VOL. 2 | NO: 6 | SPRING 2022

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RARE & UNIQUE VEHICLES

— SPECIAL THEME: ALTERNATIVE POWER —

Early Japanese Electric Cars

No Fuel - No Problem!

Armstrong Hybrid

Dey's Devotion

Propeller-Driven Cars

Wind Aided

Chrysler Turbine Car Program

The Bronze Blow Torch

Monaco-Trossi Grand Prix

Racing With the Radial

9 772709 831001

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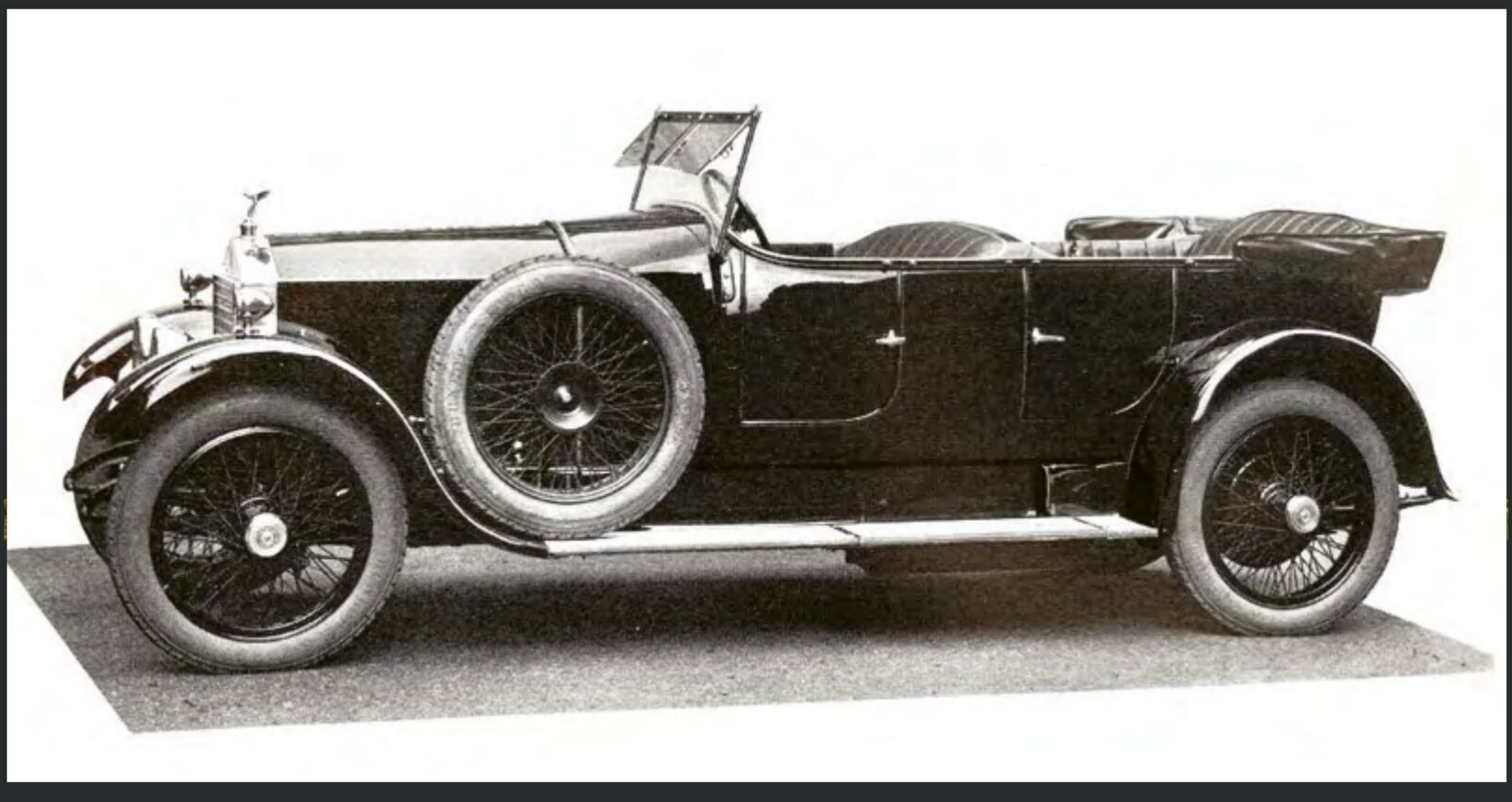
AUTO VETERAN COMPANY



1923 Rolls-Royce 20HP 'Barrel Sided' Tourer by Barker

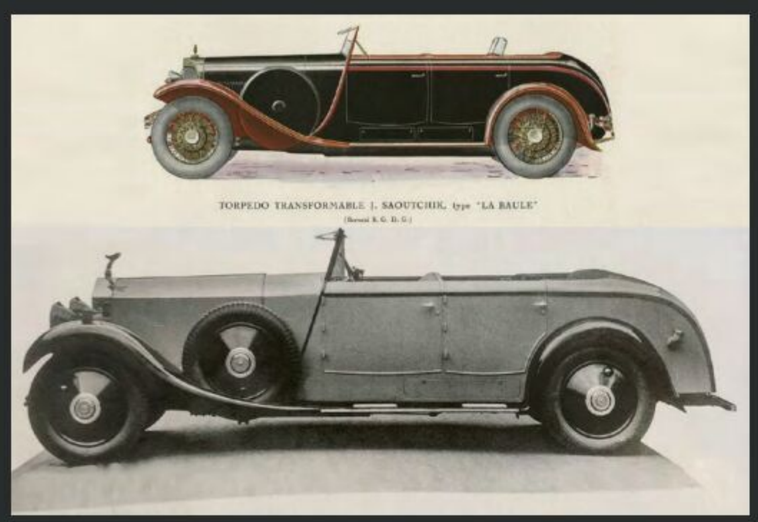
- The most sought after Twenty coachwork with nice color combination
- Older restoration (including new cylinder head) with beautiful patina (dark green over black)
- Long therm ownership for almost 40 years
- Running sweetly, driving nicely and ready to use

1952 Delahaye 235 Coupé by Antem (ex Rally Monte Carlo)

- Ex-Dunlop team car driven by Roger Crovetto and Julio Quinlin
- Only 3 owners since new, with 60 years of single ownership
- Original, unrestored and good running condition
- Comes with comprehensive dossier and period pictures

1954 Jaguar XK120 OTS (LHD)

- Well maintained Jaguar in great drivable condition
- Automobile with very well documented racing history
- Owned and raced by motorsport journalist and photographer Peter Coltrin
- Still with its original interior and paint



1929 Rolls-Royce Phantom I All-weather Tourer by Park Ward

- Built according to the patent „La Baule" of Jaques Saoutchik of Paris
- Only 3 owners since new
- Well-documented history and large "dossier"
- Desirable KR series "The biggest Rolls-Royce ever built"

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WELCOME

Editor's Letter

Dear Readers,

ON NEW YEAR'S DAY I found myself at a small pub in Suffolk, UK. The Vintage Sports Car Club holds a meeting there every month. As usual I was carrying a stash of Rare & Unique Vehicles magazines. People came up to me saying, "Oh, we know your magazine!" It is a great feeling that our effort which was started just 15 months ago is growing quickly. It is done by enthusiasts for enthusiasts. We rely on your support, and we appreciate your encouraging feedback. This has been a very eventful three months. At the beginning of December, we kick-started our new project, a book on the history of the German Standard and Gutbrod brands, at the RetroClassics Show in Nürnberg (see our news section). Though attendance was below expectations, I was able to meet some of our readers.

This issue's special theme is Alternative Power. As electric vehicles gain traction, our approach – of course – is to examine historic developments of other types of powertrains and alternatives to petroleum-based fuels. So while we have a fair assortment of early electrics from Austria, France, Japan, and North America, we also feature steam-powered, propeller-driven, and gazogene vehicles, and a gasoline-electric hybrid from 1896!

We have a number of goals with Rare & Unique Vehicles:

- We want articles that are well researched and informative, supported by extensive historical documentation.
- We want limited advertising, so that we can provide the maximum content in each issue.
- To do this, we depend on our subscribers to keep the advertising limited.
- We want Book Reviews that let people know about important books which may have been overlooked, but still adhere to a high standard of quality.
- We want to continue to produce articles focusing on vehicles that even the most knowledgeable collectors may not know of.
- Ultimately, we want to create a reference that must be part of a serious collector's library.

We are happy that more companies and collectors have joined our list of supporters. In this issue, we welcome Thiesen, a leading European classic-car dealership, and the Central Garage collection of Bad Homburg, Germany.

Dr. Pál Négyesi

EDITOR AND PUBLISHER

ROADMAP

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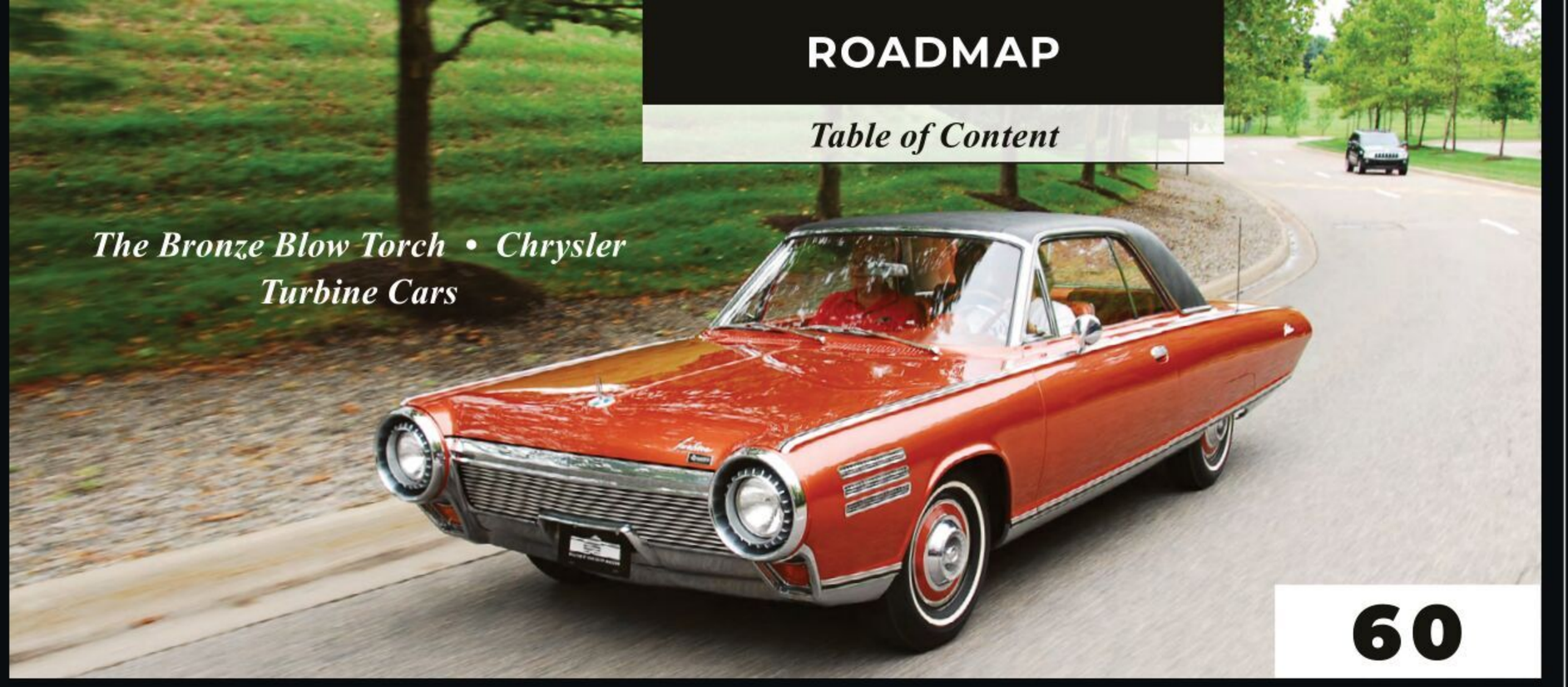

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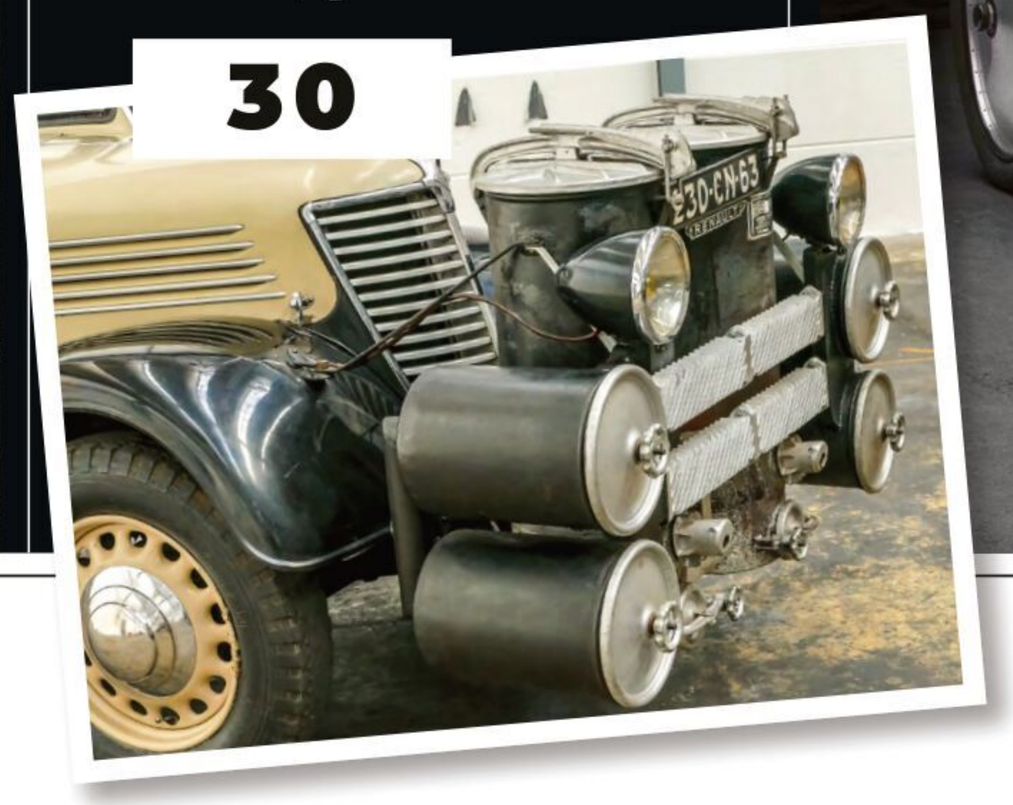
Driving With Wood • Gazogene Cars



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SPECIAL THEME: ALTERNATIVE POWER

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RETRO CLASSICS BAVARIA

At the 2021 Retro Classics Bavaria show in Nürnberg last December, Rare & Unique Vehicles presented its new book project together with Sammlung K: Alles Mit Motor – Die Standard/Gutbrod Story. This 272-page book will be published in April and will appear at the Retro Classics Stuttgart show. Our stand at the Nürnberg show received a special prize from the organizers.

