The Austro Modern. Inventors, Designers and Entrepreneurs in the Innovation Network Vienna – Moravia – Bohemia – Berlin 1900 to 1939

Richard Vahrenkamp

Austro Modern. Vynálezci, designéři a podnikatelé v prostředí inovací Vídeň – Morava – Čechy – Berlín 1900 až 1939

Abstract: *The countries of Central Europe cannot simply be understood as catching up with Western modernization. Rather, the article shows how technical developments proceeded in the car factories Lohner in Vienna and Austro-Daimler in Wiener Neustadt, and how the light and powerful gasoline engine drove aircraft construction (the Taube by Etrich) and airship construction. Austria was the leader in aircraft construction around 1910. The creative milieu in Vienna is evident from the fact that the headquarters of the Lohnerwerke was a mere 150 meters from Sigmund Freud's practice. On the technical level, the innovations of Ferdinand Porsche are described, who first built electric cars at the Lohner company before turning to gasoline-powered automobiles at Austro-Daimler in Wiener Neustadt, where he became technical director in 1908 and made a name for himself designing racing cars. Austria achieved a leading international position in the field of racing cars. On the strategic level, the work of Camillo Castiglioni is discussed, who established links with the financial world, raised capital and developed strategies for founding and managing companies. For example, Castiglioni founded Motor-Luftfahrzeug-Gesellschaft in 1909 and became a director of Austro-Daimler in 1909. The paper develops a model that depicts the interplay between Porsche, the technical innovator, and Castiglioni, the strategic innovator, and explains the success of Vienna's unique innovation network around 1910. The paper gives an outlook on the interwar period. The innovation scene shifted to the newly founded state of Czechoslovakia. The article touches on the Tatra 87 automobile (exhibited in the Pinakothek der Moderne in Munich) from the Tatra factories in Nesselsdorf and the innovative production concepts of the Bat'a shoe factory in Zlín, which went far beyond Fordism. These contributions to Czech modernism were forgotten due to 6 years of German occupation from 1939 to 1945 and subsequent 40 years of communist rule.*

Keywords: *Ferdinand Porsche – Hans Ledwinka – Tatra factories – Shoe Factory Bat'a – Nesselsdorf – Kopřivnice*

Contact: *Prof. Dr. Richard Vahrenkamp; vahrenkamp2@gmx.de*

Introduction

So far, the literature on Vienna around 1900 has focused on the aesthetic refinement of intellectual discourse in the center enclosed by the Ringstrasse. But alraeady beyond the Ringstrasse, one finds industrial ventures in the Alsergrund, such as the Lohner automobile works, in addition to the Studelhofstiege and Sigmund Freud's practice. However, the top achievements in technology and factory organization, with which industrialists, designers and inventors in Vienna, but also in Bohemia, Moravia and Austria in general appeared in the period 1900 to 1939 and radiated to Berlin and Stuttgart, are little known and shall be presented here. We start from the thesis of the architectural historian Martin Kohlrausch that the countries of Central Europe cannot simply be understood as catching up with Western

modernization, but have made independent contributions to modernity and focus here on the history of technology.[1]

The contribution is intended to fit into the debate about „modernity". This refers to the rapid expansion of industrial production at the end of the 19th century with the associated new technologies in the field of transportation (railroads, automobiles and airplanes), means of communication (telegraph and telephone) and new media (mass press, radio), which shaped the explosively growing large cities, created new settlement structures of large working-class neighborhoods and favored the rise of polarizing mass parties on the political stage.[2] The term „Viennese Modernism" is used in literature to describe how the apolitical generation following the founding generation of the liberal 1860s in Vienna around 1900 strove for refinement in the aesthetic fields of literature, music, painting, philosophy, and architecture. Ludwig Wittgenstein, the son of a steel industrialist, is representative of this generation.[3] The state of research on this aesthetic dimension of Viennese modernism, which has been documented by Jürgen Nautz and the author, among others, is to be expanded here to include the field of technical history.[4]

The life of Ferdinand Porsche - who became famous as the designer of the People's Car (Volkswagen) and held the Czechoslovakian citizenship between 1918 and 1934- serves as a guide, with many of his activities taking place in Vienna and Wiener Neustadt. Between 1900 and 1918, Austria became an important centre for automobile and aircraft development. Around the person of Porsche, a dense network of industrialists and inventors emerged in Austria, Bohemia and Moravia in the sectors of automobiles and aircraft, which has remained unnoticed until now and which will be reported on here. Geographically, the innovation view is to be extended from Vienna to Bohemia and Moravia. The following map gives an overview of innovation in Austria, Bohemia and Moravia. It can be seen that the innovations originated in the provinces. The connection between the Škoda plants in Pilsen and Austro-Daimler in Wiener Neustadt is intended to point out the interconnections between the two plants in terms of personnel and capital.

In Bohemia and Moravia, the Škoda heavy machinery and armaments factory in Pilsen, the Nesselsdorf automobile factory near Ostrava and the Bata shoe factory in Zlín are particularly noteworthy. They formed a focal point of „Czech Modernism". After the disintegration of Greater Austria in 1918, the emergence of the new state of Czechoslovakia in 1918 was associated with deep grievances against the old powers and met with massive anti-Czech propaganda by national-conservative politicians in Germany, Austria and Hungary, which obscured the top achievements of Czech modernism. Also 40 years of communist rule in Czechoslovakia, during which the Pilsen Škoda Works had been renamed Lenin Works, contributed to the oblivion. The communists also renamed the Bata shoe factory to Svit,

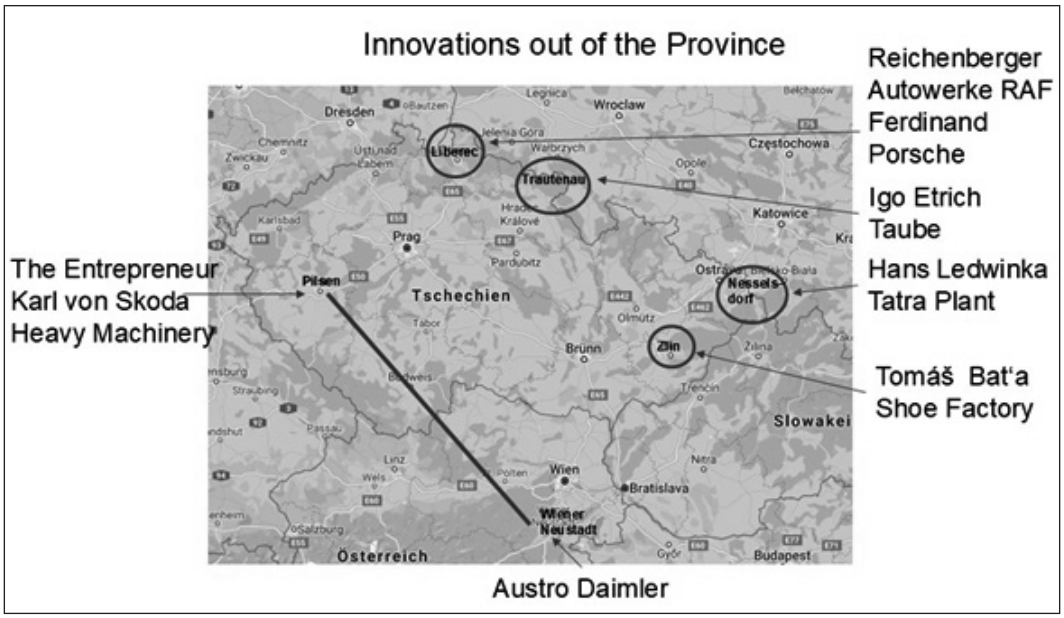
1 **M. Kohlrausch**, *Brokers of Modernity. East Central Europe and the Rise of Modernist Architects, 1910–1950*, Leuven 2019. **M. Kohlrausch**, *Imperiales Erbe und Aufbruch in die Moderne. Recent Literature on the East Central European City*, in: H-Soz-Kult, 16.11.2015, http://hsozkult.geschichte.hu-berlin.de/forum/2015-11-001 [cited on 2026-04-01].

