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Hans Ledwinka

and His Otherworldly Tatras

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The name of Hans Ledwinka, who was Tatra's director of engineering throughout the 1920s and 1930s, may be an unfamiliar one. Perhaps the Tatra marque itself is also new to you. This would not be especially surprising for residents of North America where the Czechoslovakian company's various models of automobiles were rarely, if ever, imported.

In Europe, however, both names are well known and have become increasingly so among collectors since Czechoslovakia emerged from behind the Iron Curtain in the early 1990s with the fall of the Berlin Wall. It was at that time that the West was reunited with the otherworldly finned Tatra automobiles that Hans Ledwinka's reputation is quite closely associated with. It is these designs, and those that continued Ledwinka's progressive engineering philosophy, that are featured today in the very first Tatra class at the Pebble Beach Concours d'Elegance.

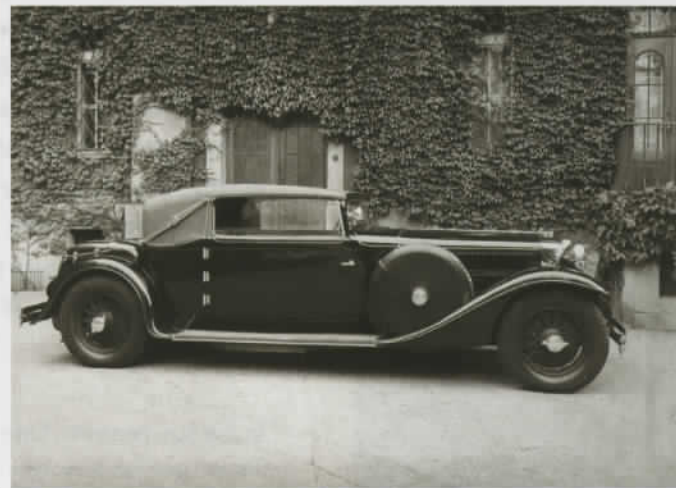


Opposite top, left to right: A 1936 T97 prototype (produced 1937–1939), featuring a four-cylinder boxer engine; The controversial 1933 V570 prototype, often touted as the precursor to the Volkswagen Beetle; Hans Ledwinka, ca. 1935.

Left: Rear view of the Tatra T77 (produced 1934–1938), showing the stabilizing fin and rear louvers for channeling hot air over the tail of the car.

Above: Front view of the model T87 (produced 1937–1950) with center fog light.

Tatra, like many automobile manufacturers, began its life as a horse-drawn coach manufacturer. Founded in 1850 as Schustala & Company and later renamed Nesselsdorfer Wagenbau Fabriks Gesellschaft A.G., Tatra began construction of its first automobile, the President, in 1897. This made it one of the oldest passenger car manufacturers in the world at the time it discontinued production in 1999. The company, which changed its name to Tatra in 1919 in reference to the nearby mountain range where they tested the durability of



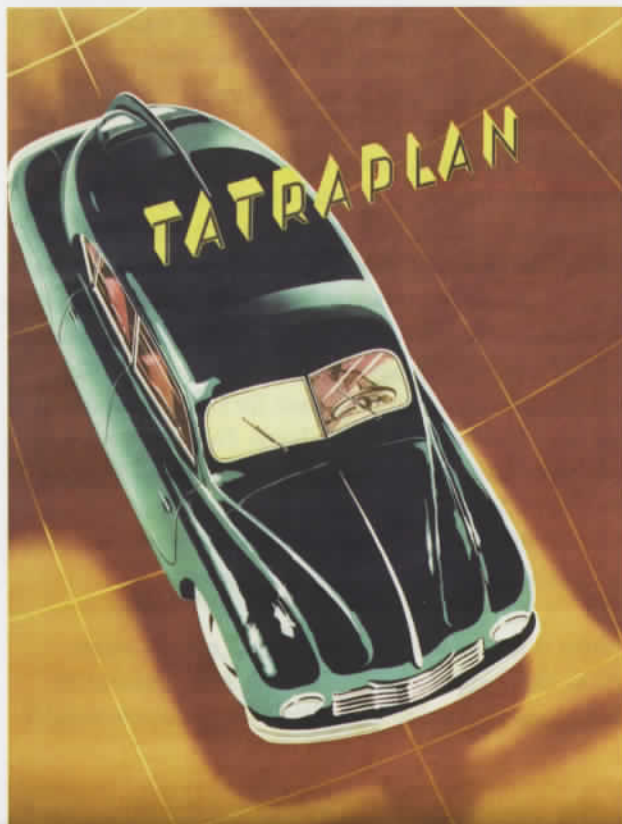
their vehicles, today still manufactures large industrial trucks for military and other purposes.