ŠKODA BRINGS ANOTHER RACING CAR BACK TO LIFE

To commemorate the 120th anniversary of Škoda Motorsport, one of the brand's rarest cars has been reconstructed. Škoda only built five examples of the 1100 OHC race car, with just two of them being coupes. Now one of the lightweight 1100 OHC coupes has been reborn, using a combination of traditional techniques and modern technology.

NEW EXHIBITION OF ROYAL CARS OPENS IN NORWAY

After being closed for a period, the Queen Sonja Art Stable, a part of the Norway Royal Court, opened to the public on February 11 with the exhibition "The King's Cars." The exhibition was officially opened by Crown Prince Haakon. Here you can experience highlights from the Royal House's car park from 1913 to today. The exhibition includes the A-1 Buick Roadmaster from 1939, which was used when King Haakon returned after the liberation in 1945. The exhibition is open until May 15.

TECHNO CLASSICA ESSEN

This year the Techno Classica Essen show will take place between March 23 and 27. We will be at the show thanks to our great partner, Classic Motorcars Holland. You can find us at Hall 5, Stand 5-519, where you will be able to find our previous issues and also our editor, Dr. Pál Négyesi, who will be happy to answer your questions.

PAYKAN CLUB IN IRAN

The Historical Vehicle Association of Iran launched a club for Paykan in January. The Paykan was the first Iranian car, produced by Iran Khodro under licence from the Rootes Group. The Hillman Hunter based car was produced between 1967 and 2005. It even spawned a pickup version, called the Bardo which was phased out in 2015.

WORLD FORUM FOR MOTOR MUSEUMS HOLDS ONLINE SEMINAR

Because of the COVID-19 pandemic, the biennial meeting for motor museum professionals, owners, and collectors has been postponed many times, so the organizers pre-recorded the presentations and offered those online. You can listen to 17 presentations on a wide range of topics at tinyurl.com/2p83ntfs .

NEW MUSEUMS

Even the COVID-19 pandemic could not dampen the desire to open new museums around the world. Dutch private collector Frans van Haren has decided to open his collection to the wider public. Metropole in Druten features more than 200 cars and 30 scooters – you need to reserve a ticket in advance. Over in California, two new collections can now be enjoyed. Ted Segerstrom has been collecting cars built by Carroll Shelby and together with his wife has now opened a museum to share his selections with the public. A couple miles to the west, in Rancho Dominguez, Rick Lorenzen fulfilled his childhood dream and recreated the old Lions Drag Strip for his museum, which features a lot of cars in original settings. "It's kind of like walking onto a gigantic movie set," said a visitor. And last but not least, a new museum has opened in Salina, Kansas. Simply called "The Garage," it features dozens of cars, but there is an aspect to this initiative which is very commendable: it has hired two graduates from the nearby McPherson College's Automotive Restoration Technology Program overseeing the vehicles and the education aspects of the collection.

Readers' Letters

ERRATA

Our good friend Rubén Verdés pointed out a few errors in our feature on the Bentley Specials (Issue No. 4): "There are a good many references that talk about (e.g.) a "Mk VI Derby Bentley Special" – there's no such thing. All motorcar production moved from the Derby factory to the Crewe factory (that made Merlin engines during WWII) after the war. The term Derby Bentley is specifically reserved to discern only those models, which were made at the R-R Derby works from when Rolls-Royce purchased Bentley (in 1931) through the end of the prewar era … There are other things that are a bit muddled too such as attributing the Bentley Boys to Sir Henry 'Tim' Birkin, who was only one of them. Unfortunately an oft-repeated story which proved to be wrong has also crept into this article: Barnato did not use the Bentley "Blue Train" to beat the train in his famous run.

REVIEWS

Books

A selection of the latest book offerings from around the world. Our panel of experts includes Frederik E. Scherer, Wolfgang Buchta, Francesco Maurizi, Lukasz Kamiński, David Cooper, and Dr. Pál Négyesi.

Kleinwagen
COLLECTING MICRO-AUTOMOTIVE HISTORY

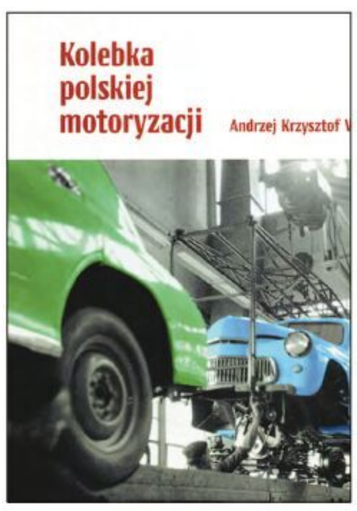
Microcars may be sought after and pricey today, but that was not always the case. Erik Eckermann started out collecting derelict German postwar vehicles as early as the 1960s and 1970s, when people wanted to get rid of them. He wanted to preserve them for the future – and he did just that, keeping the small (and sometimes bigger) machines in barns until he sold them on only much later. Being a museum professional, he documented their arrival and their departure; in some cases, he managed to retrace what happened to them afterward, or where the cars are today. The chapters are arranged by makes, giving brief historic accounts, and even though there are also unusual species such as a Wendax WS 750 or a Hartmann Formula Junior race car, his book is more about the collecting and the anecdotes surrounding each vehicle than it is another book about microcars. Eckermann's writing is humorous and tongue-in-cheek, which does not match the cheerless aspect of the cover and the mostly small black-and-white images. Nevertheless, it is an excellent read and, after all, a great contribution to microcar history! **FS**

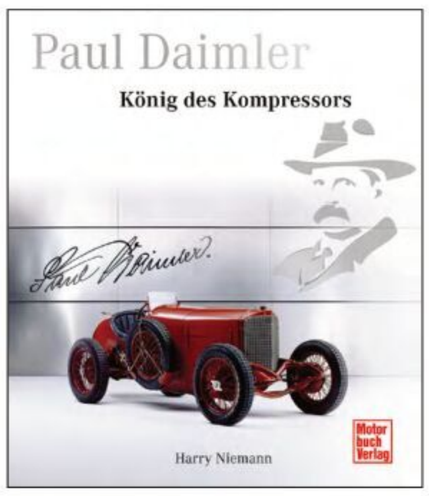
Erik Eckermann: Kleinwagen und Mobile der 50-er Jahre
Books on Demand, 280 pages,
240 images, in German, 38 Euros,
available from the author on:
autohistorica@t-online.de

Kolebka polskiej motoryzacji
HIDDEN CAMERA IN A COMMUNIST FACTORY

Today it is normal for journalists to write about their own countries' car companies. It is similar in Poland, although the Communist period brought completely different realities. Andrzej Krzysztof Wróblewski was a political journalist who died a decade ago. This book, presenting everyday life at FSO (Fabryka Samochodow Osobowych), was written six decades ago. At the time state-imposed censorship prevented its publication. Now the author's son collected the text, along with outlined censorship "corrections," which are highlighted in the recently published book. We can go back in time to the gray realities of Communist Poland. The publication contains a lot of technical content but also human stories and troubling anecdotes. Most of all, it is honest and set in the realities of the time. **LK**

Andrzej Krzysztof Wróblewski: Kolebka polskiej motoryzacji
Wydawnictwo WEI,
200 pages, in Polish, 7 Euros,
ISBN 978-83-954197-3-7

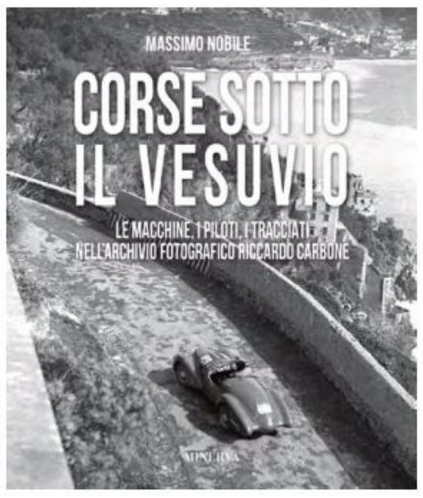




Paul Daimler
SUPERCHARGING WITH PRIDE

Sometimes it's tough to have famous parents. To make matters worse, Paul Daimler seems to have stood voluntarily in his father Gottlieb's shadow: according to author Harry Niemann, Paul drew confidence in his abilities by identifying himself with his ancestry. At the same time, he also developed "a fatal pride which was the reason of his being sometimes incapable of making compromises." Even though he pioneered the idea of supercharging, it was finally a certain Ferdinand Porsche who took credit for it. Niemann's book is not as much a biography as it is a technical documentation of the cars and designs associated with Paul Daimler, who worked not only for Daimler-Motoren-Gesellschaft but also for Horch. The author frequently quotes directly from the archives, which are today in the hands of a private collector. Referenced throughout, the book contains archival research aids as well as an extensive bibliography. It is well illustrated (though unfortunately many photo credits remain unclear), but the book design is rather outdated. **FS**

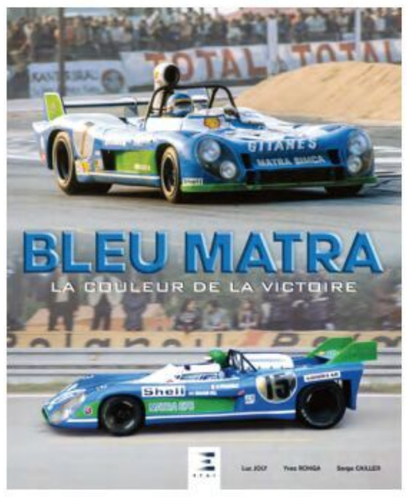
Harry Niemann: Paul Daimler. König des Kompressors
Motorbuch Verlag, 272 pages,
250 images, in German, 49,90 Euros,
ISBN 978-3-613-04267-4



Corse sotto il Vesuvio
CRAVING RACES!

We are in Italy and more precisely in Naples. The desolation of the war that has just ended has given way to a frenetic desire to resume sports activities. The Coppa Mergellina of December 16, 1945, was the first race to be held in Italy after World War II, but also the first of a thrilling series of races that were to take place in the area on the slopes of Vesuvius. In this large work by Massimo Nobile, all these races find adequate space, such as the Mergellina-Posillipo or the Sorrento-Sant'Agata, the Targa Vesuvio, and many others. The Naples Grand Prix and all the surrounding races are not missing. There is also room for a description of places where the races were held in the provinces and for the curious carruccioli, carts built with wooden boards and launched in downhill races, and finally the local craftsmen, their cars, and Neapolitan drivers. The strength of this work consists in having combined meticulous research on each race with a selection of over 600 photos from the Carbone Archive. **FM**

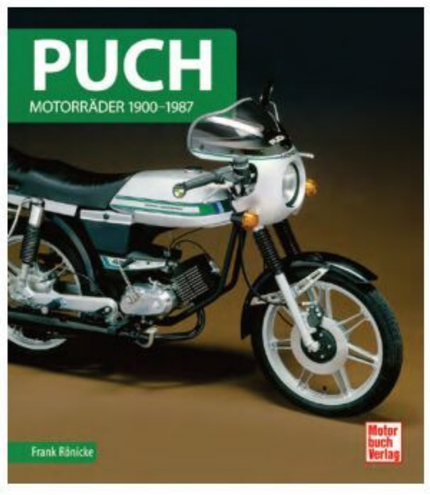
Massimo Nobile: Corse sotto Il Vesuvio
Le Macchine, i Piloti, i Tracciati
nell'Archivio
Fotografico Riccardo Carbone
Minerva Edizioni, 320 pages,
600+ pictures, in Italian, 35 Euros,
ISBN 9788833244181



Matra
THE SOUND OF SPEED

Authors Luc Joly and Yves Ronga started photographing in their teenage years, both around 1969. Without knowing each other at the time, they kept following Matra to the circuits, taking countless pictures of cars and races in Formula 1 and sports-car championships. More than 50 years later, they have brought their pictures together to create a chronological account of the most important moments in Matra racing history, commented by Serge Cailler. The years before 1969 are complemented with material from the Romorantin archives. Throughout the book, former drivers, mechanics, and other witnesses who were involved with Matra at the time share their personal insights, which gives this book a subjective twist. Those who have previous knowledge on Matra will benefit from that. Moreover, through ETAI's augmented reality app, one can listen to Matra engine sounds while reading the book. ETAI's special-interest book branch has recently been sold to the publishing house Sophia Communications, but we hope this feature will be maintained. **FS**

Luc Joly, Yves Ronga, Serge Cailler:
Bleu Matra, Les Couleurs de la Victoire
ETAI, 240 pages, 589 images,
in French, 59 Euros,
ISBN 979-1-0283-0420-1