2 **A. Nitschke – G. A. Ritter – D. J. Peukert – R. vom Bruch** (eds), *Jahrhundertwende - Der Aufbruch in die Moderne 1880 – 1930*, 2 vols, Reinbek 1990. On the concept of modernity, see also **R. Lutz** (ed.), *Theories and Experiments of Modernity: Europe's Societies in the 20th Century,* Vienna, 2012.

3 **W. Mantl**, *Modernisierung und Dekadenz*, in: **J. Nautz – R. Vahrenkamp** (eds.), Die Wiener Jahrhundertwende: Einflüsse, Umwelt, Wirkungen, 2nd edition, Vienna 1996, pp. 80–100.

4 **A. Janik – S. Toulmin**, *Wittgenstein's Vienna*, New York 1973. **J. Nautz – R. Vahrenkamp** (eds.), *Die Wiener Jahrhundertwende.*

Fig. 1: Innovation events in Austria, Bohemia and Moravia



Source: Based on Google Maps.

thus erasing the Bata brand name. Czechoslovakia's deliberate turn towards modernity can also be seen – this will be formulated here as a preliminary thesis – as a cultural demarcation from the traditional appearance of the former superpower Austria.

The innovation events in Austria and the Czech Republic are to be characterized here by the generic term „Austro Modern". However, Austro Modern also took place in Germany. Here, the development laboratory of Ferdinand Porsche in Stuttgart and the production of airplanes and the Tropfenwagen of the Viennese designer Edmund Rumpler in Berlin are to be emphasized. The aim of the paper is to make the top achievements visible again. To this end, the comprehensive concept of Austro Moderne is developed, something that had previously been lacking in standard works on the history of automobiles and aircraft. [6] An important theme of the modern era was the pursuit of speed. In this paper, too, races and competitive flights are at the centre of the discussion. Ferdinand Porsche was virtually obsessed with developing racing cars.

This text is based on the evaluation of the available literature on the biographies of the industrialists and inventors as well as on the publications of the automobile magazine „Allgemeine Automobil Zeitung" (hereinafter AAZ) published in Vienna and the magazine of the ADAC (Allgemeiner deutscher Automobilclub), the „ADAC Motorwelt" published in Munich.[7] The reports of the daily newspapers on the automobile exhibitions in Prague, Vienna and Berlin were evaluated. The available biographies often show an inability to take a broader view of Austro Moderne. For example, the extensive Rumpler biography by Jörg Kranzhoff (2004) avoids this topic completely, just as the biographical sketches by Erich Ledwinka (1985) do not draw any cross-references among the inventors, for example between Porsche and Ledwinka.

Ferdinand Porsche at Austro Moderne

Ferdinand Porsche, who was born in Maffersdorf, near the North Bohemian town of Reichenberg (since 1919: Liberec), in 1875, was a leading person of Austro Modernism.[5] Reichenberg was not only characterized by textile factories but later also the location of the Reichenberg Automobile Factories (RAF), which produced a wide range of passenger cars and trucks since 1907, and the North Bohemian Automobile Club.[6] Reichenberg shone in the 1920s with an ultramodern flagship store of the Bata shoe factory on Tuchplatz (compare Figure 20 below). Porsche came into early contact with the electrification wave of the late 19th century. His father's plumbing business laid electricity networks in private houses. In Reichenberg, he attended a course on electricity at the local trade school.[7] Porsche took up an apprenticeship in 1893 at the Vienna company Vereinigte Elektrizitäts AG Bela Egger, where he quickly rose to become head of the test room and assistant in the calculation office. At the same time, he became a guest student at the Technical University of Vienna.[8]

At the end of the 19th century, the Viennese carriage manufacturing company Jacob Lohner & Co initially experimented unsuccessfully with gasoline- or diesel-powered carriages and then switched to electrically driven carriages in collaboration with Vereinigte Elektrizitäts AG. It was there that Ludwig Lohner, the owner of Jacob Lohner & Co, met Ferdinand Porsche, hired him to head engine development at his company in 1897, and sent him to Paris for automotive training. France was the leading automobile country in Europe until 1914.[9] In 1899, Porsche applied for a patent in Vienna for the extremely innovative concept of an electric wheel hub motor for vehicles, which made power transmissions and gearboxes superfluous and sat directly in the wheel hub. The motor was first used when Porsche developed a 5 hp battery-powered electric passenger car, known as the „System Lohner Porsche," in Ludwig Lohner's company, with both wheel hub motors of 2½ hp each driving the front wheels. For a short time, the motors could even be overloaded to 7 hp each. The car was an exhibit in the Austrian pavilion at the 1900 Paris World's Fair and was hailed by the exhibition manual as an „epoch-making innovation."[10] The car was marketed as an elegant city car.

5 Numerous biographies are available on Porsche, e.g. by **R. Osteroth**, *Ferdinand Porsche: der Pionier und seine Welt*, Reinbeck 2004, who has also evaluated documents in the Porsche Museum. Accounts of Porsche's early years in Vienna are mostly based on the biography of Porsche's nephew and secretary Ghislaine Kaes, which can be viewed as a typescript in the Porsche Archive and is published in short form in **G. Kaes**, *Ferdinand Porsche*, in: **H.-R. Etzold**, Der Käfer. Die Käfer-Entwicklung von 1934 bis 1982 vom Urmodell zum Weltmeister, Stuttgart, 1984, pp. 39–62, and based on the memoirs of Ferdinand Porsche's son, Ferry Porsche, see **G. Haug**, *Ferdinand Porsche: ein Mythos wird geboren*, Landhege Verlag 2012. Many biographies unhistorically create a Porsche myth and ignore its problematic role in the Nazi regime, as Lackner (**H. Lackner**, *Mythos Krupp, Mythos Porsche. Zwei Ausstellungen im Vergleich*, in: Technikgeschichte 80 (2013), pp. 161–173) criticized. Porsche's birthplace in Maffersdorf was bought by Škoda in 2014 and refurbished as a museum.

6 See RAF advertisement in the Allgemeine Automobil Zeitung (hereinafter AAZ) of March 6, 1910. **H. Seper – M. Pfundner – P. Lenz,** *Österreichische Automobilgeschichte*, Klosterneuburg 1999, p. 104.

7 **R. Osteroth**, *Ferdinand Porsch*, p. 18.