Although Tatra built many fine automobiles in its first quarter century, it was with the 1921 appointment of Hans Ledwinka as the company's director of engineering that the marque truly came into its own. Ledwinka, who was lured away from Steyr in Austria, had actually worked on the construction of Tatra's President at the very beginning of his career. His return to the carmaker would have a profound effect on the company's design philosophy and European engineering.

In 1923, just two years after taking the helm, Ledwinka would debut one of his most important designs, the T11. Controversial at the time of its introduction, the "11" was designed as an affordable "people's" car in hopes of encouraging automobile ownership in a region of Europe where relatively low income and ownership rates existed. More than an inexpensive car, it was also quite innovative and would popularize several features that would later be adopted by other manufacturers.



Much of the T11's brilliance arises from Ledwinka's integration of the chassis and drive train components into a single cohesive unit consisting of three main elements. The first of these was a 1-liter air-cooled, overhead valve, two-cylinder engine mounted into a cast housing joined with the gearbox and the front independent suspension. At the back was a drive unit that featured a jointless swing axle independent suspension. Connecting the two and completing the structure was a central tubular backbone chassis that housed a drive shaft.



Gone was the problematic water-cooling system that was prone to cracking engine blocks in the winter or boiling over in the heat of summer or at the high altitudes commonly found throughout Europe. Also absent were many failure-prone shaft bushings. Fewer parts meant fewer things to go wrong with the car, lessening the potential maintenance costs for owners. It also meant less material cost for manufacturing the cars and less labor time spent assembling them. The "11" may not have been glamorous, but the design's overall effect was a tour de force of both mechanical and financial economy.

As it turns out, these design features also made the T11 a decent racecar. In a rather glorious win, two modified T11s took first and second place in the under-1100 cc class of the 1925 Targa Floria. This success did much to cement Tatra's reputation throughout Europe as an innovative company while simultaneously vindicating Ledwinka's unconventional design.

In the grand scheme of things, Ledwinka's T11 would establish a philosophy of engineering design that would stay with Tatra for the next seven decades. The concept of efficiency and reliability through simplicity translated well from the economy car to all areas of Tatra's motor vehicles, such as its military and heavy-duty truck applications. It also eventually metamorphosed into grand style.

Although the bulk of Tatra's passenger car production was clearly focused on utilitarian offerings (as dictated by their market), Ledwinka also designed some impressive luxury market vehicles in the late 1920s and early 1930s. The most spectacular of these was the model T80, which featured an impressive 6-liter water-cooled V-12 engine and was clothed in a variety of rather elegant body styles. Outside of the water-cooling (likely utilized due to the excessive noise produced by air-cooled engines), the T80's chassis remained true to the T11's original concept. A mere 26 examples were built over the seven-year period between 1930 and 1938.



Opposite, far left: Three T11 racers in 1923 having just completed a reliability run.

Opposite, top to bottom: A two-headlight T77 in Prague, ca. 1935. Later iterations would have three integrated lights—two headlights and a center fog lamp; A 1932 T80 Cabriolet with a 6-liter V-12 engine. Only 26 examples of all body styles were built between 1930 and 1938; The four-cylinder Tatraplan model, introduced in 1947.

Above: A Tatraplan factory poster, ca. 1950.

As magnificent as the T80 was, Ledwinka's magna opera is, without a doubt, his series of 1930s rear-engine streamline automobiles: the T77 of 1934, and the T87 and T97, both introduced in 1936 (production began in 1937). More than any of the marque's other vehicles, these three cars have been particularly responsible for the surging interest in Tatra and its chief engineer. Ledwinka and his cars are also shrouded by a great deal of myth and controversy.

