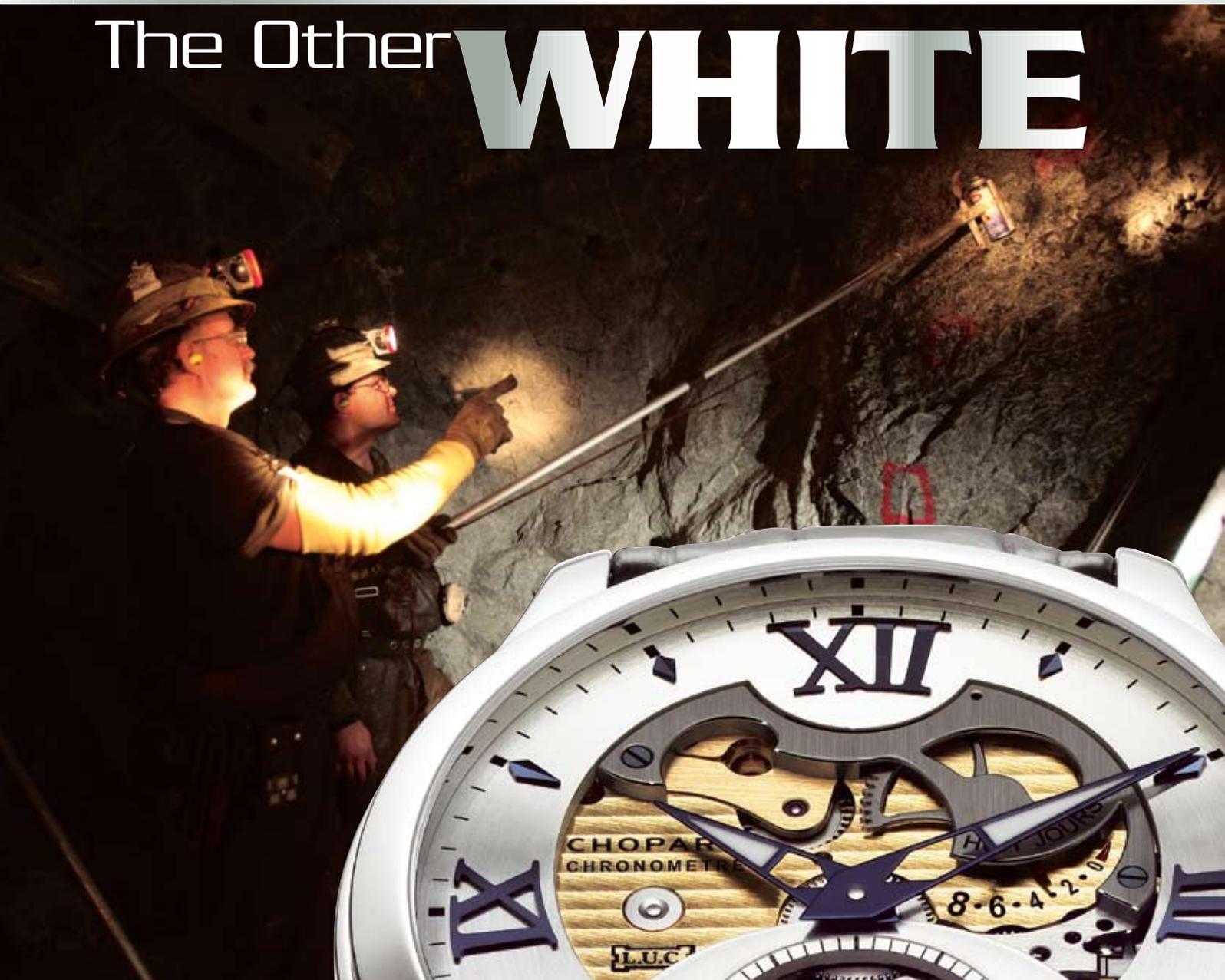


The Other **WHITE**



METAL

BY RENÉE AMELLIO

Palladium gains luster as an alternative to platinum and white gold for high-end timepieces



First identified in 1803, palladium could very well be the metal of the 21st century.

In recent years the white metal has piqued the interests of the timepiece market after serving as a design element for jewelry since the 1940s. Beyond these markets, its use spans across industries, from electrical components to surgical instruments. According to Palladium Alliance International (PAI), the automobile industry (specifically, in catalytic converters) accounts for more than 55 percent of global palladium consumption, while jew-

elry and watches represent only 14 percent of the metal's worldwide use.