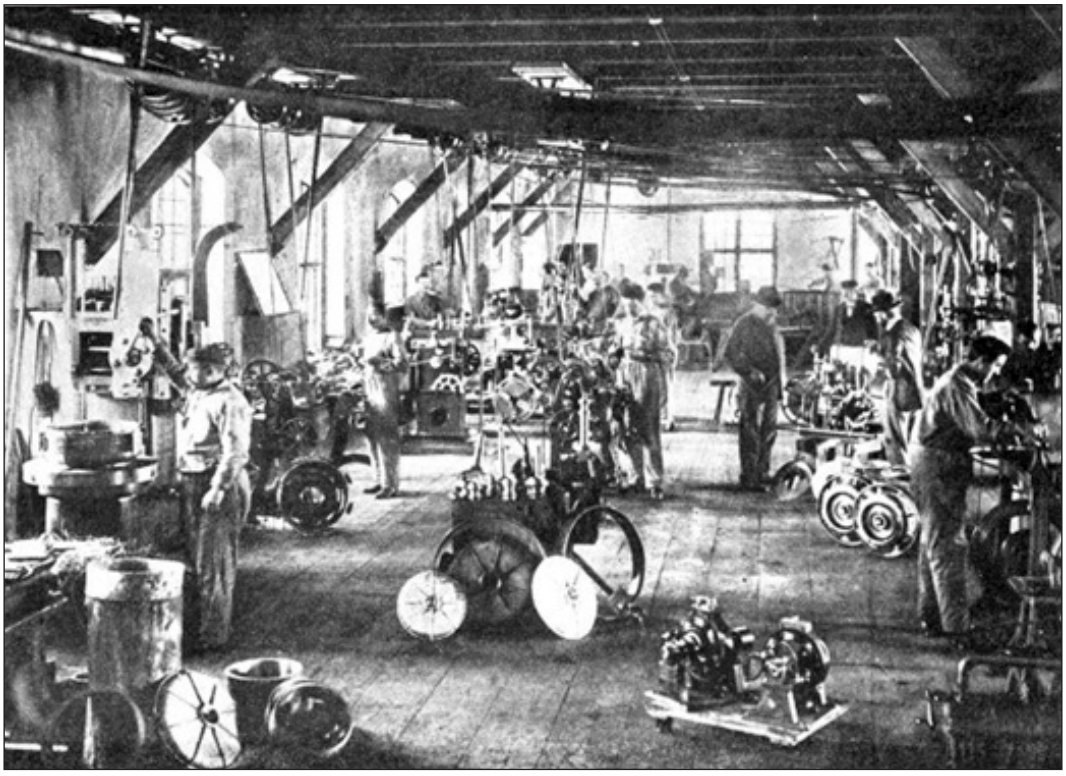
8 **G. Kaes**, *Ferdinand Porsche*, p. 40.

9 **T. Köppen,** *Die Unternehmensstrategien der städtischen Kutschenfabriken zu Beginn des 20. Jahrhunderts am Beispiel der Wiener Hof-Wagenfabrik Jakob Lohner & Co*, in: Zeitschrift für Unternehmensgeschichte, vol. 38, issue 3, 1993, pp. 176–185, here p. 179. Köppen refers to the Jacob Lohner company throughout as Jakob Lohner. **H. Seper – M. Pfundner – P. Lenz,** *Österreichische Automobilgeschichte*, pp. 35f.

10 **G. Malkowsky**, *Die Pariser Weltausstellung in Wort und Bild*, Vienna 1900, p. 431.

This electric passenger car was followed by gasoline-electric hybrid cars to increase range.[11] However, the wheel hub motor could not keep up with the increase in performance of gasoline engines, and this market segment had to be abandoned in favour of the gasoline engine. The Lohner company maintained the best contacts with the court, as evidenced by the fact that Ferdinand Porsche, as driver, was able to demonstrate the Porsche Mixte car to the heir to the throne, Archduke Ferdinand, during the 1902 imperial maneuver.[12] At the Lohner company, Porsche supervised production to ensure the highest quality. The workshops were located in the industrial town of Floridsdorf near Vienna, which was also the center of locomotive construction, and were divided into a locksmith's shop, wainwright's shop, forge and foundry on 38,000 square meters. With the exception of tires and accumulators, the company produced everything itself. The following picture shows a view into the department for wheel hub motors, where the most modern American machine tools were installed.[13]

Fig. 2: View of electric motor production at Lohner's plant in 1901



Source:

11 **G. Kaes**, *Ferdinand,* pp. 42–52; **T. Köppen,** *Die Unternehmensstrategien der städtischen,* **H. Seper – M. Pfundner – P. Lenz,** *Österreichische Automobilgeschichte,* p. 77. On the history of the electric car, see **G. Mom**, *The electric vehicle: technology and expectations in the automobile age*, 2004.

12 AAZ 19 October 1902, p. 7 with photos.

13 Report on the Lohner company in the AAZ of May 19, 1901, pp. 9–13.

After working for the Lohner car manufacturing company, Ferdinand Porsche moved in 1906 to the Österreichische-Daimler-Motoren-Gesellschaft m.b.H. car factory in Wiener Neustadt, which had been founded by the Stuttgart Daimlerwerke as an Austrian branch in 1899 in a different corporate form. Since 1900, this company had produced Daimler automobiles, which had been manufactured entirely in Wiener Neustadt.[14] In 1906, this company changed its name to Österreichische-Daimler-Motoren-Gesellschaft m.b.H., in which the Stuttgart parent company Daimler held a 25% share, and from 1908 onwards gave itself the marketing designation „Austro-Daimler", partly in order to gain better access to procurement orders from the Austrian military. As stipulated in the 1908 shareholders' agreement, Ferdinand Porsche was appointed as Technical Director and Wilhelm Strauss, who had come as „Factory Director" from the Škoda engineering and arms manufacturing company in Pilsen, was appointed as Managing Director.[15] This is how Austro-Daimler's first relations with Pilsen developed. Camillo Castiglioni became director of Austro-Daimler in 1909.[16]

Austro-Daimler's production range also included racing cars, trucks, buses and fire engines, some of which were equipped with electric hub motors. In order to achieve larger series and stimulate technical progress, the Stuttgart parent company passed on orders for trucks addressed to it to Austro-Daimler for production.[17] With the development of racing cars, Porsche succeeded in gaining recognition for Austro-Daimler's technological status among international experts. Austria drew level with the leading automobile country, France, where Porsche was still in 1897 for automotive training. At the third Prinz Heinrichfahrt in 1910, which covered 1900 km from Berlin to Nuremberg, Strasbourg and Bad Homberg, Austro-Daimler racing cars took the three first places.[18]

Unlike the German military, Austria relied on a fleet of motorized trucks, known as trains, for supplies and on motorized artillery even before 1914. As early as 1902, the army made test runs with Austro-Daimler trucks from Vienna to Przemyk and Krakow.[19] The Austrian Army encouraged the cooperation of the Bohemian Škoda concern, which manufactured heavy guns in Pilsen, with Austro-Daimler, where motorized tractors for heavy guns were to be developed. For the cooperation, Škoda and Austro-Daimler established a community of interest in 1911.[20] While working at Austro-Daimler, Porsche developed another application

14 See the factory report with photos from the AAZ of May 27, 1900.

15 **H. Seper – M. Pfundner – P. Lenz,** *Österreichische Automobilgeschichte*, p. 85. **M. Pfundner,** *Austro Daimler und Steyr: Rivalen bis zur Fusion; die frühen Jahre des Ferdinand Porsche,* Vienna 2007, p. 36, p. 44. Introducing the term „Austro" as a marketing designation was also used by other car companies for their Austrian subsidiaries, such as Fiat.

16 The role of Emil Jellinek in shaping the Mercedes brand will not be discussed here, as Jellinek was initially heavily involved in France, see **B. Gundler**, *La Mercédès - Ein automobiles Leitbild am Beginn des 20. Jahrhunderts*, in: **K. Möser – M.Popplow – E. Uhl** (eds.), Auto.Kultur.Geschichte, Stuttgart, pp. 33–44. Like Castiglioni, Jeklinek played the role of power promoter at Daimler, giving the staid Swabian designers access to the market of the rich upper class on the Cote d' Azur and providing decisive impetus for the design of racing cars.