Puch
HISTORICAL TWO-WHEELERS

Johann Puch was born in 1862 in Sakuschak – once Southern Styria, today Slovenia – and came to Graz in 1882, where he founded his first workshop for bicycle repairs in 1899 in an old glass house. From these humble beginnings emerged one of the largest manufacturers of two-wheelers – with and without engines – but also automobiles. Puch built motorcycles for 87 years, a record that no other manufacturer could match. Frank Rönicke first published his overview of the Puch company in 2009. Now we have an update, which charts the story of the company more or less in chronological order and focuses on the company's motorized two-wheelers, putting bicycles and cars to one side. While Rönicke is not as meticulous as the late Prof. Fritz Ehn, whose 648-page "Das Große Puch Buch" is still the ultimate work on the company, his comprehensive overview gives an ample introduction for those who are interested in the company and its products. A comprehensive appendix (almost 40 pages) with the technical data of all models and a list of sources complete the work. Unfortunately, one looks in vain for an index, which somewhat reduces its value as a reference work. **WB**

Frank Rönicke:
Puch: Motorräder 1900–1987
Motorbuch Verlag, 280 pages,
in German, 29.90 Euros,
ISBN 978-3-613044494

Kaiser Wilhelm
A DIFFERENT PRANCING HORSE

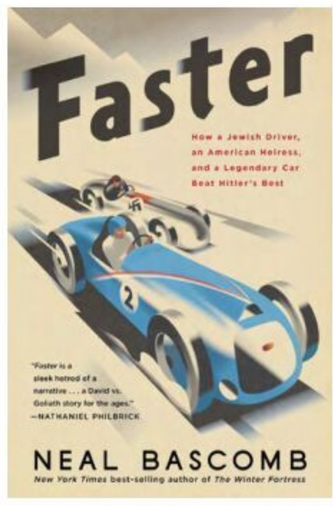
The obvious question that many of you will ask is: Why are we featuring a book that focuses on the stable of Wilhelm II, the German emperor? Well, the answer is really simple: because this particular stable has included exceptional motorcars since the early 1900s, and the author did an exemplary job of including these in a grandiose overview of a grandiose person's horses, carriages, motorized carriages, automobiles, and the people surrounding them.
Henning Heese is a historian, and this heavily annotated 447-page hardcover volume is not for those who like light reading. It is a very serious work that also illustrates what a proper motoring history book should look like, with in-depth, detailed research, clear references, and plenty of illustrations. The only problem is that the author decided not to enlarge some of the nice pictures and give cars the same treatment as the horses and carriages received. Otherwise you can learn everything about the fleet of the emperor, including the vitally important engine and chassis numbers, which are required to verify provenance of a car. **PN**

Henning Heese: Der Königlich Preußische Marstall nach 1900
Lukas Verlag, 447 pages,
47 illustrations, 50 Euro,
ISBN 978-3-86732-384-0

Automobilgeschichte
A HEAVY BOOK FOR EASY ACCESS

Even for many classic-car enthusiasts, the pre- and interwar years seem very far away. Peter Kirchberg's new book may be just right for them: It addresses all those "who are just getting started, not knowing much about automotive history and its inner coherences." Limited to pre-1939 Germany, it explains the subject from a technological point of view, taking also into account the developments made in the fabrication of cars and the materials used, as well as sociological aspects. Professor Kirchberg has taught automotive history at the Dresdner Hochschule für Verkehrswesen for decades. The overall concept of the book reflects this educational approach: In addition to well-chosen historic photos, there are countless diagrams, graphs, and explanatory schematics – all specially designed for the book. They fit into a coherent graphical concept that is up to date. Referencing is limited to side notes; unfortunately, there is no bibliography for further reading. These and other minor shortcomings aside, this book sets a standard for the whole genre of automotive books. **FS**

Peter Kirchberg:
Automobilgeschichte in Deutschland.
Die Motorisierungswellen bis 1939
Olms, 560 pages, ca. 620 images,
in German, 68 Euros,
ISBN 978-3-487-08642-2



Faster
RACING AGAINST THE GERMANS

Many years ago, I asked René Dreyfus about how politics affected racing in the 1930s. There had been a camaraderie of all top racing drivers, oblivious to what was happening in the outside world. They understood each other better than anyone who was not a driver. Rather suddenly, their friendships were undermined by politics – and driver René Dreyfus was in the middle of it. In 1938, he won the Pau Grand Prix, against the dominant German cars. The story can be found in his autobiography, "My Two Lives: Race Driver to Restaurateur" written with Beverly Rae Kimes. In his newest book, Neal Bascomb goes beyond that, adding historical context, and an account of team manager Lucy Schell and the precarious situation of race car manufacturer Delahaye. Though Bascomb is not a car guy, he prodigiously researches his stories to the point where he can describe them as if he had been there. A former journalist, he writes books focused on historical moments that are mostly forgotten. "Faster" is a compelling account of a moment where race history intersected with political and social history. **DC**

Neal Bascomp
Faster: How a Jewish Driver, an American Heiress and a Legendary Car Beat Hitler's Best
Houghton Mifflin Harcourt, 344 pages,
$24.75 USD, ISBN 978-1328489876

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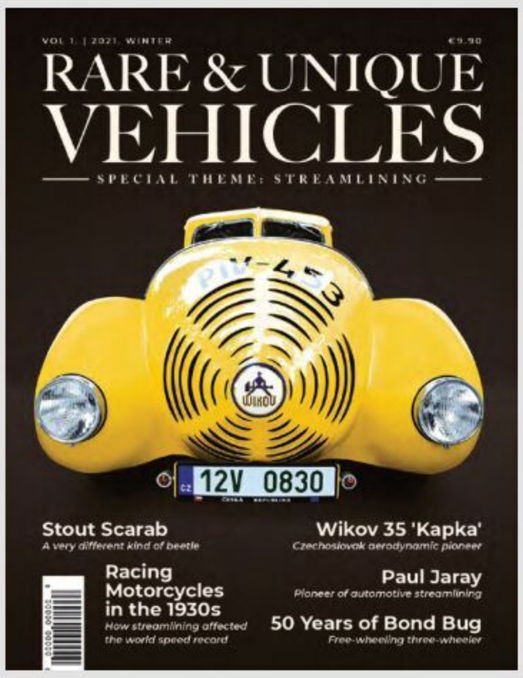

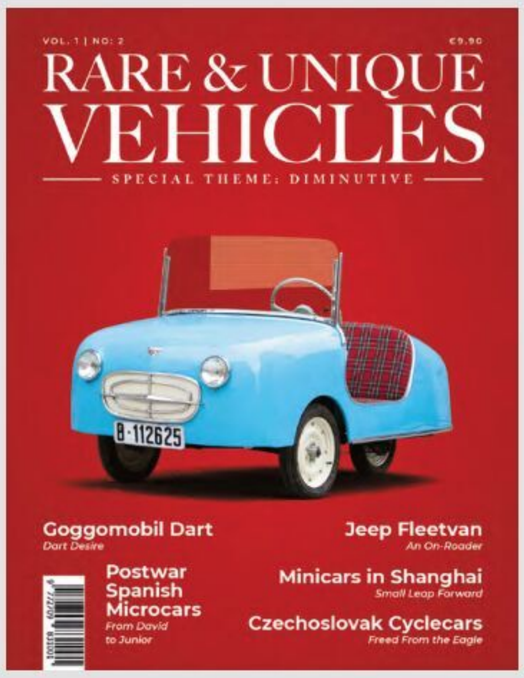

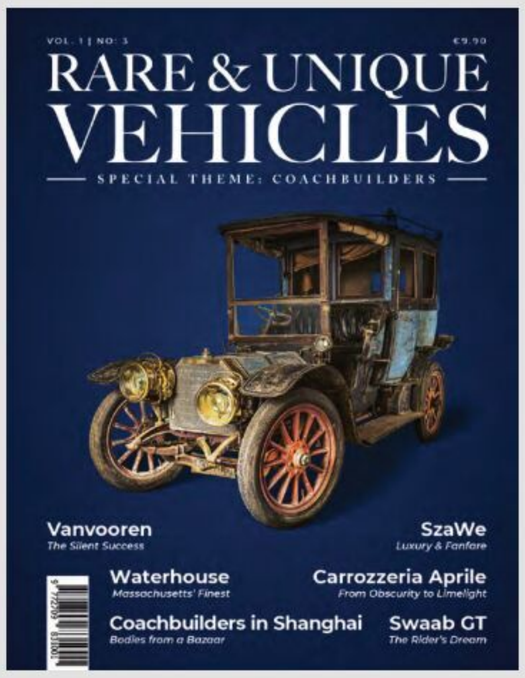

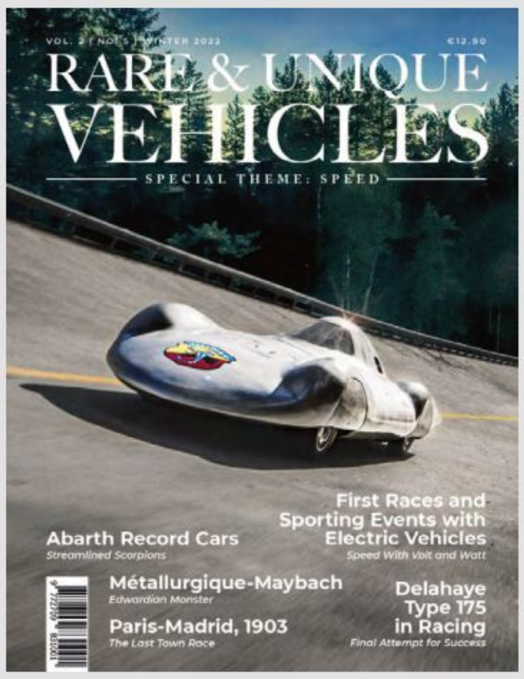

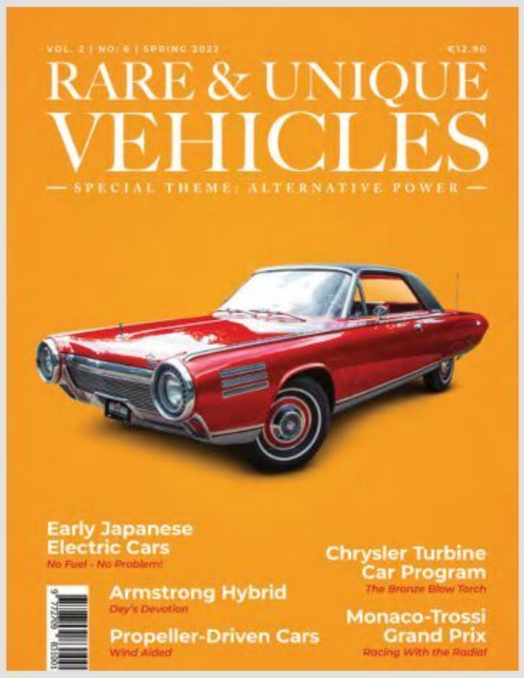

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The Armstrong-built vehicle was the world's first hybrid.

ARMSTRONG HYBRID

The car is now shown in the Louwman Museum.

DEY's DEVOTION

Harry E. Dey (1862–1927) was an electrical engineer in New York, who worked on perfecting the electric vehicle throughout his life. His best-known work, the 1896 Armstrong Phaeton, was the first hybrid car in the world. It is now being displayed at the Louwman Museum in the Netherlands. **Dr. Pál Négyesi** provides an overview.

MIXED PIONEER

Alternative Power

IN 1896, the electrical engineer Harry E. Dey created the first hybrid gasoline/electric automobile, and he was the first to include a self-starter. Dey was a remarkable innovator, especially focusing primarily on electric vehicles. Unfortunately few of his cars survive, with the notable exception of the Armstrong Hybrid. Bonhams auction house called him "startlingly forward-looking" in its catalog. Today he is largely unknown.

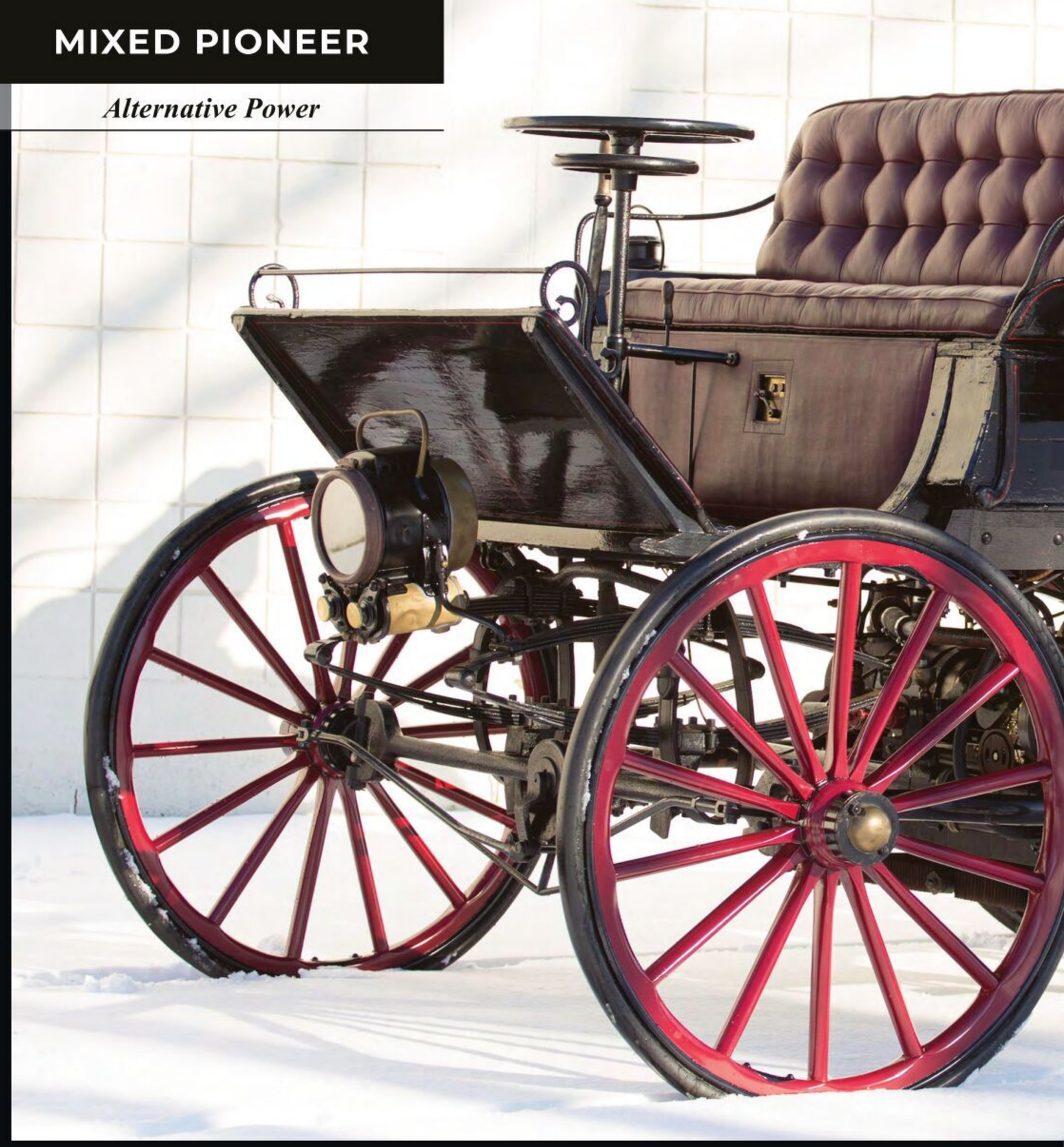
HARRY E. DEY's LIFE

Harry E. Dey was born in Minnesota in 1862. By the 1880s he was living in New York City and worked as an electrical engineer. His first known patent was a storage battery in 1889. Six years later he set up Dey-Griswold Co. in New York to manufacture an electric phaeton that was claimed to be able to "carry two to four people 75 miles on one charge of the battery, while not weighing over 900 pounds" thanks to its special battery, "which would cost an owner just one-third of a cent per mile to operate," claimed an article in The Horseless Age.