More than a few people have noted the overall similarities and feel of the small T97 and the later Volkswagen Beetle (originally called the KdF-Wagen). There is much talk, in fact, that Ferdinand Porsche stole part of his design for his VW from the now-lesser-known Ledwinka. As proof, people point to Ledwinka's very Beetle-like rear-engine V570 prototype car of 1933, which clearly predates the VW. There is also a reputed quote from Porsche confessing to "looking over" Ledwinka's shoulders while designing the Beetle. And some even claim that the two men were close friends and that Ledwinka regularly advised Porsche throughout the Volkswagen's development.

And then there is the patent infringement lawsuit brought by Tatra against Volkswagen. VW is said to have paid Tatra a three million Deutschmark settlement that many people believe clearly acknowledges Porsche's plagiarism. Adding insult to injury, it is claimed that not only was Ledwinka robbed of his design and a legacy on par with Porsche's, he received no portion of this settlement and died basically penniless and without recognition.

Yet, as intriguing as these stories are, much of what has been reported has not actually been substantiated or has even been disproved. Tatra's VW lawsuit, for example, does not provide the hard evidence of design theft that is claimed. Only one Tatra patent was involved in the settlement, and Tatra's right

to that patent (which does not list Ledwinka or any other Tatra engineer as the designer, as is usually referenced) was heavily disputed at the time. Yes, VW did make a settlement, but for a rather paltry one million Deutschmarks (about \$250,000 at the time, or \$2,000,000 in today's money), which says volumes about how little the patent was valued.

And then there is the problem with Porsche's confession, which may not actually be a confession at all. Apparently it was Ledwinka, not Porsche, who claimed that Porsche sometimes looked over the Tatra engineer's shoulder, and vice versa. Were the two men friends? No one seems to know. Again, some say that they were close while others believe they were not-always-friendly competitors.

Perhaps more important, however, is the fact that Ledwinka's V570 was far from the only Beetle-like prototype or even production automobile that presaged Hitler's dream car. Numerous European engineers in the early 1930s, including Porsche, began designing Beetle-like cars inspired by the work of Josef Ganz—the now-virtually forgotten engineer whose ideas (which he began promoting heavily in the late 1920s) became the eventual conceptual basis for Hitler's Volkswagen project (see Paul Schilperoord's book, *The Extraordinary Life of Josef Ganz: The Jewish Engineer Behind Hitler's Volkswagen* (2012)). Without a doubt, if anyone can lay claim to the title of the "father" of the Volkswagen concept, it would be Ganz, as opposed to Ledwinka or Porsche.

Still, there is one area of the Volkswagen project where Ledwinka likely greatly influenced Porsche. Thanks to the T11 and a long succession of similarly designed automobiles



he produced at Tatra during the 1920s and 1930s, Ledwinka had an incredible wealth of experience with air-cooled car engines that no other European automobile engineer could likely touch. This is a particularly important point, as many engineers were forced to abandon their work in Ganz's Volkswagen realm because they were unable to design air-cooled engines, and the water-cooled versions they made proved difficult to cool at the rear of the car. The added weight of the water-cooling system also made these automobiles incredibly tail-heavy, resulting in inferior handling. Utilizing air-cooled engines, however, as found in the majority of Ledwinka's automobile designs from 1923 onward (and eventually on Porsche's Beetle) greatly minimized these problems. It would be highly surprising, then, if Porsche did not carefully examine Ledwinka's work in this regard when working on Hitler's project.

As exciting as the many controversies surrounding the beloved Beetle and Ledwinka are, Tatra's top engineer's greatest achievements do not need any of the hype from conspiracy or drama to be considered spectacular. While other leading automobile engineers were struggling and failing with Ganz's Volkswagen concept, Ledwinka managed to design and put into production arguably the two most spectacular rear-engine streamline automobiles ever produced: the T77 and T87.