17 AAZ August 5, 1906, p. 38. See also **F. Pinczolits**, *Austro Daimler: Paul Daimler und Ferdinand Porsche – Pioniere des Automobils*, Wiener Neustadt 1986, pp. 51–58.

18 AAZ June 10, 1910, p. 1. Porsche was one of the drivers. See also **F. Pinczolits**, *Austro Daimler* pp. 62–68. On the importance of car racing for the early history of the automobile, see **K. Möser**, Geschichte des Autos, Frankfurt 2002, p. 71.

19 **F. Pinczolits**, *Austro Daimler,* p. 17.

20 See the report on the use of the trains during imperial maneuvers in AAZ of August 5, 1906. **M. Pfundner,** *Austro Daimler und Steyr,* p. 33, p. 45f. As early as 1903, Paul Daimler at Austro Daimler received an order from the Austrian military to develop a traction engine for heavy artillery.

of his electric wheel hub motor for the Austrian army. He incorporated the wheel hub motor into a road train for the Austrian Army in 1913 that was gasoline-electric powered (a 150 hp gasoline engine drove a generator) and could carry supplies as well as heavy weapons by both road and rail.[21] Neither the German military nor the German railroad companies ever had a comparable train.

The engineering and arms manufacturing group Škoda in Pilsen transformed its cooperation with Austro-Daimler into a group company and thus expanded its product range in the direction of the automotive industry. The Czech industrialist Karl von Škoda from Pilsen, the owner of Škoda-Werke, acquired the shares of Stuttgart's Daimler Werke in Austro-Daimler in 1912 and appointed Porsche as general director of Austro-Daimler. In the 1920s, when the Czechoslovak car industry was struggling with sales problems as a result of the new customs borders created since 1918 and had to merge, Škoda bought up the well-known Laurin & Klement car plants in Mladá Boleslav (before 1919: Jungbunzlau), 60 km northeast of Prague, which had already taken over the Reichenberger Automobilfabriken (RAF) in 1913, in 1925 and changed the Laurin & Klement brand name to Škoda.[22] The Škoda engineering group thus now also owned an automobile branch within Czechoslovakia.

Aircraft development at Austro Moderne

The fields of innovation in vehicle and aircraft construction overlapped around 1910. Both the automobile and the aircraft required gasoline engines. Many entrepreneurs and inventors in the automotive sector turned to aircraft construction.[23] The automobile as an adventure machine was supplemented by the airplane as an adventure machine, and racing drivers mutated into airplane pilots. This development could also be observed internationally in France and Germany. As a result of its leading position in the construction of gasoline engines, France was also the European leader in aircraft construction. The Frenchman Blériot crossed the English Channel for the first time in 1909 with his plane Blériot XI. Since 1909 public demonstrations and competitions took place in France (in Reims) and in Germany (in Berlin-Johannisthal), in Austria since 1910 (Flugfeld Wiener Neustadt), which were called „days of flying", after a German airplane could only perform a short aerial jump at a Flugtag in Kiel in 1908.[24] Developments in the construction of airships and airplanes overlapped. Initially, airship construction led the way, but it was overtaken by aircraft construction from 1910. Airplanes proved to be faster and more maneuverable than airships, they were easier to launch and were less sensitive to winds.

The network around Ferdinand Porsche expanded to include inventor Igo Etrich, industrialist Edmund Rumpler, and financial investor Camillo Castiglioni. The requirements for aircraft engines were different from those for automobile engines. The engines had to be

21 AAZ, April 19, 1914, p. 24f. **R. Osteroth**, *Ferdinand Porsche,* pp. 46–56.

22 I. Sievers, *Škoda - 100 Jahre Automobilbau*, in: ATZ - Automobiltechnische Zeitschrift (107) April 2005, pp. 612–615, here p. 614. **H. Seper – M. Pfundner – P. Lenz,** *Österreichische Automobilgeschichte*, p. 104. **M. Bartuška** (ed.) 1859–1959. 100 years in the service of technical progress (Škoda), Pilsen 1959. **W. Schmarbeck**, *Hans Ledwinka,* 2nd edition *Graz* 1997, p. 75.

23 See **K. Möser**, *Grenzerfahrungen - Mobilitätsbegeisterung für Auto. Flugzeug und Boot im frühen 20. Jahrhundert*, in: **K. Möser – M. Popplow – E. Uhl** (eds.), Auto.Kultur.Geschichte, Stuttgart 2013, pp. 19–32.

24 **G. Schmitt – W. Schwipps**, *20 chapters of early aviation*, Berlin 1990.

lightweight and ensure continuous operation for several hours without failure. The AAZ took account of the expansion of the field of innovation from automobile to aircraft construction when it carried the subtitle „Allgemeine Flugmaschinen-Zeitung" from November 28, 1909. The Vienna branch of Automobilwerke Karl Benz from Mannheim and made their turn to the aircraft sector with aircraft engines.

Austro-Daimler also became involved in the aircraft business, which was initially limited to airships for the military, and founded Motor-Luftfahrzeug GmbH in 1909 together with the balloonist and director of the Österreich-Amerikanische Gummiwerke in Vienna, Camillo Castiglioni. On the strategic level, Camillo Castiglioni established links with the financial world. He raised capital and developed strategies for setting up and managing companies, drew up visions for the aircraft industry, and in 1909 became a director of Austro-Daimler. It was thanks to his foresight that the provincial town of Wiener Neustadt created Austria's first airport („Flugfeld"), where Etrich and Porsche worked together, and Austro-Daimler became a leader in the construction of aircraft engines.[25] Following on from Witte's theory of a team of promoters, the interaction between Porsche, the technical innovator, and Castiglioni, the strategic innovator, explains the success of Vienna's unique innovation network around 1910. The joint, sensational sightseeing flight around Vienna's St. Stephen's Cathedral in the first Austrian military airship „Parsifal" by Porsche and Castiglioni on December 4, 1909, throws light on this interaction.[26]

The airship's usefulness to the military was limited, however, because airships were not allowed to fly in strong winds. A windless day had therefore been chosen for the demonstration flight of the „Parsival". In addition to Castiglioni, Ferdinand Porsche was also on the board of Motor-Luftfahrzeug Gesellschaft, which produced airships for the military, with Austro-Daimler developing and manufacturing the engines and Österreich-Amerikanische Gummiwerke supplying rubber sheets for the airships. Motor-Luftfahrzeug GmbH produced military aircraft from 1915 as Österreichische Flugzeugfabrik AG (OEFFAG) with the participation of Škoda in Wiener Neustadt.[27] Likewise, the Viennese company Lohner expanded its program from vehicle construction to aircraft construction and now called itself „Wiener Aeroplan- und Carosseriewerke Jacob Lohner & Co". Igo Etrich had his pigeon (Taube) produced there from June 1910.[28] The Lohner aircraft works developed a biplane with angled wings called the „Lohner-Daimler Pfeilflieger" and equipped with a 60 hp engine from Austro-Daimler. On June 22, 1911, it became the first aircraft to fly the Vienna-Budapest route

25 **R. Schlüter**, *Der Haifisch. Aufstieg und Fall des Camillo Castiglioni*, Vienna 2015, p. 47. Schlüter's study is an important contribution to the appreciation of Castiglioni, as he is always mentioned with an anti-Semitic undertone in the festschrift literature on Porsche.