Chris Ploof, bench and fabrication consultant for PAI, says that palladium's malleability is similar to that of gold, allowing it to be hammered into sheets no more than a millionth of a centimeter thick. It is lighter in weight (with like density of silver), 10 percent harder than platinum and has 23 percent greater wear resistance compared to gold. Thus, it has greater durability and is less prone to scratches and dings.

Chopard's L.U.C. Tourbillon Heritage, made in palladium, retails for \$170,000 and is limited to twenty-five pieces.



The H. Moser Mayu Palladium

These properties alone make palladium advantageous in the design and construction of timepieces.

A Look at the Element

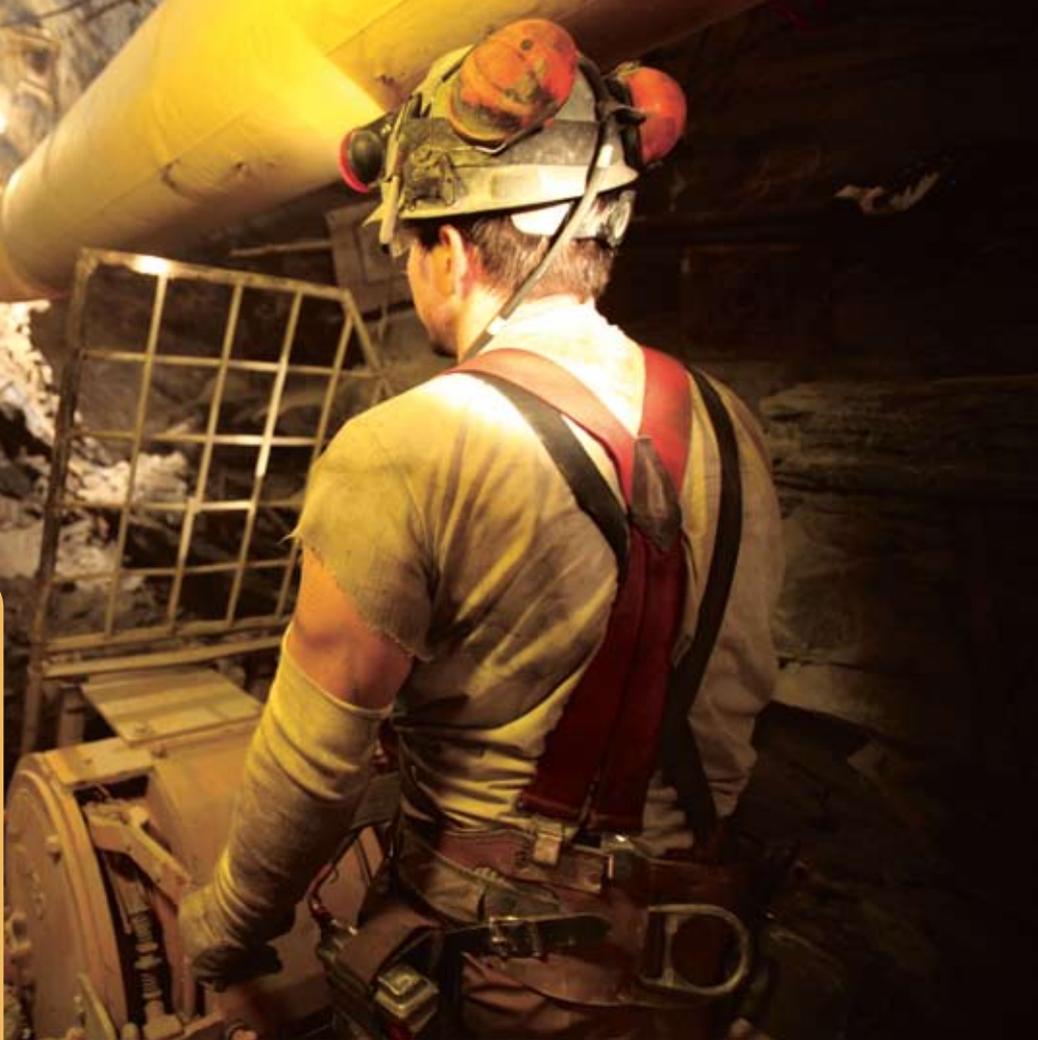
Palladium is quite rare. In fact, it is approximately thirty times more rare than gold, making it one of the ten rarest elements in the earth's crust. To put things in perspective, PAI estimates that approximately seven million ounces of palladium were mined in 2007 as compared to 80 million ounces of gold. Platinum is slightly more rare—with 6.6 million ounces excavated during the same period.