Featuring a futuristic-looking, aerodynamically streamlined limousine body, the "77" debuted in 1934 and was reportedly the hit of both the Berlin and Paris Auto Salons that year. Ledwinka powered the large sedan with a relatively small but highly advanced "Elektron" magnesium-aluminum, 3-liter (later enlarged to 3.4-liter), hemispherically chambered, air-cooled V-8 engine. It's streamlined body, designed with the

help of Paul Jaray (a former Zeppelin engineer considered by many to be the father of automobile aerodynamics) allowed the small power unit to comfortably propel the large car to over 90 miles per hour—a considerably high rate of speed for passenger cars of the era and a true testament to the benefits of scientific streamlining. The chassis is a central backbone support design with all-wheel suspension that finds direct precedent in Ledwinka's T11 of twelve years earlier, only positioned in reverse.

The T77 became more than the sum of its individual components. When closely examined, the simplest to the most flamboyant details of the car harmonize into a thoroughly functional and unified design. The rear hood, for example, is fashioned so that the escaping hot air from the engine is pushed out its louvers in such a way as to smooth out eddying caused by the car's long tail. Hot air, more slippery than cold air, also adds to the car's low coefficient of drag. The futuristic dorsal fin stabilizes the car in straight lines and also equalizes pressure against the body in crosswinds. The carburetor even has an adjustable cover that allows for the intake of fresh air in the summer and recycled warm air from the engine during the wintertime. Despite the unconventional design, more than 250 T77s were produced over a four-year period—a huge success in the luxury field for the small manufacturer.

Below, left to right: A T77 interior, featuring right-hand drive. All Czech cars were left-hand drive after Germany annexed the Sudetenland in 1938; The T77 V-8 hemispherically chambered air-cooled engine was initially 3 liters, but later increased to 3.4 liters; The side profile of a model T87.



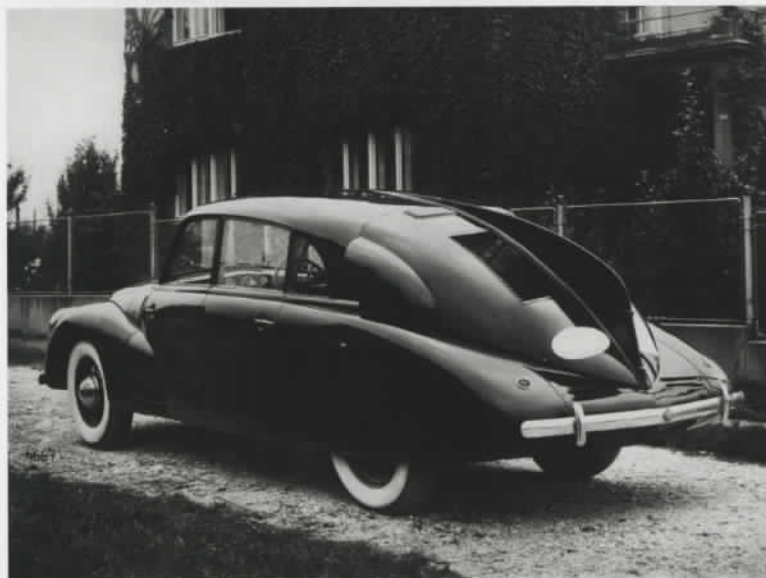


Top: The enameled hood badge for the T87.

Middle: The rear view of an early T87. The white oval and square on the rear hood were reserved for the country code and vehicle registration number, respectively.

Bottom: An early three-headlight T603, ca. 1956.

Opposite: Rear view of the model T87.



Paul Jaray, by the way, began experimenting with automotive form in a wind tunnel in the late 1910s and patented his ideal form in 1922. This shape, the bottom half of which resembles a teardrop from the side and encloses a car's four wheels, would revolutionize automobile body design by forcing wind *over* a unified body as opposed to splitting it like a wedge in plan view—as found in conventional automobile coaches of the time. Jaray's form would come to define the car of the future in the 1930s, and its essence was translated onto many vehicles, including the Chrysler Airflow and the Volkswagen Beetle.