26 In the AAZ of December 5, 1909, a photo of the round flight was shown on the front page. Eberhard Witte introduced the model of the promoter team, consisting of a specialist promoter and a power promoter, see **E. Witte**, *Organization for Innovation Decisions - The Promoter Model, Göttingen 1973.*

27 **M. Pfundner,** *Austro Daimler und Steyr*, p. 50. **W. Haberfellner – Walter Schroeder,** *Wiener-Neustädter Flugzeugwerke Gesellschaft m. b. H. (Entstehung, Aufbau und Niedergang eines Flugzeugwerkes),* 3rd edition. Graz 1999. Castiglioni also appeared as an investor in the automotive industry after 1918 and took over the major share of Austro Daimler.

28 **J. Kranzhoff – E. Rumpler**, *Wegbereiter der industriellen Flugzeugfertigung*, Bonn, 2004, p. 43. The AAZ of October 16, 1910 contains an advertisement of the „Wiener Aeroplan- und Carosseriewerke Jacob Lohner & Co" on page 37. In the advertisements of the AAZ before this date, the Lohner company presented itself merely as an automobile shop.

without a stopover. The flight took Rittmeister von Umlauff two hours and 22 minutes and he won the prize money of 10,000 crowns. It was about twice as fast as the Orient Express from Vienna to Budapest, as the AAZ pointed out in its report.[29]

Igo Etrich, born in 1879 in the Bohemian town of Trautenau (from 1919: Trutnov) as the son of a textile manufacturer, first experimented with flying gliders based on Otto Lilienthal's principle with his father in Trautenau before designing a motorized Etrich I aircraft in Vienna, which made its first ascent on the Wiener Neustadt airfield on November 29, 1909.[30] This ascent represented the first ever powered flight in Austria by an Austrian aircraft.[31] In his autobiography, Etrich noted that he would have put his father's considerable sum of about 200,000 gold crowns into the project. The improved version of Etrich I, the pigeon (Taube), made its breakthrough in 1910. The Taube was not merely a copy of a Western aircraft type, but an innovation in its own right. It was widely recognized in Austria and Germany as a reliable aircraft that was not very sensitive to crosswinds and was also widely copied as a military aircraft. „Germany was in a state of pigeon fever", found Rumpler biographer Jörg Kranzhoff.[32]

The pigeon first soared in May 1910 at the Wiener Neustadt airfield and was equipped with a 40 hp engine from Clerget.[33] It was at this airfield that Ferdinand Porsche expanded his network and, as a member of the airfield committee, made contact with Igo Etrich, who commissioned him to equip the aircraft with a light, powerful and reliable gasoline engine from Austro-Daimler.[34] Etrich's pigeon took part in the Kaiserflugtag in Wiener Neustadt on September 18, 1910 – as the following illustration shows - where other designs of flying machines were also on display. Ludwig Lohner, Ferdinand Porsche and Igo Etrich gathered in front of the Emperor's box and were presented to the Emperor. The Emperor expressed his satisfaction that the first engine flight in Austria had been made by an Austrian pilot on an Austrian flying machine (meaning the Etrich I). When asked, Porsche was able to tell the Emperor that his company, Austro-Daimler, was equipping numerous aircraft with engines.[35] Igo Etrich's pilot, Karl Illner, completed a flight from Vienna to Horn and back on October 10, 1910, covering a total distance of 160 km.[36] This won him the prize money of 20,000 crowns from the city of Vienna. When Illner took off for his flight on the Simmeringer Heide, Ferdinand Porsche was also registered as a spectator.[37]

The influences of Austro Moderne radiated to Berlin when the aircraft industry developed there at the beginning of the 20th century. There was an invitation to the first public flying day at Berlin-Johannisthal airfield on the occasion of its opening on September 26, 1909.

---

29 AAZ, June 25, 1911, p. 52f. **E. Danzinger**, *Aus den Anfängen des österreichischen Flugzeugbaues*, in: Blätter für Technikgeschichte (22) 1960, pp. 172–188, here p. 187.

30 **E. Danzinger**, *Aus den Anfängen*, p. 172f.

31 AAZ, December 5, 1909, p. 43.

32 **J. Kranzhoff – E. Rumpler**, *Wegbereiter der industriellen,* p. 75. **I. Etrich**, *Die Taube: Memoiren des Flugpioniers Igo Etrich, 1879–1967*, Vienna 1962, p. 35.

33 . **E. Danzinger**, *Aus den Anfängen des österreichischen*, p. 174.

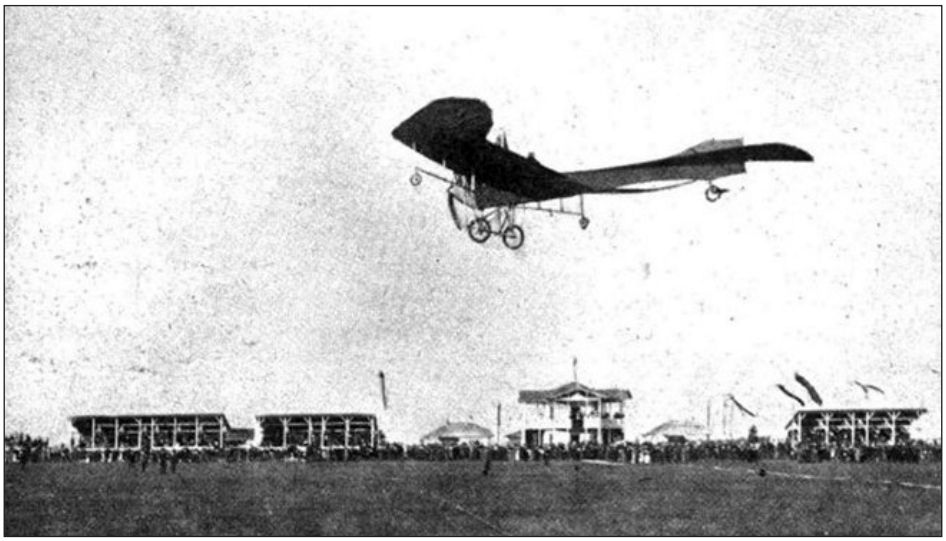
34 **I. Etrich**, *Die Taube,* p. 19, p. 23, p. 35. **W. Haberfellner – Walter Schroeder,** *Wiener-Neustädter Flugzeugwerke.*

35 AAZ, September 25, 1910, p. 10.

36 AAZ September 25, 1910, p. 2.

37 AAZ October 16, 1910, p. 2.

Fig. 3: The pilot Karl Illner in the Etrich-Taube at the Kaiserflugtag on September 18, 1910. in Wiener Neustadt.[38]



Source: AAZ of September 25, 1910, p. 11.

The person of Edmund Rumpler shows the connections from Berlin to Austro Moderne. Rumpler, born in Vienna and trained as an engineer there and working as engineer in Nesselsdorfer automobile works in Moravia, took the decision to become active in the new business field of aviation in Berlin. He developed the six-cylinder Aeolus aircraft engine in 1907 and founded the company „Edmund Rumpler - Luftfahrzeugbau" in Berlin in 1908. In 1910, he signed a license agreement with Igo Etrich for the reproduction of the Taube at the Berlin-Johannisthal airfield.[39] However, the first two pigeons to soar there had been brought disassembled by train from Vienna to Berlin. This shows Austria's leading role in aircraft construction. Rumpler terminated the license agreement in 1911 and doubted Etrich's invention contribution to the pigeon. Etrich subsequently failed to obtain protection for his invention in Germany at the German Patent Office.[40]

Etrich's Taube was easy to fly because it was not very sensitive to crosswinds. This contributed to its great success in Germany as well. By 1914, the German military had equipped about 50% of their aircraft with the Taube model. The Taube also caused a sensation when the aviator Hellmuth Hirth won a prize of 50,000 marks offered by the Kathrein coffee company in June 1911. He was the first aviator to fly the 540 km distance from Munich to Berlin in less than 6 hours. After the initial successes of the pigeon, however, it turned out that it was difficult to maneuver when it came to conducting aerial combat in wartime conflicts.[41] The aircraft manufacturer Edmund Rumpler, who was now able to reproduce the Taube license-free, received numerous orders for the Taube from the German military. Other aircraft fac-

38 Source: AAZ of September 25, 1910, p. 11.

39 **J. Kranzhoff – E. Rumpler**, *Wegbereiter der industriellen,* p. 46.