The beauty of palladium has been known to jewelry makers since at least 1939, when the British Government's declaration that platinum was a strategic metal re-

served for military use only saw jewelry makers turn to its sister element. As the demand for wedding bands increased in the 1940s, known designers—such as Tiffany—turned to palladium as the precious metal of choice for women. The trend, however, did not continue, as the palladium alloys of the time proved difficult to work with.

Palladium has been used in such watch industry applications as springs for quite some time. It is used as an alloy to optimize platinum's working characteristics and wear properties. The naturally white





PALLADIUM'S SHINING HISTORY



The history of palladium naturally starts with platinum, with evidence of its use dating back to ancient Egypt in the seventh century B.C. It is doubtful that platinum was recognized as a separate metal in such early civilizations and, most likely, mistaken for silver. The most successful exploitation of platinum occurred in the New World of the late 1800s, where pieces of jewelry, rings and pendants were made of platinum or platinum and gold combined, showcasing the noteworthy and advanced metallurgical skills of these times.

Discovered by William Hyde Wollaston, and named after the Greek goddess of wisdom Pallas, palladium is found with deposits of the periodic table's platinum group metals such as ruthenium, rhodium, osmium, indium and, mostly, platinum. To a lesser degree, it is a derivative of nickel-copper mining.

metal is an ideal alloy in the production of white metal—eliminating the need for rhodium plating. However, until recently, palladium alloys were too soft to correspond with the production standards of a watch case. But this has changed as the fairly new adaptable proprietary palladium 950 alloy provides the suppleness and the ductility to withstand varied mechanical treatments.

Watch Interest

With increased popularity of palladium comes the need for watch companies to examine the metal's unique working conditions. Popular belief dictates that casting palladium is the greatest challenge in watch manufacturing, due to the

risk of oxidation. But this is no longer the case, says Linus Drogos, a casting consultant for PAI.

“The notion that palladium is difficult to cast is—at this point—outdated,” he notes. “Palladium can be cast successfully with consistent results.” It will heavily oxidize at extreme heat and become an oxygen sponge when molten at temperatures above 1,112 degrees Fahrenheit. A controlled environment and the use of an induction melt casting machine (with a sealed chamber) and an argon cover can mitigate reactions. Palladium is able to withstand higher temperatures than its sister metal platinum, resulting in an enhanced consumable life.

According to Drogos, most



Below: Vacheron Constantin's new Quai de L'île line offers customers the chance to personalize their watch purchase with a number of exotic metals, including palladium. The line also comes in a number of premade versions. This palladium piece is one of them.



Right: Ulysse Nardin's Macho Palladium 950



Cartier's Pasha was among the first watches to be offered in this white precious metal.



Parmigiani Fleurier has offered palladium models for several years, including this Kalpa. The firm's new Pershing collection also features palladium cases.

Palladium and the other platinum metals share common characteristics. They are less susceptible to corrosion and tarnish, have a naturally white patina and exhibit high levels of inherent strength and durability.

The majority of palladium, roughly 96 percent of the world's consumption, is generated from mines in South Africa, Russia and North America. The palladium reserves of South Africa are located in one of the largest layered silicate rock intrusions in the world—the Merensky Reef. Anglo American Platinum—South Africa's largest palladium producer—operates six mines. And the United States has only one principal palladium producer, the Stillwater Mining Company in Montana, which operates two mines. Norilsk Mining in Russia is the world's leading palladium producer and holds a majority interest in Stillwater Mining.

Palladium is valued for its resilient nature, lithe character and tensile strength, it takes much work to refine it. A three-stage filter system selectively extracts—in specific order—other metals to

watches start as a billet (a shape suitable for further processing) and are machined into case components. The trace elements of the palladium alloy dictates the machining techniques used.

"Palladium in its pure state is machinable, yet it tends to be gummy," Ploof adds. "But some of the newer proprietary alloys...are less gummy and can be machined at a higher speed, producing a clean-surface finish."