This car was set to have an electric motor with a revolving field and armature, each driving a shaft on which was fitted a radical oil pump with a single acting pistons. A special Dey High Potential Series Battery supplied the current to the motor. When the current was switched on and the shaft began rotating, twin oil pumps forced oil along lines to miniature fluid gear turbines located on each rear wheel. This was an early attempt at an automatic transmission.

Though there is no record that Dey-Griswold ever produced a vehicle, this was probably the idea that attracted the attention of the Roger American Mechanical Carriage Co. and resulted in the Armstrong hybrid of 1896 (see below).

Also in 1896 he designed a "turbine gas motor" which was to be used "at home to charge the batteries, and when going



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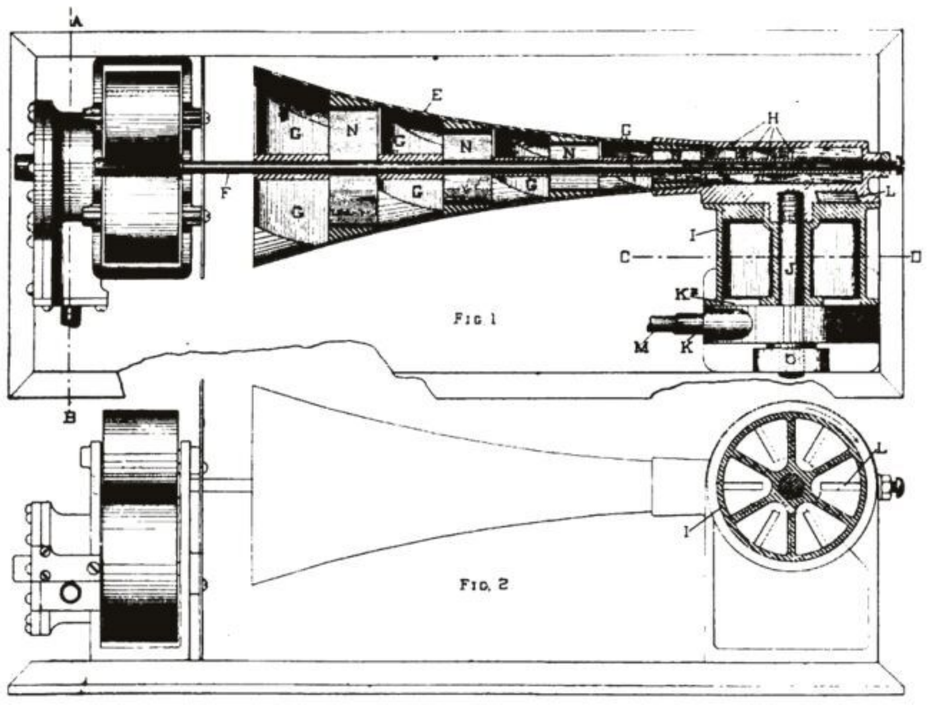
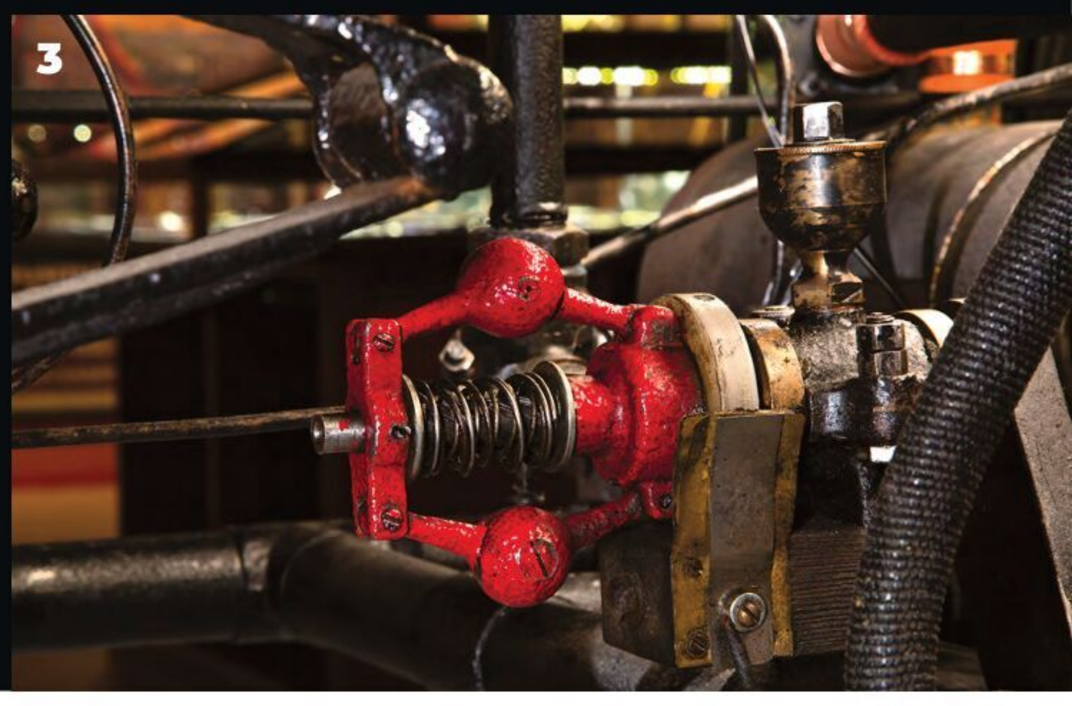


1 Dey's plans for a "turbine gas motor" were published in 1896.

2

2 The planned Dey-Griswold electric carriage.

3



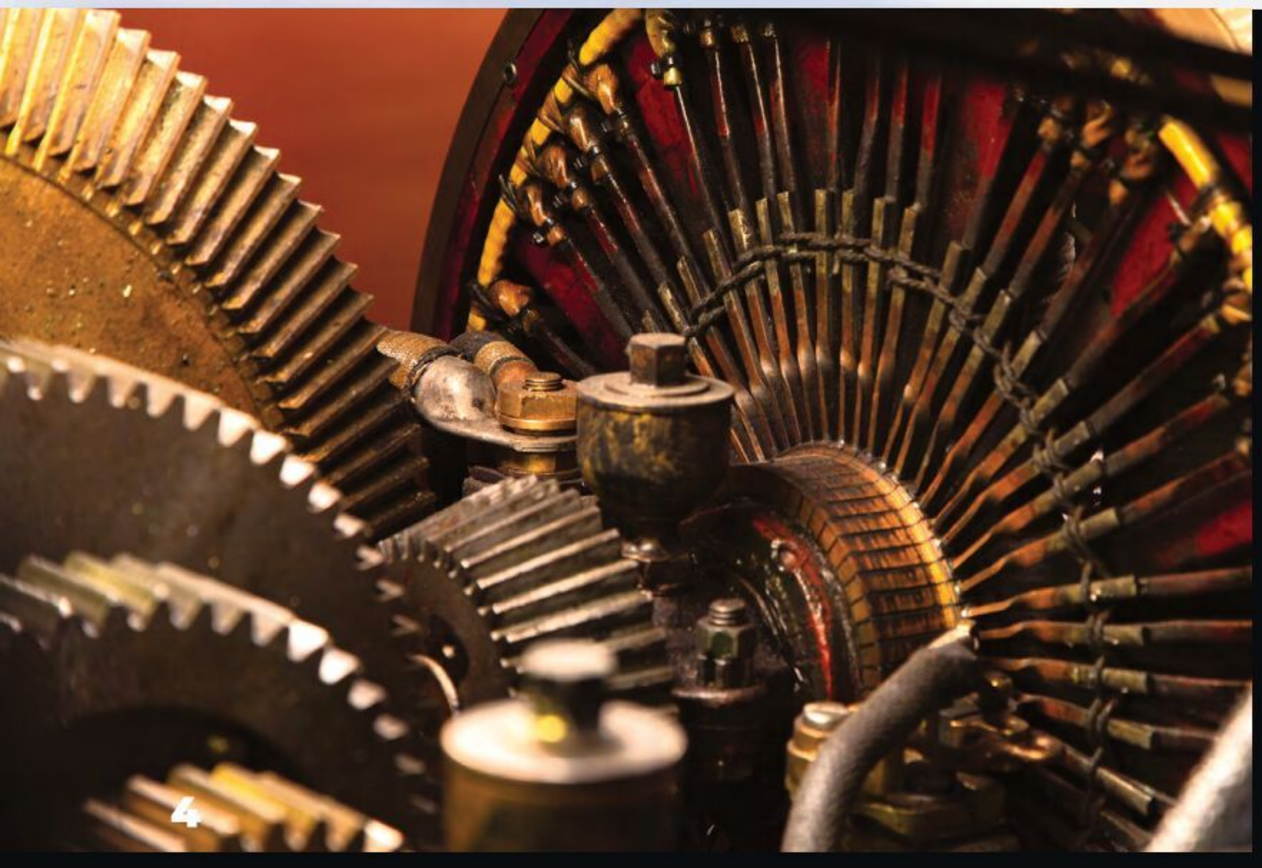
3 Centrifugal advance mechanism.

While it may look like a typical horse-less carriage of its time, the Armstrong Hybrid featured a revolutionary drivetrain.

off on long tours, may be taken along and kept steadily running, charging the battery constantly." Unfortunately, this auxiliary powertrain was not developed further.

Dey's next automotive venture was yet another New York-based manufacturer, the Pawtucket Motor Carriage Company, in 1897. It was set up with the intent of producing motor vehicles designed by Dey, but it proved to be another failure and folded a year later. Dey seemed to have stepped back and there is no evidence that he worked on yet another design until the First World War. In 1915 Dey teamed up with Charles Steinmetz, another electric vehicle developer. The Dey Electric Vehicle Syndicate, which quickly became the Dey Electric Vehicle Company, introduced its first model in 1917.

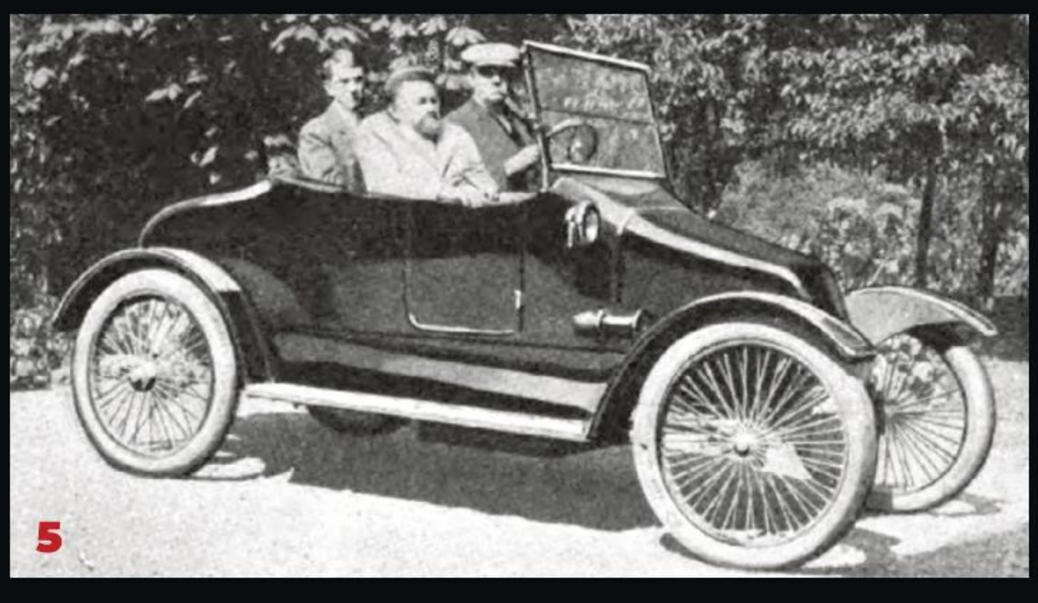
In 1920, Popular Science introduced the Dey electric. In the article, Steinmetz praised Dey's efforts, saying he "solved the problem of the $500 electric automobile." This small car was a hybrid again, which carried its own charging plant – a 3-hp air-cooled gasoline engine. The gasoline engine could be removed and used as a stationary charging unit for charging a separate battery or for house lighting. Of its many new features, the motor combined a rotating armature with field magnets connecting to a driving wheel by way of reduction gears. This eliminated the expense and weight of a differential gear. The construction of the vehicle included a number of tapered slip rings and was called a "nutless" car as so few were used. The chassis was made of wood, and the commonly used elliptical spring suspension was replaced by air springs. The battery was carried underneath the floor of the chassis housed in truss rods. This permitted more room for passengers and luggage. The battery could be lowered to the floor of the garage, or, by lifting a trap door in the floor of the car, water could be added to the battery. This design, like others by