40 **J. Kranzhoff – E. Rumpler**, *Wegbereiter der industriellen*, p. 129.

41 **T. Dietl**, *Rise and fall of the „Taube",* Blog of the Deutsches Museum at https://www.deutsches-museum.de/blog/blog-post/2019/11/08/aufschwung-und-absturz-der-taube/ [cited on 2026-04-01].

tories in Germany also participated in the construction of the pigeon, such as the Deutsche Flugzeugwerke in Leipzig and the Kondor Flugzeugwerke in Essen.

In order to participate in the business of aircraft for the German army, Igo Etrich founded the Brandenburgische Flugzeugwerke in Briest near Brandenburg on April 1, 1914, together with local investors, and produced the technically superior biplanes there. The designer and managing director was Ernst Heinkel, who founded his own aircraft company in Rostock in 1922. The financial investor Camillo Castiglioni – previously a business partner of Igo Etrich with his company Motor-Luftfahrt-Gesellschaft in Vienna – merged various aircraft companies in Germany and Austria into one group and bought the Brandenburgische Flugzeugwerke in 1915.[42]

The designer Hans Ledwinka at Tatra

An outstanding person of Austro-Modernism is Hans Ledwinka, whose work was honored by the Technical Museum Vienna in an exhibition in 1978.[43] Like Porsche, he also received an honorary doctorate from the Technical University of Vienna. He became chief designer of the „Wagenbau-Fabriks-Gesellschaft" in Nesselsdorf (from 1919: Koprivnice), 20 km south of Moravian Ostrava, in 1921. Like Edmund Rumpler, Lewinka grew up near Vienna and received a technical education in Vienna. He worked intermittently as a designer at the Nesselsdorf wagon factory from 1897, where he met Edmund Rumpler, who designed the first Austro-Hungarian automobile to be built in series there in 1898 – a vehicle called the President.[44] In 1906 Ledwinka was appointed head of the automobile department of the Nesselsdorfer Wagonbau-Fabriks-Gesellschaft.[45] The director of the Nesselsdorfer Wagonbau-Fabriks-Gesellschaft, Hugo Fischer von Röslerstamm, was in close contact with Ludwig Lohner in Vienna. Both were founding members of the Austrian Automobile Club, which supported the network of innovators.[46] Thus, Nesselsdorf is an important node in the network of innovators. The following illustration shows a view of the Nesselsdorf car plants in 1900.

In 1923, the Nesselsdorfer Wagenbau-Fabriks-Gesellschaft merged with the Ringhoffer AG wagon factory located in the Prague district of Smichov and appeared with the Tatra brand name. Initially, the new company was based in Vienna, which was later moved to Prague.[47] The biographies of Porsche and Ledwinka show remarkable parallels. Both were rather self-taught without engineering studies at the Technical University Vienna. Both received an honorary doctorate from the Technical University Vienna, Porsche in 1917 during WW1, Ledwinka in 1944 during WW2, probably for their involvement in the armaments pro-

42 **H. Salz**, *I. Etrich - Flugpionier, Flugtechniker, Flugbegeisteter*, in: **H. Salz – H. Waitzbauer** (eds.), Im Flug über Salzburg: Igo Etrich und der Beginn des Flugwesens in Salzburg, Salzburg 1993, pp. 9–60, p. 22, p. 46.

43 **H. Seper – H. Krackowizer – A. Brusatti**, *Österreichische Kraftfahrzeuge von Anbeginn bis heute, Welsermühl*, Wels 1984. Museum catalogue for the exhibition of the Technik Museum Vienna 1978 on Hans Ledwinka.

44 **H. Seper – M. Pfundner – P. Lenz,** *Österreichische Automobilgeschichte,* p. 39f. A photo of the production of the President can be found in **W. Schmarbeck**, *Hans Ledwinka*, inside cover, with details of the persons involved, including Rumpler, see

45 **E. Ledwinka**, *Sudetendeutsche Pionierleistungen im Kraftfahrzeugbau*, in: **R. W. Eichler** (ed.), Sudetendeutsche Beiträge zur Naturwissenschaft und Technik - Schriften der Sudetendeutschen Akademie der Wissenschaften und Künste, vol. 2, Verlagshaus Sudetenland, Munich 1981, pp. 195–206, here p. 197.

46 **H. Seper – M. Pfundner – P. Lenz,** *Österreichische Automobilgeschichte*, pp. 45–50.

47 http://www.geschichte-der-technik.de/technisches-museum-tatra-koprivnice [cited on 2021-03-10].

Fig. 4: Advertisement of the Nesselsdorf car works in 1900

Source: AAZ of February 25, 1900, p. 13.

duction of their respective plants. For his cooperation with the German occupation forces, Ledwinka was sentenced to prison in Czechoslovakia in 1948.

Before Ledwinka returned from Autowerke Steyr to the Nesselsdorf car factory as chief designer in 1921, he checked the tensions between the German and Czech ethnic groups in the factory with a visit. There, the workforce of 3000 was 75% Czech.[48] While until 1918 Germans formed the elites in the economy and administration of Bohemia and Moravia and German was the official language, while Czechs vainly demanded national autonomy in the Austrian Empire, after 1918 relations between the two ethnic groups turned around and Germans had to submit to Czechs.[49] In 1923, Lewinka brought out the Tatra 11 small car, which, including

48 **E. Albeck**, *Dr. tech. h.c. Hans Ledwinka - Ein Pionier des Automobilbaus*, in: Blätter für Technikgeschichte, 1961, pp. 63–95, here p. 75.

49 **H. Mommsen**, *1897 - Die Badenikrise als Wendepunkt in den deutsch-tschechischen Beziehungen*, in: **D. Brandes** (ed.), Wendepunkte in den Beziehungen zwischen Deutschen, Tschechen und Slowaken 1848–1989, Essen 2007, pp. 111–118.

its successor, the Tatra 12, was successfully built in numbers of 25,000 until 1930. With its air-cooled boxer engine, it already possessed an important element of the later Volkswagen.[50] In order to secure sales in Austria, which was shielded by protective tariffs, Tatra built an assembly plant there in 1921. Similarly, the sales company Detra, including an assembly plant, was founded in Frankfurt a.M. for the German market.[51] In the 1930s, Ledwinka designed a four-axle, 72-seat gasoline-electric high-speed railcar, which began running in 1935 as the „Slovak Arrow" on the 400-km route between Prague and Bratislava, reaching 130 km/h. The train's speed shrank from one to two hours. Travel time shrank from 7 hours to 4 ½ hours.[52]

Hans Ledwinka's Tatra 77 automobile became his masterpiece and an icon of Czech modernism. Specimens of its successor Tatra 87 are in the Museum of Modern Art in New York and the Pinakothek der Moderne in Munich, and in many technical museums around the world, such as the National Museum of Technology in Prague and the Transport Center of the Deutsches Museum in Munich.