As for soldering the palladium 950 alloy...no firecoat or flux is necessary, but a surface oxidation will most likely occur at high temperatures. The resulting blue-violet color on the surface is easily removed.

Precious metal refiners Hoover and Strong and Johnson Matthey have each developed a 950-palladi-

um alloy that offers ease of manufacture for both machined and cast product. The alloy contains 950 (or 95 percent) parts of palladium to 50 (5 percent) parts other metals—with ruthenium comprising approximately 48 parts (4.8 percent) and other metals that improve the working and casting characteristics of palladium, accounting for the remaining two parts (0.2 percent). As ruthenium is a platinum-group metal with similar characteristics to palladium, it nicely complements the beauty of this precious metal.

Watch companies like Parmigiani Fleurier are highly selective and demanding with regard to the "whiteness" and "brilliance" of precious metals. "Palladium was highly interesting [to Parmigiani]



Left: Carl F. Bucherer's Patravi TravelTec FourX uses a case partially constructed from palladium.



Right: Cvstos's Challenge QP S, available in a number of materials, also comes in palladium.

produce a higher-grade concentration and minimize precious metal loss.

"In general, the full refining processes used for palladium, platinum and gold are well-established and fairly similar in that they require multiple chemical steps to enable separation," says Mark Danks, PhD, Sales and Marketing Manager of Johnson Matthey—the largest secondary refiner in the world. But, the refining process for palladium requires further steps.

"Primary material from the mine has a very low concentration, so it must be refined through a complete circuit to remove all impurities, separating the metals from each other," adds Danks.

Refining costs vary from metal to metal and depend on the material's origin and grade.

On a cost basis, the percentage charged by refiners is the same for platinum and palladium, while gold is less expensive. While refining costs are relatively low, it's the cost per ounce of the respective platinum group metal that will dictate price comparisons.

due to its natural white color and brilliance. But it was not until Johnson Matthey developed the 950 palladium alloy that it became suitable...for watch making," says Michelle Veyna, President of Parmigiani Fleurier North America.

Until lately, palladium had been the quiet metals giant, but now industry leaders are more interested in the exquisiteness of this white, light precious metal. The PAI was formed in 2006 as the marketing arm of Stillwater Mining Company—with offices in the United States, United Kingdom and China (which is the most advanced

market for palladium). Dawn McCurtain, director of marketing for PAI, points out it is the world's first organization dedicated to establishing palladium as a luxurious, precious and distinctive metal.

"The project of identifying where palladium fits into the marketplace and the creation of a corresponding brand image has been as monumental as it is exciting, and it's only getting bigger," says McCurtain.

With the increasing proliferation of palladium, the watch industry has stood up and taken notice. Thanks to the production toler-



Based near the Stillwater mine, Montana Watch company plans a collection made with palladium cases.

ances of the proprietary alloys, palladium is the beating heart of some of today's limited edition timepiece collections.

Cartier has embraced the precious metal in a recent 'Pasha de Cartier,' which sold out prior to its official launch in Geneva. Chopard's palladium L.U.C. Tourbillon Heritage, which retails for \$170,000 and is limited to twenty-five pieces, has also garnered accolades. Palladium is equally inherent in Parmigiani Fleurier's brand-new Pershing collection and in Ulysse Nardin's Macho Palladium 950, among others.

Investment?

The demand for palladium as a precious metal is not only driven by its practical use but by its inher-

ent investment value. As of mid-May, palladium is valued at \$440 per troy ounce (the weight measure used to price precious metals). It sells at more than half the price of gold (\$919 per troy ounce) and nearly five times less than platinum (\$2,136 per troy ounce). Rhodium is currently the most expensive of the precious metals and is priced at \$9,600 per troy ounce.

Beyond weight, the most notable difference between platinum pieces and palladium timepieces is this lower price, which may also attract retailers.

In 2006, PAI embarked on a market development program aimed at retailers. Their owners and the general public, however, still need more information about the metal, say miners and watch firms.

"The timepiece market is no longer in the dark about...the luxurious nature of palladium, although we have further to go in working with the end customer," according to Stillwater Mining. Parmigiani's Veyna agrees.

"There is not a keen awareness [of palladium], so we need to...educate the public."

Parmigiani works closely with PAI to generate greater awareness of palladium in the marketplace and enhance the associates' understanding of the metal's qualities. "But, for those who understand the dynamics of the precious metal," she adds, "the response has been quite positive." ☺