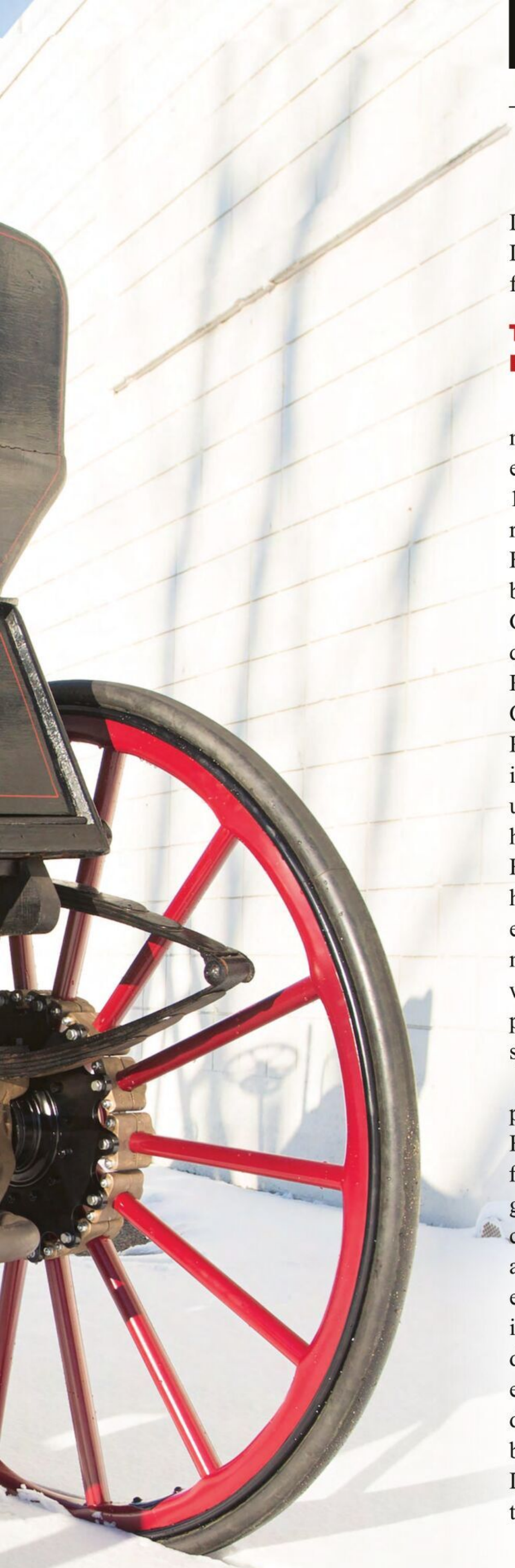
SOURCE: LOUWMAN MUSEUM

5 Dey is sitting at the wheel of the 1919 Dey electric.

4 The size of the flywheel enabled electric-only mode.



The rear part of the chassis doubled as exhaust and muffler.



MIXED PIONEER

Alternative Power

Dey, never made it to mass production. Dey died in 1927, and today he is largely forgotten.

THE ARMSTRONG HYBRID

Émile Roger was a French bicycle manufacturer who became one of the earliest customers of Karl Benz. In 1888 he was granted the sole agency rights for Benz vehicles and engines in France. Thus the Roger-Benz brand was born – but the cars were still produced in Germany. In 1895 Roger decided to conquer the American market. He set up the Roger American Mechanical Carriage Co. (which is sometimes referred to as the Roger American Horseless Carriage Co.) in New York. Dey was commissioned to update a Roger horseless carriage, but he opted instead for an all-new design. His vehicle was the first gasoline-electric hybrid and the first automobile with electric self-starting. As Roger had no manufacturing capability, construction was contracted to the Armstrong Company in Bridgeport, Connecticut, which specialized in the production of tools.

Dey designed a car that was equal parts electric and gasoline automobile. He used an electric dynamo as the flywheel of the large opposed-twin engine. This design allowed the engine to charge its storage batteries for ignition and lighting but could also rotate the engine for starting. Dey built solenoids into the intake valve housings to serve as decompressors while turning the engine electrically. The ample size of the flywheel dynamo would even allow the vehicle to be propelled under electric power alone. Dey's design innovations extended to the drivetrain. An electrically operated clutch would join the engine and transmission and would gradually engage as motor speed increased, generating more dynamo power.

The transmission was a three-speed constant mesh design engaged by a sliding key system. Dey specified half the gears be cut from rawhide to reduce noise. Gearshifts were executed by turning the steering column selector wheel. The electric clutch automatically disengaged and reengaged the engine power during gear changes.

The motor is a more conventional opposed-twin of 6½" x 7" capacity with a novel centrifuge-controlled automatic ignition system. The chassis is of tubular construction and the back half doubles as exhaust and muffler. A more conventional car would have had a tiller, but the Armstrong had a steering wheel years ahead of its time.

Though it was used regularly, the car remained at Armstrong's Bridgeport facility until 1963, when a worker moved the flood-damaged vehicle to his home garage. Later it was shipped to a collection of Connecticut-made automobiles. It then went to Robin Loder, a British collector, who restored the car to operating condition before selling it back to America. Interestingly, the Armstrong hybrid's motor was too powerful for its own good, as the torque repeatedly damaged its carriage wheels. Holman Engineering in Massachusetts reinforced the wheels and also fixed other issues with the aged machine to put it in good working condition.

In 2016 the Louwman Museum acquired this interesting car, and comissioned further restoration. Today the car is still in operational condition. ♦

SOURCES

- Curtis Darrel Anderson, Judy Anderson: Electric and Hybrid Cars, a History
- Louwman Museum
- Bonhams
- The Horseless Age
- Popular Science

COMPETITION IN PARIS

TAXICABS

with Electric Motors

The Krièger No. 16 that won the Concours des Voitures de Place, 1898.

One hundred and forty-four years ago, a taxicab competition took place in Paris. There were seven vehicles in the final line up. Six were electric powered, three Krièger, two Jeantauds, a Jenatzy, and one petrol-engined Peugeot. The vehicles all had to be fully operational and remain in service for 12 days, throughout the competition. A detailed record of the performance and use of each vehicle was made. They all fought valiantly, as V. Christian Manz reports.

TEST CHARGE

Alternative

Eighteen ninety-eight was an eventful year for French motorists, who enthusiastically took part in the numerous speed races (Marseille-Nice, Périgueux-Bergerac-Périgueux, Paris-Bordeaux) that had been scheduled for that year. The busy Automobile Club de France not only organized the first motor show, on June 15 in the Jardin des Tuileries, but also a Concours des Voitures de Place, i.e. a competition for taxicabs, from June 1-12. A year earlier, in 1897, the Club had organized the first concours for heavy trucks.

The regulations for the taxi competition stipulated that each participant would be in full service in the center of Paris for 12 days, covering at least 60 kilometers per day and keeping to a minimum speed of 20 km/h. On the last day of the competition, a motorcade was to be organized as a crowning finale. All the contestants together would drive from the Jardin des Tuileries to Versailles and back.

Participation was open to all taxi models, regardless of their type of propulsion. Soon the first entries started arriving. The demand was quite positive, because in the end a total of 26 taxis had registered to take part, 14 electric models and 12 with petrol engines. However, the petrol-driven models all withdrew except for one Peugeot – the reasons for the sudden withdrawal were never made clear – and the number of electric taxis was also reduced drastically.

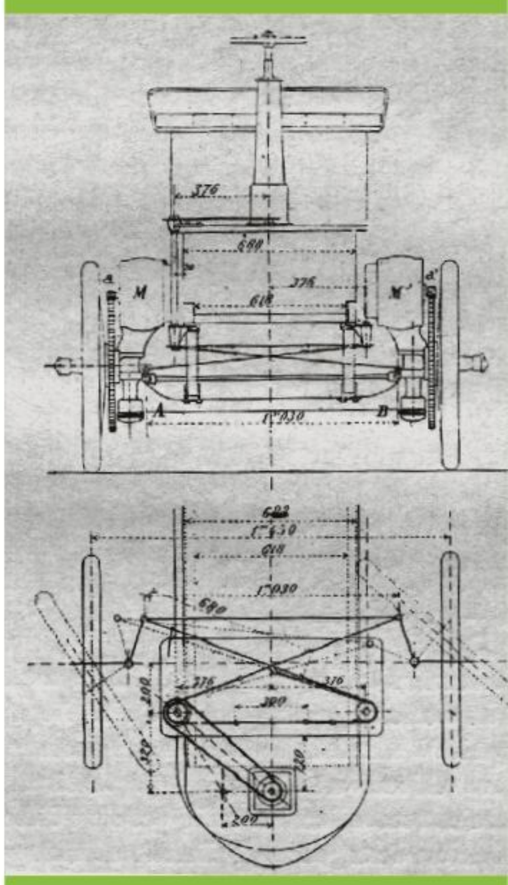
In the end, only seven vehicles took part in the competition, three Krièger, two Jeantauds, one Jenatzy, and the petrol-engined Peugeot. However, 17 vehicles lined up in Versailles on the last day, as the photo on page 21 shows.

The participants came from the major manufacturers of electric vehicles at that time (Jeantaud, Krièger); Louis Krièger, for example, personally drove his Victoria Vis-à-Vis, and Charles Jeantaud his white Hansom Cab.

All vehicles were subjected to many checks during the twelve days of the competition regarding speed, endurance on gradients, as well as charging cycles and consumption; in some cases inspectors accompanied some of the drivers in their taxis.

Recharging took place in the large, still unfinished hall of the new factory of the Clément car company in Levallois-Perret, where all six vehicles could be attached to the charging stations at the same time, making comparisons easier.

In order to provide the 415 Kwh of electricity at 110 volts,



The Krièger, published in the French book "Voitures Automobiles 4ème Volume Voitures Électriques, of 1899, by E. Bernhard & Cie, Editeurs Paris.

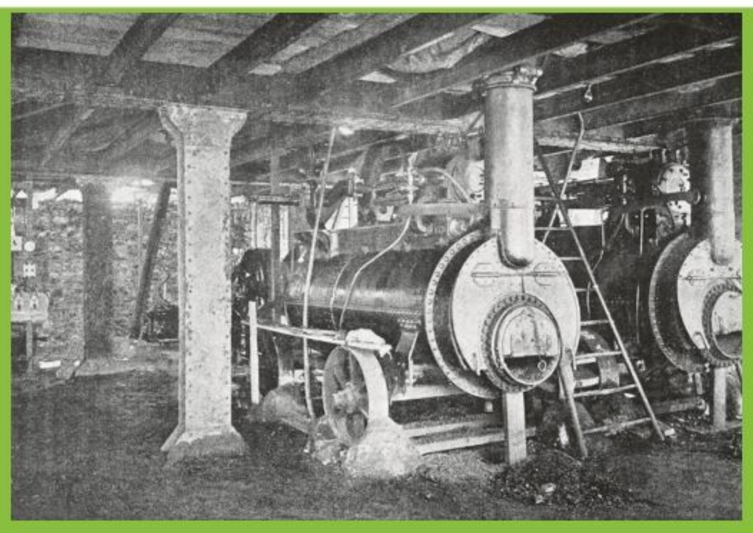
PHOTOS: L. GAUMONT (PARIS), CURRENTLY IN THE V. CHRISTIAN MANZ PHOTO COLLECTION

The Krièger Victoria Vis-à-Vis No. 3, with Louis Krièger at the wheel, on the return journey from Versailles.

The Jeantaud Hansom Cab, No. 25, in the Rue Magdebourg.