The Tatra 77 was not merely a catch-up modernization of Western models, but was also considered a technological tour de force in the West. When the Moravian Tatra works launched its innovative Tatra 77 in 1934, it caused quite a stir at the motor shows in Paris, Prague, Vienna and Berlin. Tatra confidently displayed a red-painted example of the Tatra 77 at the 1934 Vienna Motor Show.[53] For the first time, the Tatra 77 combined the design principles of streamlined shape (with an extravagant tail fin), rear engine, and air cooling in a serial production vehicle - „a car so completely different from the norm," as the Prague Tageblatt found on March 6, 1934, on the occasion of the Prague Motor Show – principles later found in Ferdinand Porsche's Volkswagen. The AAZ emphasized the streamlined shape and spoke of a „fully streamlined car."[54] The fact that it achieved a top speed of 145 km/h with an engine of just 60 hp was even considered a sensation! The German press also spoke favorably of the Tatra 77, which was exhibited at the Berlin International Automobile and Motorcycle Exhibition in March 1934 on the Tatra stand between the Ford and GM stands. The „peculiar design attracted general interest," noted the Berlin Morgenpost on March 16, 1934, adding that the car was built „in almost perfect streamlined form." The Tatra chief designer, Hans Ledwinka, was able to demonstrate the rear engine of the Tatra 77 to Hitler at the International Motor Show in Berlin on March 4, 1934.[55] The AAZ called the Tatra 77 the best piece of this exhibition. The Tatra 77 with two front headlights was built in a run of just 105 units until 1935. Despite its avant-garde design, the Tatra 77 had constructional shortcomings. It was built as a wooden body on a tubular steel frame and weighed almost two tons. Only the Tatra 87 used the lightweight construction of a self-supporting steel body.

The successor type Tatra 77a with three front headlights and three seats per row was produced in the years 1935 to 1936 in a run of only 150 copies. The driver's seat was provided in the first row in the middle. This was an uneconomical small series. Here Ledwinka also resembles Porsche, both of which tended to expensive experimental studies. The successor to Tatra 77a, the Tatra 87, also with three front headlights (but only two seats in each row),

50 **E. Albeck**, *Dr. tech. h.c. Hans Ledwinka*. The engine sat in the front section, the drive was to the rear wheels.

51 **W. Schmarbeck**, *Hans Ledwinka,* p. 68.

52 **W. Schmarbeck**, *Hans Ledwinka*, p. 91.

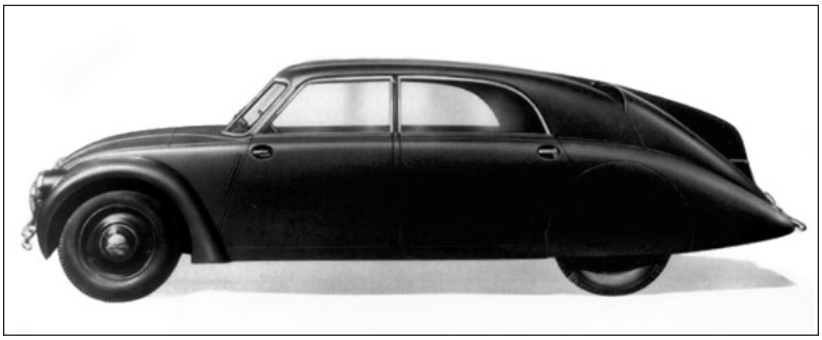
53 AAZ, April 1934, p. 7.

54 The question of whether the body of the Tatra 77 was actually tested in the wind tunnel before series production is open.

55 See fair report in the March 1934 AAZ and http://www.aerotatra.czweb.org/hitler.jpg, [cited on 2026-04-01].

was produced from 1936 through all the economic, social and political turmoil of the war and post-war period until 1950 in a run of over 3000 units.[56]

Fig. 5: The Tatra 77 - The Icon of Czech Modernism



Source: https://cs.wikipedia.org/wiki/Soubor:Tatra_77.jpg [cited on 2026-01-04].

Hardly any biographies address the question of the relationship between Ledwinka and Porsche. Only Schmarbeck states that there were no formal relations, but that the two designers knew each other well and held discussions and exchanged ideas at trade fairs and car races.[77] The following illustration shows Porsche and Ledwinka as joint visitors to the 1935 Masaryk Race on the Masaryk Ring near Brno. The Ring was opened as a race track in 1930 and named after the first president of Czechoslovakia, Tomas Masaryk.

At the Berlin International Automobile and Motorcycle Exhibition in March 1934, not only did the Tatra 77 appear in streamlined form, but also a four-cylinder DKW, the shape of which „approximated the complete streamline," as the Berlin Morgenpost wrote on March 16, 1934. However, the general public was initially unwilling to accept streamlined cars. Rather, conventional car bodies predominated in the 1920s. Even at the Berlin International Automobile and Motorcycle Exhibition in March 1934, the public still „rejected so-called streamlined cars as unattractive," as the Berlin Tageblatt pointed out in its trade fair report on March 8, 1934.

Forerunners of the streamlined cars could already be observed before 1915. In 1914, the Italian Count Marco Ricotti gave the Alfa Romeo 40-60 HP automobile, following the approaches of Italian Futurism, a closed streamlined aluminum body called Aerodinamica.[57] In 1913 in Vienna appeared an automobile in closed zeppelin form, the 35/75 HP Charron. Also, in 1914, experiments were conducted in Vienna with tapered tail shapes to reduce drag. Likewise, experiments with the streamlined shape were carried out in Germany. One example is Max Lochner's „Opel Egg" from 1912.[58]

The contribution of the Shoe Factory Baťa to Austro Modernism

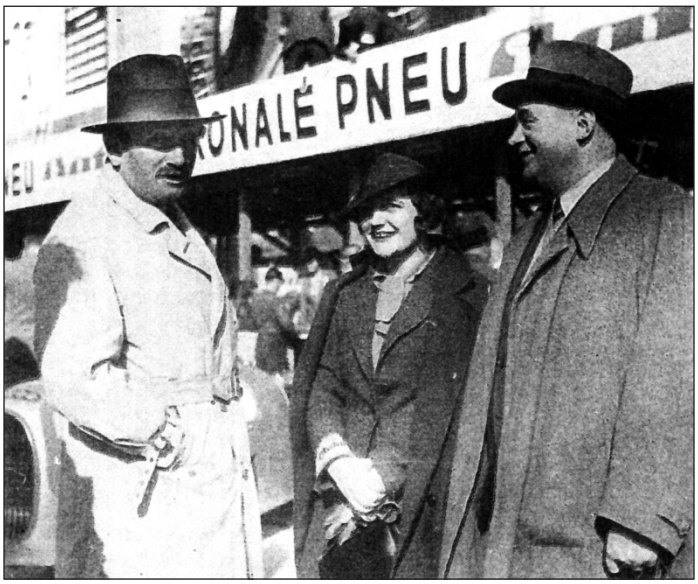
Just as Tatra developed as an innovative enterprise in the Moravian province, the Bat'a shoe factory in the small town of Zlín, 100 km northeast of Brno, unfolded as another centre of

56 **H. P. Bröhl**, *Paul Jaray Streamline Pioneer*, Bern 1978, p. 133.

57 AAZ 21 February 1915.

58 AAZ, April 13, 1913, p. 57. AAZ, December 27, 1914, p. 29. **I. Sievers**, *Die Entwicklung der Stromlinien-Karosserie*, in: Automobiltechnische Zeitschrift (104) April 2002, Issue 4, pp. 364–369, here p. 364.

