CREATING THE MOST COMPLICATED WATCH

Jean-Pierre Musy, the creator of the Calibre 89, speaks for the first time about the conception and fabrication of the most complicated watch in the world...

COSTANTIN STIKAS: ***Can you talk to us about the conception of the Calibre 89, the most complicated watch in the world?***
JEAN-PIERRE MUSY: Right from the start, the idea was precisely to fabricate the most complicated watch in the world. At the time, there were two watches that could claim this title. One was the famous Graves of Patek Philippe and the other one was the LeRoy 01, which had been manufactured by the French watchmaker LeRoy. The latter had more indications than the Graves, but those two or three extra indications were not watchmaking complications (thermometer, barometer, etc.). Thus Philippe Stern, the owner of Patek Philippe, decided on the occasion of the 150 year anniversary of the House, to design and fabricate a watch that would be even more complicated than these two and would solve all these questions. His purpose was to leave no room for doubt this time. That's when he called on me.

Was the work method the same as in these historical watches?
What do you mean by "work method"? The Graves was fabricated by a watchmaker of the period, who had obviously made his calculations in advance, and had also made some drawings in order to help him as to how to do it. Personally, I am an engineer, and in the case of the Calibre 89 I was asked, along with my colleague François Devaud, to use my knowledge of Micromechanics in designing the entire movement, in deciding which complications to include in the watch and how to synchronize them with each other, and finally in producing the technical drawings that would include all the details for manufacturing the elements, as well as the method of assembly. Of course, we had already studied all the watches that combined many complications. We did all this with the aid of calculators, since we had no computers like today, but these calculators used calculation programs. Imagine that each piece has its own plans, its own dimensions, its own measurements, and its own tolerances. As many as 2000 plans were used for the fabrication of Calibre 89! These plans were used as a blueprint for manufacturing the elements, which were later assembled by the watchmaker of our company, Paul Buclin.

How much time did the project take?
The research and design process took 5 years. Of course, during that time we also did all the calculations in order to find out the kinematics of complicated movements. Afterwards, we created the prototypes and then we manufactured the first pieces with the use of machines, like we do today in Patek Philippe. At that time, in 1984, we received the first numerically controlled machines. In 1988 Paul Buclin began assembling and constructing the watch.

What is the structure of a watch that has 33 complications?
There is the main plate, which is the base that supports the entire movement. The watch has two faces: on one side (that which most people consider the front) there are complications based on real, average time. On the other side, there are complications which are rather based on astronomy, sidereal time. The base plate supports the entire movement of the Minute Repeater, which is extremely complicated, because it contains 4 hammers and gives an exceptional sound. All the other complications are modules attached to the main plate, on both sides, of course.

What is the greatest difficulty in fabricating a watch that combines so many complications?
First of all, the major difficulty is to synchronize all these complications in the same mechanism! But the solution to this problem lies in conception. Everything can be evaluated and executed according to the plans. If you know the logic of an indication and the way it evolves over time, then you can estimate the gear-system which will give you the desired result. The problem is with cycles that are extremely long, sometimes spanning several centuries and varying a lot! The greatest difficulty that we encountered in the fabrication of the Calibre 89 was the calculation of the feast of Easter. The search cycle of the date

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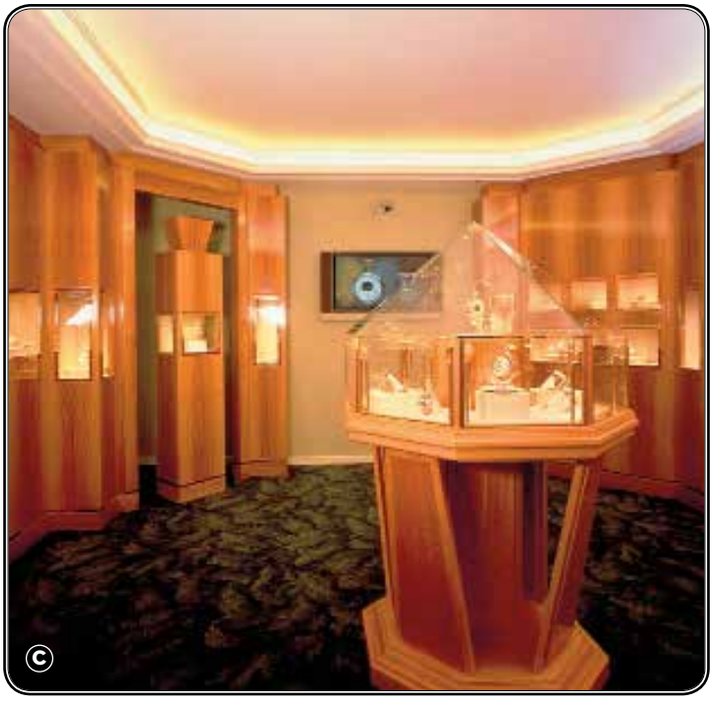

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– A&B –
The two faces of the Calibre 89

– C –
The showcase in which the Calibre 89 is displayed at the Museum of Patek Philippe