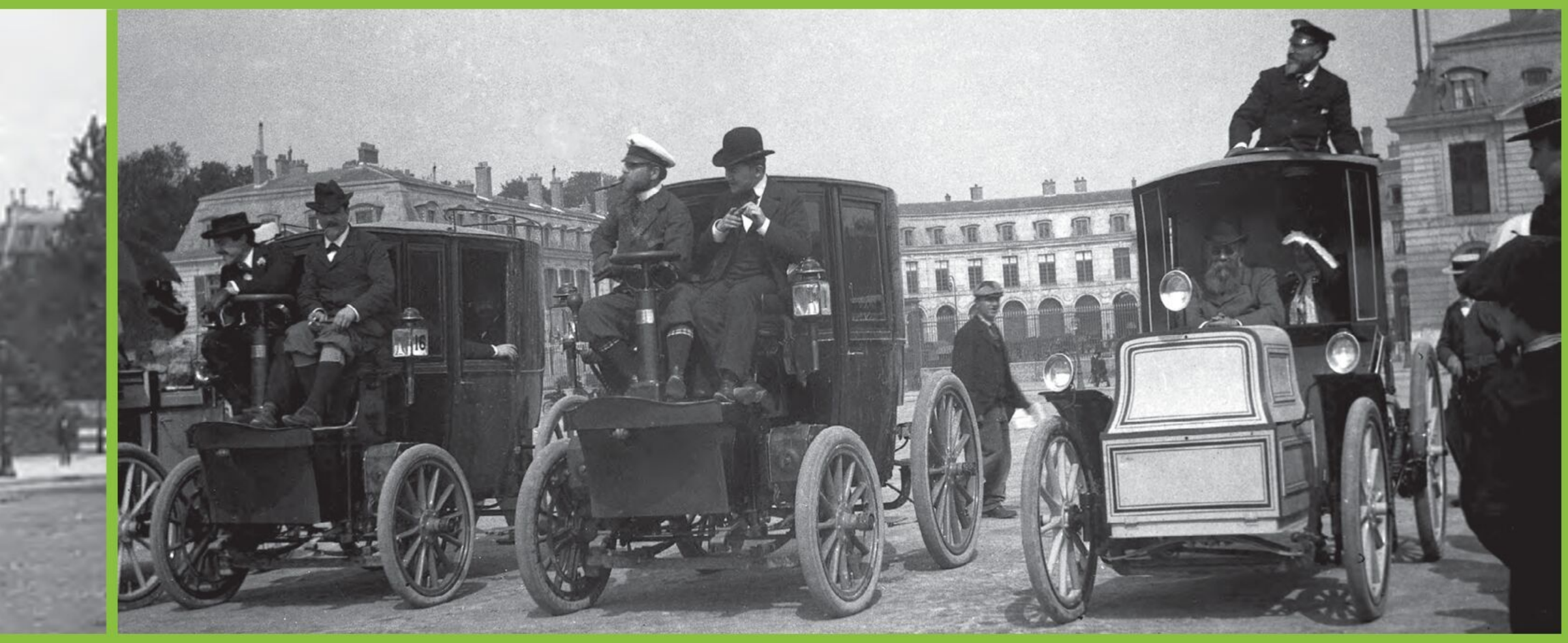
the organization had to install a temporary electrical power station consisting of three locomobiles (static locomotives), each with 100 horsepower, providing power via three dynamos. All vehicles were equipped with accumulators from the Fulmen battery company, which naturally kept an eye on this continuous use of the vehicles with great interest as well as checking the constant recharging. The checks showed that the consumption was between 10 and 13 kWh. Jeantaud was the oldest and best known of all the manufacturers of electric cars. His rival was Jenatzy of Belgium. Beginning five months after the taxi competition, there was a series of private competitions between a Jeantaud, driven by nobleman Chasseloup-Laubat, and Camille Jenatzy, in a CGA dog cart, as to who would be considered the "fastest man on four wheels." Jeantaud raised the stakes on March 4, 1899, with his Jeantaud Duc Profilée, an early streamlined 36-hp car. However, the rivalry was settled on April 29, 1899, when Jenatzy brought the first car purpose-built to set a land speed record, the 68-hp La Jamais Contente, and set a speed record of 105.99 km/h. This record stood for three years. Jenatzy had previously been active in France, where he founded the Compagnie Générale des Transports Automobiles, in Boulogne-sur-Seine, to manufacture electric taxis. In 1898 he signed a contract with a Parisian company for the delivery of 30 of these electric taxis, which were built according to his own ideas under the brand name of Jenatzy. One of these models took part in the taxi competition.

Although Louis Krièger was still relatively new in this sector, he had immediately made a good name for himself with his first creations and was even able to market his vehicles abroad. He immediately issued licenses for the manufacture of his vehicles in other countries, especially in Germany and Italy. During the competition rides, all participating vehicles showed a high degree of reliability, none of the participants broke down, and most of them drove far more than the prescribed 60 kilometers per day. As can be seen from contemporary photographs, the vehicles carried passengers at all times. However, the average speed attained was only between 11 and 13 km/h because of the various gradients, far below the minimum speed of 20 km/h as laid down by the



Temporary factory to produce the energy to recharge the batteries.

PHOTO PUBLISHED IN "CONCOURS DES VOITURES DE PLACE AUTOMOBILES, PARIS 1898, RAPPORT DU JURY," PUBLICATIONS DU JOURNAL LE GÉNIE CIVIL, 1898.



Three of the 17 vehicles that took part in the family photo in Versailles included two Krièger with black bodywork and the white Jeantaud Cab, entrant No. 25.

organizers. The prize distribution was simple. The seven vehicles were divided into three categories. The first category was for vehicles with manual gear change, including the Peugeot and the Jenatzy. However, the petrol-engined vehicle was disqualified at the end of the competition. In the second category were the vehicles with a single gear change, the two Jeantauds, while the third category was for those vehicles with two electric motors, i.e., the three Krièger. While the petrol-driven Peugeot was able to keep to the minimum speed of 20 km/h prescribed by the organizers without any mechanical problems, the fuel consumption, noise, and foul exhaust smell were so dramatic that the organizers refrained from giving this participant a prize. The French scientific prophet M.E. Hospitalier, a well-known personality at the time, said that such a combination would never be able to establish itself as a central-city vehicle.

In most cases the vehicle bodies were still following the model of the horse-drawn carriage: the front wheels were smaller than the rear ones, and in some of them only the drawbar and the horses were missing. Nevertheless, other approaches to the design of the bodywork were also tested. The so-called hansom, for example, was also based on a similar type of horse-drawn carriage.

The light-coloured Jeantaud was a hansom. It was a two-seater, with the driver enthroned at the rear above the roof of the cab, from where he steered the front axle. The passenger sat in the front. It was a bit hair-raising, as one never knew how the driver would react when facing difficult traffic situations, but of course there was no way one could intervene in any event. In this type of vehicle, the batteries were located under the "bonnet," while the electric motor was located at the rear directly on the driven axle.

In contrast to Jeantaud, Louis Krièger installed his motors in the front wheels, either one (centrally) or two (one in each wheel). In either case, the front wheels were both steered and driven. This was quite new at the time and caused minor technical challenges. Krièger also built hybrid vehicles on this basis, coupling the electric motors in the wheels to a petrol-driven De Dion-Bouton engine under the bonnet. This again proves that everything has been done before! ♦

PHOTOS: L. GAUMONT (PARIS), CURRENTLY IN THE V. CHRISTIAN MANZ PHOTO COLLECTION

The 17 vehicles leaving Versailles in a portrait photo by an unknown photographer.

PUBLISHED BY J.A. GRÉGOIRE IN HIS BOOK "50 ANS D'AUTOMOBILE, 2: LA VOITURE ÉLECTRIQUE."

RADICAL RADIAL

Alternative Power

Augusto Monaco's revolutionary Grand Prix racer is now on display at the Museo Nazionale dell'Automobile.

GO AGAINST THE FLOW

MONACO

While Ferdinand Porsche perfected his V-16-engined Auto Union racing cars in Germany, Augusto Camillo Pietro Monaco took a radically different approach, building a racing car with a 16-cylinder radial engine. **Frederico Signorelli** worked with the Museo Nazionale dell'Automobile in Turin to research the story.

In the middle is Augusto Monaco during the testing of his experimental GP racer.

TROSSI GRAND PRIX

GRAND PRIX RACING IN THE 1930s

In the early 20th century, vehicle aesthetics and technology developed at an unprecedented pace. This was most evident in motor racing, where some of the most sensational and radical cars emerged, one of them being the Monaco-Trossi Grand Prix racer in Italy.

Racing has been a catalyst for the development of the automobile since its inception. Racing tracks were often battlefields where cars broke down and terrible, often fatal, accidents occurred. However, these competitive events inspired new, more advanced features and innovations that filtered down to road cars. This was particularly true in the 1930s, when racing became the stage for different political regimes. Sensing a potential to spread propaganda, they used the victories of their country's cars and drivers as an evidence of technical and political supremacy, earning credit among the crowds and respect in front of foreigners. To push the matter further, authoritarian regimes financed the most promising companies. A case in point is Alfa Romeo in Italy, which was supported by the Fascist government; and of course Auto Union, Mercedes, and to a degree BMW benefited from ties to the Nazi regime. France and Britain did not subsidize their race teams, leaving them at a considerable financial disadvantage. This made it practically impossible for their teams and others to keep up with the incessant and effective technical evolution of German race cars. For these teams, there had to be a way to compete. Could one choose the path of revolution rather than evolution?

THE GENIUS OF AUGUSTO MONACO

The protagonist of this article took the second path, and he proposed a totally new way of thinking. Augusto Camillo Pietro Monaco was born in Buenos Aires, Argentina, on March 15, 1903, to Italian parents who emigrated in the 19th century. At a very young age Monaco showed a keen interest in mechanics, graduating in engineering. Given that he was a car enthusiast, he felt the call of Italy. At the end of the 1920s he moved to Turin, where he began to work in various companies in the chemical and mechanical sectors. He preferred short-time collaborations that did not tie him down, fitting his free and independent spirit.

In 1932 he developed his first car, which was designed in collaboration with his friend Giulio Aymini. The acclaimed team of Massimo Lancia and Enrico Nardi were also involved. Together they set out to build a light and compact hillclimb racer. The end result, called the Monaco-Nardi "Chichibio," was named after the dachshund dog of Monaco – probably because it also had an elongated silhouette! It was very low: just 83 cm from the bonnet to the ground. The JAP motorcycle derived 998-cc V-2 engine capable of 65 hp (!) was more than enough to propel a 300-kg car. Its minimal bodywork was crafted from lightweight alloy. The front brakes were placed inboard, the five-speed gearbox was also made of aluminum, and the front suspension with independently sprung wheels was formed by a pair of overlapping leaf springs with the triple function of elastic element, suspension arm, and shock absorber. The car won a lot of victories. Once, it reached 180 km/h on the flying kilometer at the Monza racetrack.

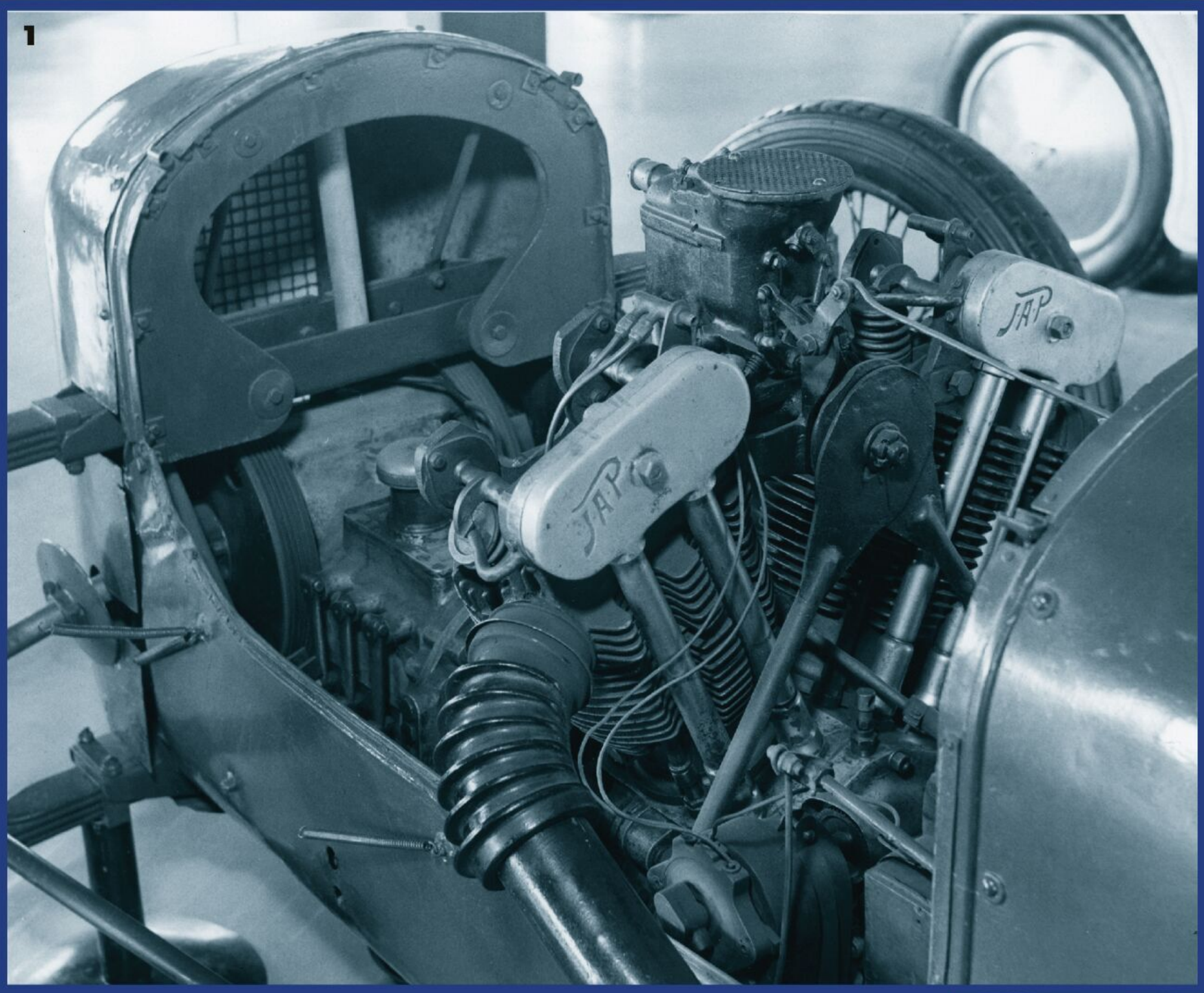
THE MONACO-TROSSI

Boosted by the results of the Chichibio, Monaco went on to work on the most important project of his life – a Grand Prix racing car. The project took its first steps from the engine. His dream (with a touch of patriotism) was to design a Grand Prix car capable of challenging the German avant-garde racing cars that dominated the racing circuits in Europe, and to beat them at their specialties: power and innovation. He kept and extended some characteristics of the Chichibio. The idea, which was fine-tuned with his friend Aymini, was to develop a car with front-wheel drive, thus avoiding the heavy and bulky transmission, and to combine the engine, gearbox, and differential into one compact and lightweight unit. The air-cooled engine, reduced frontal area, independent suspension, low stance, and simple aerodynamic body were all carried over from the Chichibio. The most troublesome obstacle was the engine: both the supercharged in-line eight-cylinder units of Alfa Romeo and Maserati and the huge V-16 units of the Germans were deemed too bulky and heavy for the type of car Monaco had in mind. Monaco turned his attention to the aeronautical field and studied radial engines, which had always fascinated him. In a radial engine, the cylinders were exposed directly to the airflow for cooling, avoiding a forced-air system. This enabled an extremely compact car with a shape that clothed the mechanical parts with a simple and tapered line. The engine that took shape in Monaco's mind was a two-stroke radial unit with cylinders split in a double coaxial star for a total of 16 cylinders (8 + 8), with a capacity of 3982 cc, and a maximum power of 250 horsepower at 6000 rpm. The engine was placed at the front, cantilevered in front of the wheels fed by two Zenith carburetors and two Zoller superchargers. The five-speed gearbox was placed in the longitudinal "transaxle" position behind the front with a manual lever under the steering wheel. The suspension was independent on all four wheels, with overlapping triangles, coil springs, and driver-adjusted hydraulic shock absorbers. Four-wheel drum brakes were hydraulic. Pirelli tires were fitted, with a larger size on the front for the front-wheel drive. The whole unit rode on a 40-mm section steel tube frame, which was covered by an alloy sheet monoposto body. The driver was protected by a small windshield. The short wheelbase of 2300 mm meant an agile and compact car with a total weight of 750 kg. It is clear that the project met perfectly with the ambitions of Augusto Monaco.