The T87, which went into production in 1937, was essentially a smaller, berline-bodied version of the T77 design. In its construction it was greatly improved over the 77, having an all-metal unit body as compared to a coachbuilt “composite” body (wooden skeleton skinned with metal). Ledwinka also redesigned the engine, continuing with a 3-liter sized V-8 that was more compact, lighter and more efficient than the 77's, allowing for a top speed around 100 miles per hour. The smaller size also resulted in a better front-to-rear weight ratio, which, as Tatra folklore suggests, was never truly ideal.

One of the most popular-yet-unverified stories surrounding the T87 involves the Second World War and Tatra's rear-heavy handling. Germans greatly admired the 87, and after the annexation of the Sudetenland (with Tatra now a German factory), many of the country's military officers were given one of these cars. Soon afterward, so the story goes, the German high command was forced to forbid them from driving the vehicles, as too many were injured or killed in one-car accidents as a result of the heavy rear-end bias—supposedly earning the T87 the nickname of “Czech secret weapon.” The unspoken punch line, it would seem, is the implication that the Czechs (unlike their German occupiers) had no problem handling these highly sophisticated machines!

After the war, Tatra not only continued production of the T87 for a number of years (total production was over 3,000 units), but also introduced its T600 Tatraplan model in 1947. The Tatraplan was a completely fresh design that might be best described as the company's post-Second World War equivalent of the model T97. It featured a small 2-liter, 4-cylinder

boxer rear engine inside a body design that continued along the lines established by Ledwinka and Jaray with the 77. The design of the car, however, was not under Ledwinka's direction, for, as with Ferdinand Porsche, he was imprisoned as a Nazi collaborator after the war ended. It is claimed, however, that Ledwinka had already designed much of the Tatra during the war. He also continued to work on car designs (presumably including the Tatra) during his time in jail.

The final "streamline" Tatra built, and the newest of the marque's cars featured in the Pebble Beach Concours Tatra class, is the model T603. Introduced in 1956, the "603" has the distinction of being the only streamline Tatra designed in communist Czechoslovakia—despite the common misconception that all Tatras are communist in origin. Those unfamiliar with the history of central Europe are often unaware that Czechoslovakia was founded as a democratic republic much like the United States. It was only in 1948 that the country became a communist state and the country's factories were socialized.

Due to the country's planned economy, for several years in the 1950s Tatra was not allowed to manufacture passenger cars. This situation reportedly changed, however, when Czech government officials realized they needed a replacement for the country's aging fleet of T87s and Russian-built limos. Tatra was then commanded to design a new car, which became the T603.

The 603's body design differs greatly in overall appearance to Tatra's earlier models, although some semblance to its predecessors can be seen. Ledwinka's design philosophy, however, is clearly evident in the car's use of a relatively light and small 2.5-liter air-cooled V-8 that could propel the heavy sedan to well over 100 mph. The front-to-rear weight ratio was also greatly improved for better driving, making the car a popular choice among Tatra enthusiasts. Three different body versions would be available over time, the first series having three headlights and the latter groups having four.

As for Hans Ledwinka, he did not return to Tatra upon his release from prison in 1951. He immediately moved to Austria, and then to Munich, Germany, where he eventually retired. His only possession upon release was the suit he was wearing—all of his other property having been confiscated. Ledwinka would start a new life without Tatra, but his post-Second World War career would be anticlimactic to say the least.

Yet, the engineer did not die completely forgotten. In 1966, he received the German Order of Merit for his work with the German auto industry. Following his death in 1967, though, his memory was mostly neglected for the next 25 or so years, until interest

in his Tatras was renewed with the reopening of the East. In 2007, he was inducted into the European Automotive Hall of Fame. Pebble Beach's Tatra class, dedicated to his incredible car designs, is an equally fitting tribute to a giant of the automobile industry that was almost, but thankfully not, forgotten.

Hampton C. Wayt is a 20th Century design historian who specializes in automobile design, especially relating to streamlining, the design process and the interrelationship of technology and art, as well as the legacy of car designers. He is presently working on a book on Alex Tremulis and the untold story of the Tucker 48's design evolution.