– D –
Jean-Pierre Musy

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of Easter, in every year, is very difficult. I've read many astronomy books, and it is almost impossible to include all these parameters in a gear-system! There is only one clock in the world which can calculate the feast of Easter with extreme precision, and that's the clock of the Strasbourg Cathedral. We studied this problem and we realized that it was impossible to include all these parameters in a watch with the dimensions of the Calibre 89. We thus had to find an alternative, and that was to represent the dates of the feast of Easter over 30 years in a pre-programmed cam and then to construct a mechanism that would make the cam jump once a year. For 2020, the watch must be sent to Patek Philippe in order to change the cam and to program the dates of the subsequent 30 years. Every year, on December 31, this cam jumps and arrives on the date of Easter of the following year. Another major difficulty was to know how to restore the indications of a watch when it has stopped functioning for a certain time. We had to confront this problem from the very beginning and it was one of the most difficult to solve from a mechanical point of view. There are certain astronomical indications that are very difficult to calculate, and we had to be able to correct them separately.

Was the energy required for the operation of all these complications also a problem?
No. It is based on a very simple calculation. We calculated so that the springs of the barrels are strong enough to support all these mechanisms according to the energy needed for each movement.

Before conceiving the Calibre 89, were you a specialist in the design of complicated watches?
No, not at all! I was not familiar with complications, since before that, in 1980, I had been working for Omega in Bienne. It was Mr Studer, the Technical Director of Patek Philippe, who hired me as project manager for that piece.

What type of watches did you work on before?
Quartz! (laughing...)

You must be joking!...
I was making quartz watches for Omega at the time...

What you're saying comes as a great surprise for fans of watchmaking!... To think that an engineer can switch so easily from designing quartz watches to conceiving the most complicated watch in the world...
(Still laughing...) I must admit however that I studied before coming to this place. I visited Patek Philippe, I talked with many watchmakers, and I also read LeCoultre's book on complicated watches. They told me, "Buy this book and read it". So I bought LeCoultre's book on complicated watches and read it!

You surprise me! For fans of watchmaking mechanics, it is difficult to imagine that the conception of a simple, everyday watch is based on the same principles as that of the most complicated watch in the world!
The mechanisms of the Sonnerie, for example, were already available. They were described in the book that I bought. You really have to take a look at this LeCoultre's book. There is a description of the Minute Repeater, the Sonnerie, and there is also a description of the Perpetual Calendar... I was interested in all this because I believed that there was still a chance for mechanical watches, given that at the time, in the 1980s, quartz watches were supposed to be the only thing that mattered. It was a challenge for me to revive these complicated watches. My second construction in Patek Philippe was the Minute Repeater. When I finished the design of the Calibre 89 in 1986, I set about designing the Minute Repeater, and they were both launched in the same year, in 1989. Ever since, all of Patek Philippe's Minute Repeaters are based on the movement that I designed at that time. The Calibre 89 renewed interest in complicated watches on the level of conception. Until then, isolated watchmakers took old ébauches and assembled, filed and finished these pieces, but they did not design complicated watches any more. Later, watchmakers like Franck Muller or Roger Dubuis started to use complicated movements for whose conception they were entirely responsible.

Is the very beautiful representation of the starry sky in the Calibre 89 the same as that used in the Sky Moon Tourbillon and the Star Caliber 2000 models, or did you make improvements?
The position of the stars on the map is perfectly accurate. We also took into consideration the magnitude of the stars, and we created 5 different dimensions according to their distance. We cooperated at the time with the Astronomical Observatory of Sauverny, near Geneva, and they provided us with all the necessary data. Afterwards, for the two watches that you mentioned, we thought of adding the Moon, which appears among the stars, and we also applied for a patent on the mechanism showing the phases of the Moon.

If you had to compare the Calibre 89 with the Henry Graves, what would you say?
At the level of complicated movements, I think that the Graves has some deficiencies...

However, it was auctioned by Sotheby's for a higher sum than the two Calibre 89, which were also sold at auction...
There are two factors which determine the price of a piece: its rarity and the date of its fabrication. And the Graves has priority in these two domains compared to the Calibre 89. However, as the years go by, the Calibre 89 will get older, and it will sell at a more expensive price considering that it has more complications. I think it's going to beat the record set by the Graves.

What watch do you wear in your everyday life?
Every day I wear the watch that I received after 25 years of work in the House. It's an Annual Calendar, one of my own conceptions which was introduced to the market in 1995. At the time, there were only watches that anticipated the leap years. The difficulty of fabrication lay in the fact that they had to "jump" 4 days, when at the end of February the watch passes from the 28th to March 1st. With the other months things are simpler: there are 7 months with 31 days, and thus no need for correction, while there are only 4 months with 30 days, and the correction concerns only one day. That watch was very successful since the beginning.

The Calibre 89 were fabricated 20 years ago. Did they already need service?
No, but it depends, of course, on the way that the owner of the watch looks after it. The need for service is different depending on whether the watch is wound every day or whether it is constantly inside a showcase. I am very happy that all the Calibre 89 belong to collectors and not to businessmen engaged in commercial activities.

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Four photos that reveal all the complexity and the splendour of the movement of the Calibre 89

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