RADICAL RADIAL

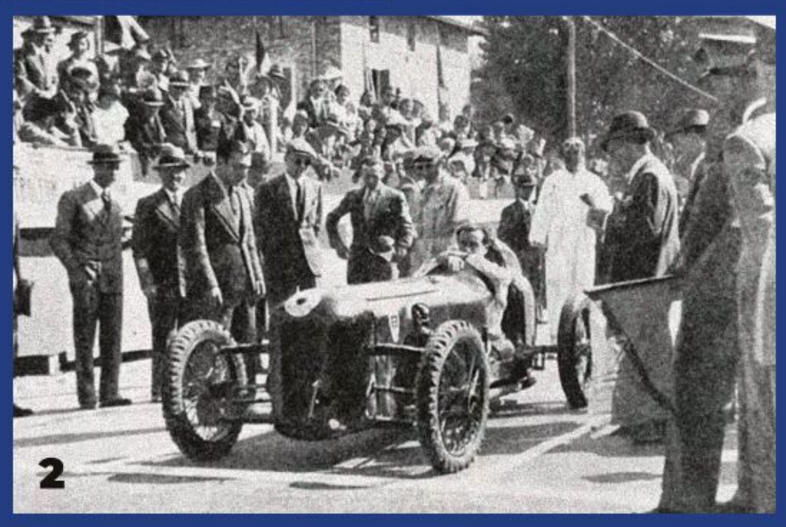
Alternative Power

Monaco's first work, the Chichibio, is also at the same museum.



1 The 65-hp engine was derived from a JAP motor-cycle unit.

2 Enrico Nardi at the wheel of the Monaco-Nardi Chichibio at the start of the 1937 Parma-Poggio di Berceto race.



RADICAL RADIAL

Alternative Power

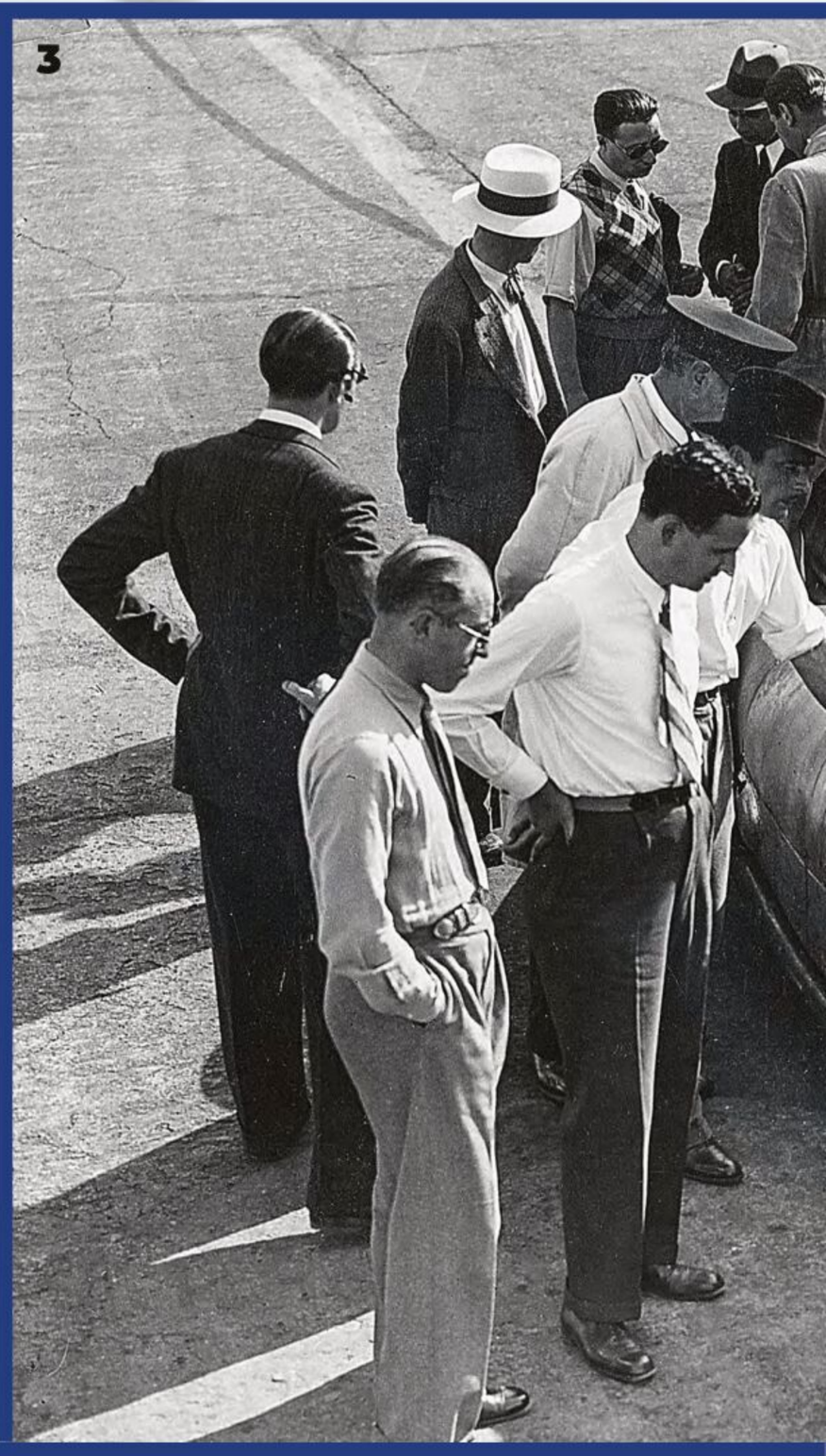
1

1 Unfortunately the radial engine easily overheated and broke too many spark plugs.

2 Is it a car? Is it a plane? The Monaco-Trossi has characteristics of both road and aerial vehicles.

3 The still unpainted car at the Monza track in 1935.

2



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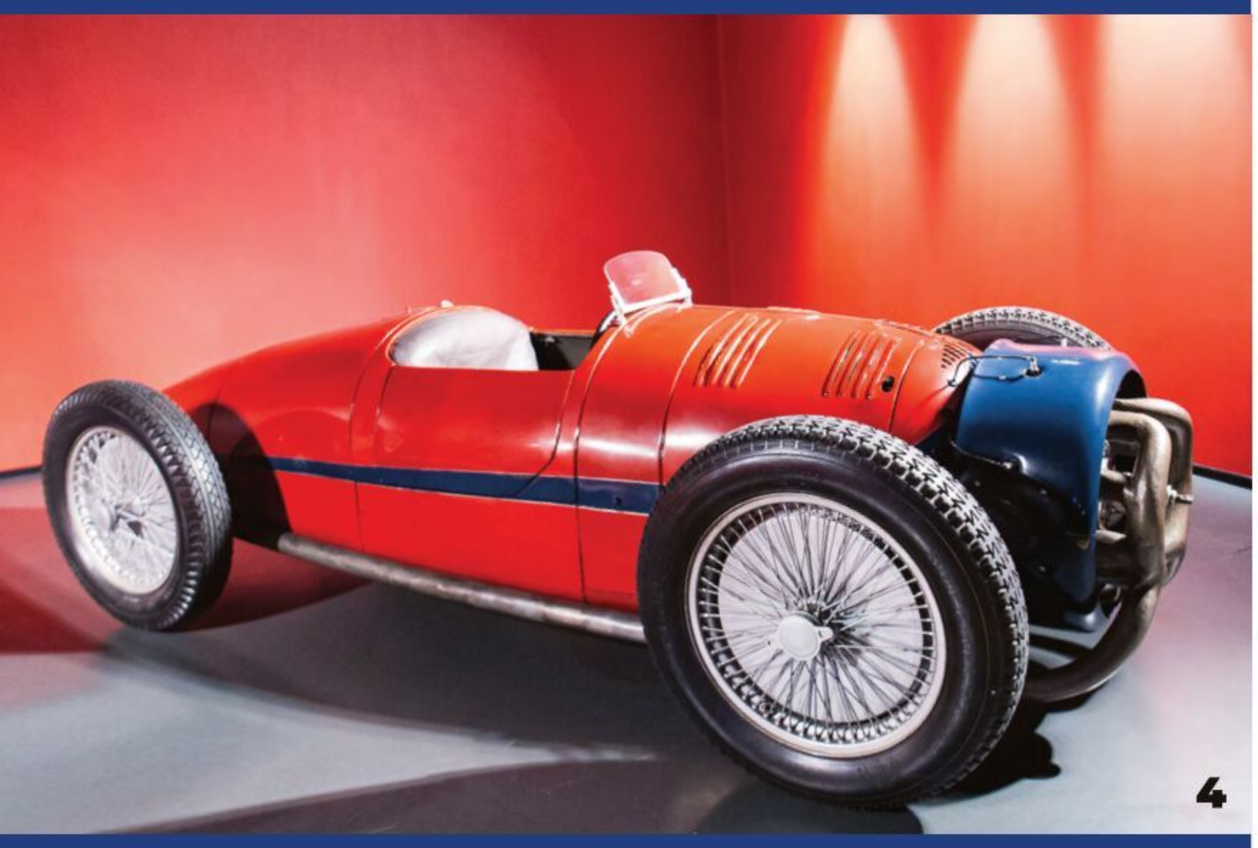

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4 The front-heavy car had a tendency to oversteer.

5 Rare photo showing the car in action.

5

SOURCE: CLASSIC & SPORTSCAR

SENATOR GIOVANNI AGNELLI AND COUNT CARLO FELICE TROSSI

The ambitious and very advanced project attracted the attention of Fiat's patron, Senator Giovanni Agnelli. Agnelli was interested in returning to the world of racing after he abandoned the field in 1928. He offered Monaco the possibility of a permanent job at the company, which would allow him to continue the development of the project internally including the necessary road tests. This certainly tempted the young engineer who, although he was full of ideas, was in a precarious financial position. It was clear that his unprecedented Grand Prix dreams needed the financial muscle of Fiat. However, his desire for independence and freedom resulted in his asking Agnelli if he too would have to punch his time card every morning, like everybody else. Agnelli replied that indeed he would be obligated to do so. Augusto Monaco did not like this answer and replied: "So Senator, thank you, but I prefer to work on my own." At that moment Agnelli stepped away from the project, realizing it would never be "Made by Fiat." Unfortunately for Monaco, this also meant no financial support – that is, until Count Trossi appeared on the horizon. Carlo Felice Trossi was born in Biella on April 27, 1908, into a noble and wealthy family who supported him from a very young age in his passion for racing. Racing brought him great success. He was first successful with Alfa Romeo, reaching second place at the 1932 Mille Miglia and third place at the 1933 Monaco Grand Prix. He then moved on to Maserati, winning third place at the Italian Grand Prix in '34 and the title, in 1935, of Italian champion in the 1500-cc category. Trossi was fascinated by Monaco's project and offered him the necessary financial support to complete the project. He brought in his friend Mario Revelli from Beaumont for the design of the bodywork. Revelli's life was similar to that of Trossi: he was born June 25, 1907, in Rome into a noble and wealthy family, starting at a very young age to explore his passion for mechanics and motorcycle racing, and graduating as 1924 European Champion at the Grand Prix of Nations on a motorcycle he conceived, the "GR 500." He was nicknamed "the teenage champion," but his brilliant career as a driver ended following a bad accident on the streets of Turin that forced him into a long convalescence. His time recovering opened up the world of car design for him. He worked as a freelancer for the likes of Farina, Ghia, Garavini, and Casaro, distinguishing himself for balance, originality, and inventiveness. In 1929 he joined Fiat, where he designed the Fiat 6C 1500 "Aerodinamica" in 1935, one of his greatest masterpieces. Revelli's design for the Grand Prix was extremely simple and aerodynamic, covering both the front suspension elements and part of the engine.

