sunken into a transparent enamel. A few years ago, Hermès launched a watch with *millefiori* on the dial, an enamel that incorporates little evenly-spaced, colorful tubes that look like lots of little flowers, hence the name "thousand flowers."

Another specialty is *plique-à-jour,* which is enamel in a metal frame. It is difficult to produce and very delicate. Diane Almeyda, a jeweler in Florida, fell in love with it when she needed to decorate a box. "There was a delicacy in the glass, yet the colors were so brilliant," she told me in a written interview, "it was the perfect addition to the metalwork." With *plique-à-jour,* a transparent enamel paste is fired on a metal skeleton of metal or metal wires without a back. The result is like stained glass. "Glass and metal have different coefficients of expansion and contraction causing inherent problems in the joining of the two," Almeyda writes. "Some enamels are not compatible with each other or the metal structure. They may melt at different temperatures or create too much stress and cause cracking or even tearing of fine wires." It's why she considers each piece "a miracle." Actually, if you speak to most of those in this particular art, they will say that getting anything out of the kiln that doesn't have some kind of defect is a bit of a miracle. But that is enamel, a ground powder that continues to challenge artists and artisans and thrill afficionados.



3

1 Millefiori or thousand flowers technique.

2 Embedding metal slivers (paillons) in the enamel.

3 Preparing to make plique-à-jour enamel.

4 Plique-à-jour specialist Diane Almeyda makes delicate jewelry with 'transparent" enamel.





4

FIRED UP

MARTON RADKAI

She was twelve when she fell in love with what would become the rest of her life. But she didn't know it, perhaps. Anita Porchet, born in La-Chaux-de-Fonds, entered the hallowed atelier where her godfather, a jeweler by training, had taken up enameling when the notorious quartz crisis more or less put him out of work. She began an ad hoc apprenticeship, spending all her free time at the studio learning how to paint with this finicky material in a thousand small steps and discovering the world of art and music. She later learned the standard techniques and turned to watch dials.



1

Anita Porchet has a calm voice with a distinct lilt from her native Jura. She is a dyed-in-the-wool artist, very independent and a collector of impressions, inspirations, techniques. The shelves and tables in her studio are covered with jars of colorful powders, enamel swatches, cups filled with various tools and of course her paint brushes. One of her treasures is a collection of *paillons,* little gold shapes (like numbers) stamped from gold leaf and used to make designs that are then captured in enamel. She shows me a box containing a wad of photographs of the apple tree outside her studio window shot one season after the other under a big sky on the plateau northeast of Lausanne. It's where we met for an interview.

Marton Radkai: *Do you remember what attracted you to your godfather's workshop?*
Anita Porchet: I liked painting and drawing, but basically, I just liked to be in the atmosphere in that atelier. My godfather taught me a lot about art and music as well. I played violin with him. He was a painter, too. When I was fifteen, he had me listen to all of the Bach cantatas.

MR: What did he and you work on?
AP: *He was an immensely creative person; he was always looking to create new things. He was ahead of his time and did things that were not recognized at the time. But I think today it would resonate. Back then we reproduced paintings with enamel, but he would do abstract drawings. I kept a notebook with little drawings and with colors in it. We would fire enamels and keep track of the colors.*

MR: Do you remember your first picture?
AP: *Yes! When I was fifteen, I did a tableau by Corot.*

MR: What still fascinates you with enamel?
AP: *It's all very simple. I work with very simple tools. You start with bits of glass, you crush it, you add a little bit of water, you take a paint brush, and that's it.*

1 Anita Porchet fell in love with enamel as a child.

2 Her workshop has an inspiring view.

3 Porchet has her own collection of paillons.

4 Working on Audemars Piguet's Grande Sonnerie.



2

MR: But it's not that easy, is it?
AP: *You have to be patient. And you need to be resilient in the face of failure. The more I progress with enamel, the less I understand it. One thing I know is that I always know less. You need experience, though. But the great big question mark is what comes out after the firing process. It is really alchemy. We work with fire, and nothing can be fully mastered. When discussing a project with my clients, I always tell them that I will not know the outcome until I've done a prototype.*

MR: Could you give me an example?
AP: *If you are doing a* cloisonné *[with wires -Ed.] and you are using a so-called tender color with a harder color, the first might melt and tip the wires over. So, I have to look for an enamel of a similar color, but with a different melting point. Sometimes the powdered enamels don't mix properly, or they suddenly form bubbles when fired or become lighter…*

MR: When you start a project, how do you go about finding the inspiration for it?

AP: *I begin by talking with the client. I then need time for the project to ripen, even if the client has a definite image he or she wants. Suddenly something happens and I know how I'm going to interpret it. With experience, I can now tell the client sometimes how to improve the image. And so we evolve together.*

MR: Enamel is becoming industrialized. Does that sadden you?
AP: *I've seen* flinqué *dials that are perfect, and I cannot compete with them. We should do what the Japanese do, which is to transmit knowledge—the hand gesture—which is what lets us attain artisanal perfection. It's not technical perfection.*
However, I think we are losing something on the artistic side, a sensitivity, an emotional quality. And a skill. If we have machines that can do everything, I don't understand what the point of life is. I always see the errors in the pieces that I do, that's good, and I am happy to go on to the next project. The so-called "errors" or imperfections are the signature that shows that the piece was handmade.

(Excerpted from a longer interview.)





3



4