Fig. 6: Porsche and Ledwinka at the Masaryk Race near Brno in 1935, together with the Czechoslovak racing driver Elisabeth Junek. The Czechoslovak racing driver Elisabeth Junek was celebrated in the country and was considered an icon of the newly founded state of Czechoslovakia.



Source: W. Schmarbeck, *Hans Ledwinka,* 2nd edition *Graz* 1997, p.121.

Czech-Modernism in the 1920s and 1930s. This strand of modernism has been studied primarily by architectural historians.[59] At this point, this view will be expanded to include the innovative organization of production, which goes far beyond the Fordist approach and thus represents an independent contribution of Czech modernism, without merely catching up with Western modernism. Around the production of shoes, Thomáš Baťa built a conglomerate that also established links with the automobile and aircraft cluster of Austro Moderne. Thus, he took up the production of car tires in his rubber factories and in 1931 merged his aircraft activities into a subsidiary ZLAS, which operated the airfield near Zlín, maintained airlines and started producing airplanes.[60]

Thomáš Baťa transferred shoe production, which until then had been organized by hand, into processes of industrial division of labour and mechanization.[61] The factory in Zlín, which included work and life in an integrated concept with a workers' settlement and was built in the style of industrial modernist architecture, made Baťa widely known. Zlín was the venue for the 1935 Congress of CIAM, the International Congress of Modern Architecture, and became

59 **M. Kohlrausch**, *Brokers of Modernity.* **W. Nerdinger**, *Zlin - Modellstadt der Moderne*, Munich 2009. **O. Sevecek – M. Jemelka,** *Der Fall der Firmenstädte des Bata-Konzerns*. In: Firmenstädte des Baťa-Konzerns: Geschichte – Fälle – Architektur, Stuttgart: Franz Steiner Verlag, 2013.

60 **P. Bezouska – D. Billig**, *Zlín - die Erfolgsstory der mährischen Flugzeugschmiede*, in: Fliegerrevue extra, 19, 2007. **H-J. Mau**, *Tschechoslowakische Flugzeuge*, Berlin 1987.

61 **R. Vahrenkamp**, *Von Taylor zu Toyota - Rationalisierungsdebatten im 20. Jahrhundert, second corrected and expanded edition*, Cologne 2013.

a pilgrimage site for architects.[62] Baťa departed from the concept of centralized operations. Instead, the individual production steps of shoe manufacturing were grouped into workshops that were controlled semi-autonomously by key figures, specifications of input and output variables, and transfer prices. By implementing the principle of loose coupling of semi-autonomous workshops for the first time in industrial history, Baťa took on a pioneering role in industrial history, since in the 1930s the notion of the special productivity advantages of a hierarchical large-scale enterprise prevailed both in the capitalist West and in the young Soviet Union.

Baťa used its distribution network to synchronize production with sales throughout Europe.[63] With this approach, it took a leading role in the European footwear industry, which had previously organized its sales through independent retailers. Baťa covered major European cities with a network of representative flagship stores for its products. The following picture shows the ultra-modern flagship store in Liberec in 1936.

Fig. 7: Baťa Flagship Store in Liberec at Tuchplatz 1936

Source:

40 years of communist rule in Czechoslovakia caused Baťa's innovations to be forgotten. The Baťa shoe factory in Zlín was nationalized and renamed Svit. Moreover, following the Soviet cult of personality, in 1949 the city of Zlín was renamed Gottwaldov after the Czechoslovak president Klement Gottwald. The names Baťa and Zlín – icons of Czech Modernism – which were important for the transmission of the Baťa story, were thus extinguished. The concepts of decentralized corporate management returned to Western Europe in the 1980s

62 **O. Sevecek – M. Jemelka,** *Der Fall der Firmenstädte des Bata-Konzerns*. **W. Nerdinger**, *Zlin - Modellstadt der Moderne.*

63 In Berlin, according to the 1932 Berlin Address Book, Baťa's flagship store was located at Leipziger Strasse 77.

– not from Czechoslovakia but from the Japanese automotive industry under the name „Toyota Production System" (Lean Production).[64]

Austro Modern. Vynálezci, designéři a podnikatelé v prostředí inovací Vídeň – Morava – Čechy – Berlín 1900 až 1939

(Resumé)

Studie Richarda Vahrenkampa se zaměřuje na fenomén tzv. „Austro Modern" a analyzuje technologický a průmyslový rozvoj ve střední Evropě v období let 1900–1939. Autor kriticky přehodnocuje tradiční interpretační rámec, podle něhož byly země tohoto regionu chápány primárně jako periferie dohánějící západoevropskou modernizaci. Namísto toho ukazuje, že prostor vymezený Vídní, Moravou, Čechy a Berlínem představoval svébytné a vysoce dynamické centrum inovací, které významně přispělo k utváření modernity, zejména v oblasti techniky, průmyslu a organizace výroby.

Analytickým východiskem studie je biografie Ferdinanda Porsche, jejíž prostřednictvím autor rekonstruuje komplexní síť vztahů mezi průmyslníky, konstruktéry a investory. Porscheho působení ve firmách Lohner a později Austro-Daimler ilustruje nejen vývoj od elektrických a hybridních pohonů ke spalovacím motorům, ale také rostoucí význam systematického technického výzkumu a experimentu v automobilovém průmyslu. Jeho konstrukční činnost, zejména v oblasti závodních automobilů a vojenské techniky, přispěla k mezinárodnímu uznání rakouského průmyslu před první světovou válkou.

Vedle technických inovací studie akcentuje i roli strategického řízení a finančního kapitálu, reprezentovanou osobností Camilla Castiglioniho. Jeho aktivity v oblasti zakládání podniků, získávání kapitálu a propojování průmyslových aktérů dokládají, že inovační proces byl podmíněn nejen technickou kreativitou, ale i institucionálním a ekonomickým zázemím. Interakce mezi technickými a strategickými inovátory je v textu interpretována jako klíčový faktor úspěchu sledovaného inovačního prostředí.

Zvláštní pozornost je věnována propojení automobilového a leteckého průmyslu, které se projevilo zejména v oblasti vývoje spalovacích motorů. Rakousko se kolem roku 1910 zařadilo mezi přední centra letecké konstrukce, přičemž významnou roli zde sehráli Igo Etrich a Edmund Rumpler. Jejich aktivity zároveň ilustrují transregionální charakter inovací, které se šířily z habsburského prostoru do Německa, zejména do Berlína.

Po rozpadu Rakousko-Uherska v roce 1918 se těžiště inovačních aktivit částečně přesunulo do nově vzniklého Československa. Studie poukazuje na význam podniků jako Tatra v Kopřivnici, vedená technickým ředitelem Hansem Ledwinkou, a Baťovy závody ve Zlíně. Ledwinkovy konstrukce automobilů představovaly technologicky pokročilé řešení kombinující aerodynamiku, zadní uložení motoru a lehké konstrukce, zatímco Baťův podnik rozvinul inovativní model průmyslové organizace založený na decentralizovaných výrobních jednotkách, jenž předjímal pozdější principy flexibilní výroby.

Autor rovněž upozorňuje na diskontinuitu historické paměti způsobenou politickými zvraty 20. století, zejména nacistickou okupací a následným komunistickým režimem, které vedly k marginalizaci či zapomenutí těchto inovačních tradic. Studie tak přináší podnětný příspěvek k reinterpretaci modernity ve střední Evropě a zdůrazňuje aktivní roli regionu jako autonomního centra technologického a průmyslového vývoje.

64 **R. Vahrenkamp**, *Von Taylor zu Toyota.*