ON THE TRACK BETWEEN HOPE AND DEFEAT

The debut of the futuristic Monaco-Trossi Grand Prix took place during the tests (in July) for the Monza Grand Prix on

1

2

3

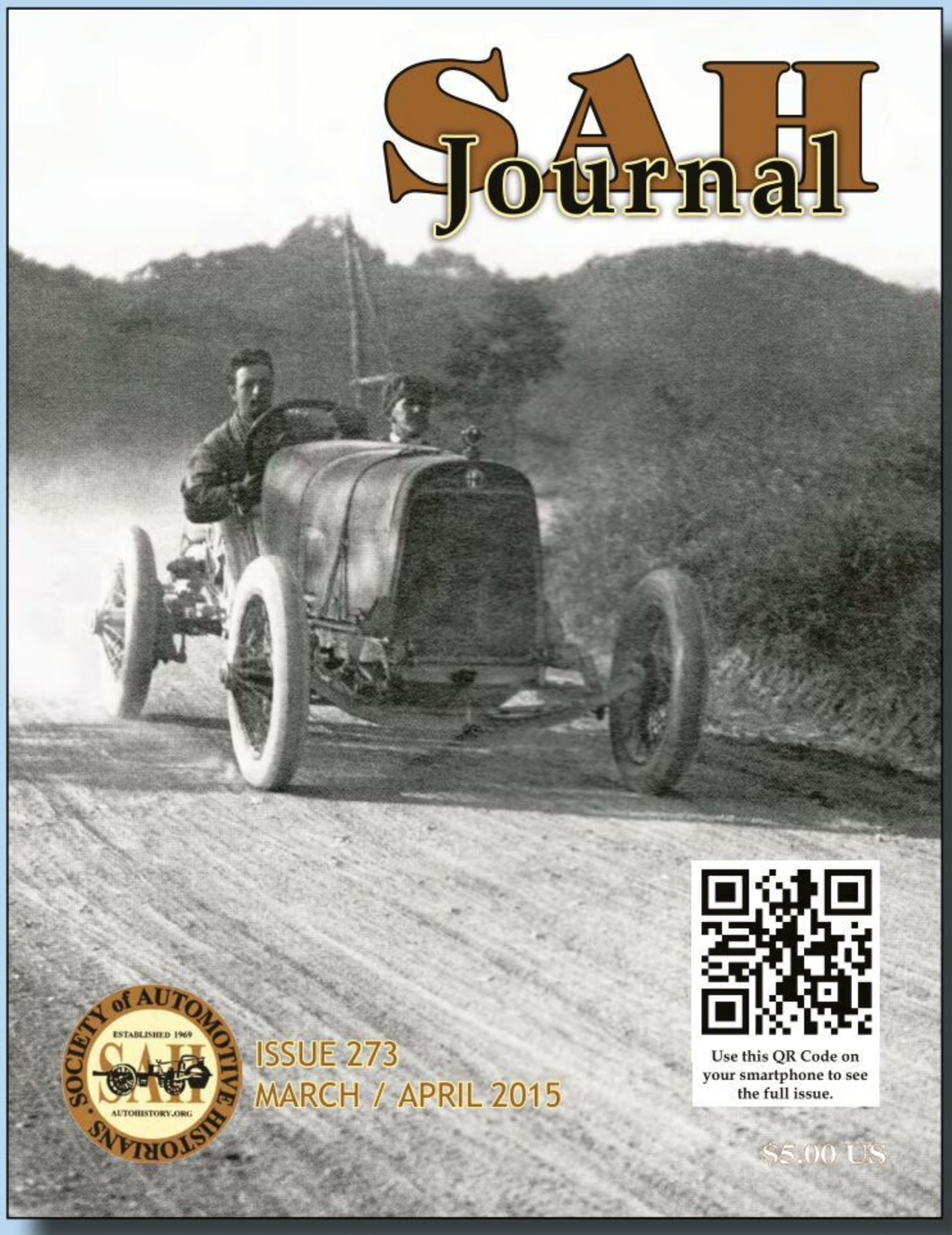
1 The car had promise, but needed further work to be competitive.

2 Count Trossi in the 1930s.

3 Simple and functional interior.

September 8, 1935, in which it was registered to participate. The designated speed of 200 km/h was easily exceeded as the car reached 280 km/h in the hands of Aymini and Trossi. It became apparent that the car tended to overheat, and it also repeatedly broke the spark plugs. But it was the tendency for unmanageable oversteer that sealed the fate of the car. Tests were immediately halted for fear of a serious accident. The problems were caused by the 75/25 percent weight distribution, the high center of gravity (caused by the practically vertical engine), abrupt acceleration reactions transmitted to the steering wheel, and also the need to refine front-wheel drive for such a powerful machine.

The car had promise but needed further design work. However, the additional investment was too much for Trossi, so the car was withdrawn, finishing its history before starting it. It was donated to today's MAUTO in Turin in 1950 by Trossi's sister, Lisetta, where it still continues to amaze today with its aesthetics, courage, and genius. ♦



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FIRE IN THE TANK

Alternative Power

The PS Speicher collection in Einbeck, Germany has a few gazogene cars, including this Renault which was converted by Jean Bardon.

DRIVING WITH WOOD

GAZOGENE CARS

SOURCE: STEPHAN RICHTER / PS.SPEICHER

It seems the internal-combustion engine is heading for replacement. Various alternative powertrains are being considered, with battery-electric vehicles taking the initial lead. Many of these alternatives are older technologies that have been revived. Just like the electric drive, gas generators have also been around for a long, long time. **Erik Eckermann** looks back at the story of the gazogene and other solid-fuel cars.

1

SOURCE: BERNARD VERMEYLEN

3 An Italian ad from 1936. Tinarelli remained one of those firms that never really caught on.

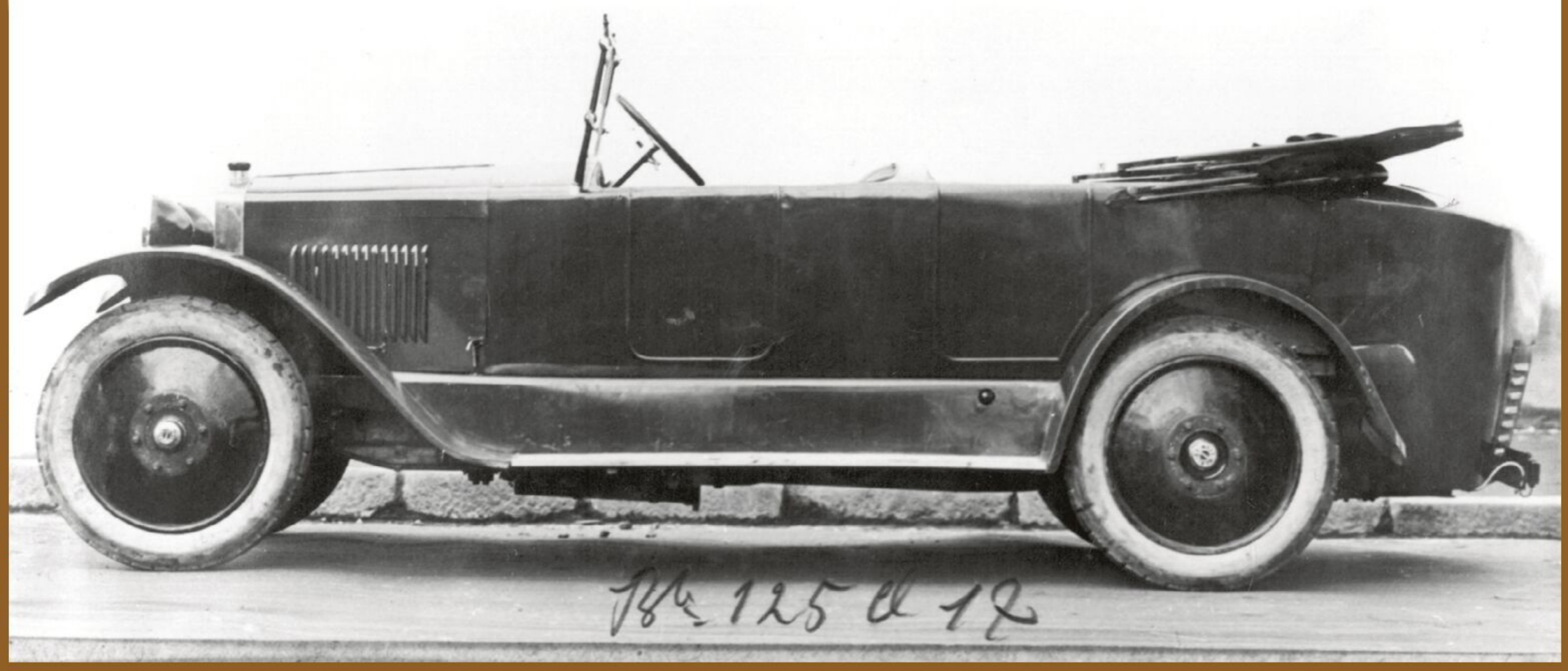
3

SOURCE: AUTOPUZZLES

1 A Panhard-Levassor truck from 1927 which was converted to wood gas. Three of these were sold to Sweden in that year.

2 1924 Berliet 12 CV with an Imbert conversion kit.

2



SOURCE: ERICK ECKERMANN

FIRE IN THE TANK

Alternative Power

SOURCE: BIBLIOTHEQUE MUNICIPALE DE LYON

This photo was probably taken in Lyon in around 1942 showing a dented Peugeot 402 with a charcoal burner at the back and four cleaning drums on the roof.

Using wood, coal, or other domestic solids as fuel is a tempting idea to replace petrol and diesel. It goes back a long way. Smelting master Karl Bischof (1812–1884) extracted fuel gases from peat for iron production in 1839 in the Lauchhammer smelting works near Cottbus, Germany. While stationary generators from domestic solids became more common in the late 1800s, it was in 1906 that two Scottish consulting engineers applied the technology to vehicles. They equipped a voiturette, a passenger car, and a bus with anthracite systems. Development of gas generator vehicles was first concentrated on commercial applications. Under normal conditions, converting passenger cars to gas generators makes little economic sense because the ratio of purchase price to engine output and weight becomes less favorable as the system becomes smaller.

Nevertheless, the history of both commercial and passenger-car solutions, especially during wartime scarcity, shows the advantages and disadvantages of these types of systems. Apart from the gas generator, there are other possibilities using solids and biomass as well.

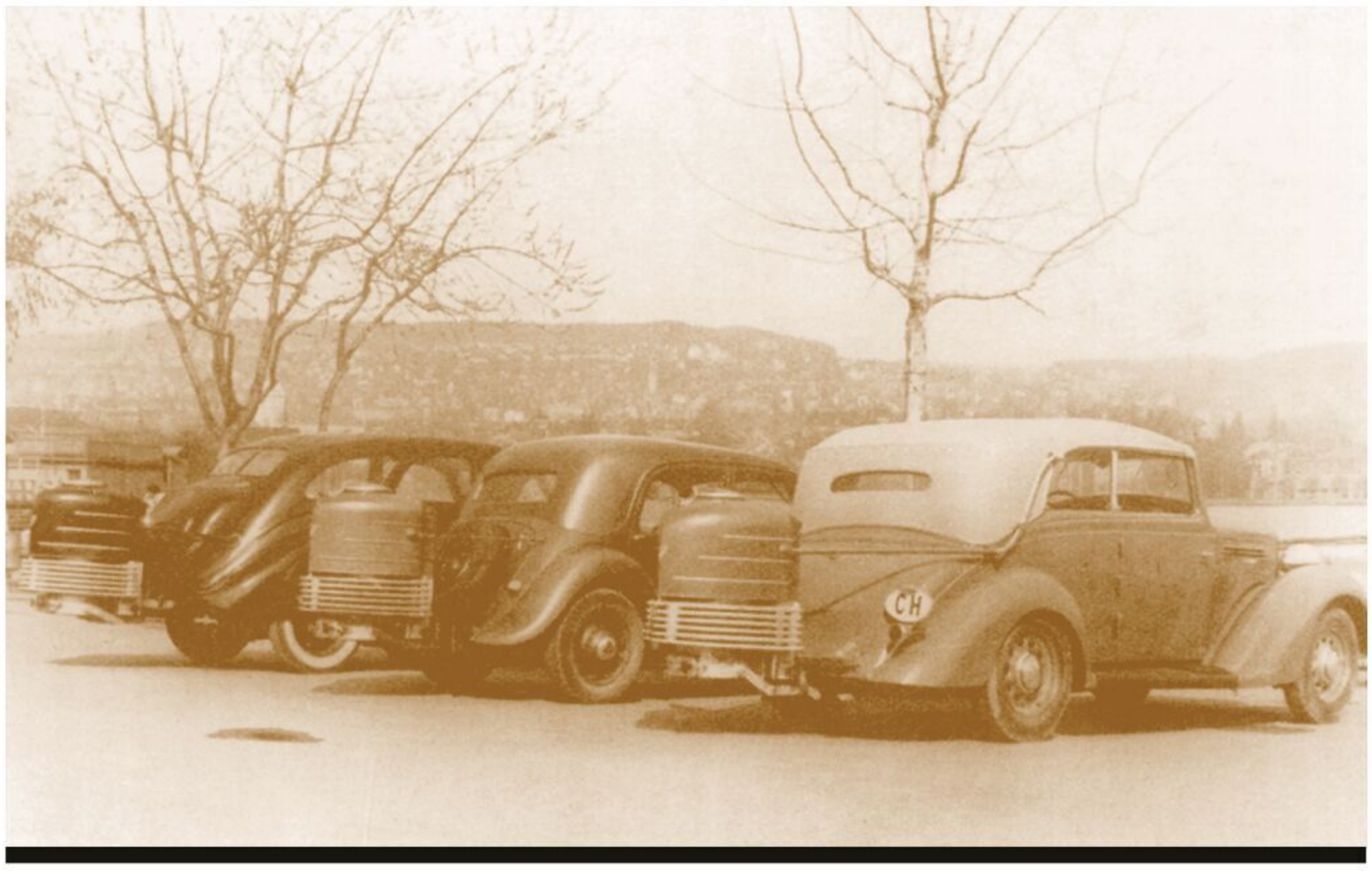
FIRST ATTEMPTS IN FRANCE

Wood-powered vehicles didn't rise to prominence until the end of the First World War. Alarmed by gas shortages during the war, many countries in Europe encouraged private companies to develop alternatives to petroleum fuels. Electric cars were considered, but they were ultimately deemed too impractical for an array of reasons, including the limited driving range they offered and the extra weight added by the batteries. Wood gas generators seemed, at first, to be an ideal compromise.

THE IMBERT GENERATOR

In the 1920s, Georges Imbert (1884-1950), an engineer from Niederstinzel, Lorraine region (which at the time of his birth was German territory and later became French land), made wood-gas travel a practical possibility with a mobile generator unit. With a redesigned burning chamber that used vacuum suction from the engine to pull gas downward through the hot core of the burning logs, his model could create a great deal more carbon monoxide fuel than previous iterations. It also ensured a steady burn, as gravity and the vibration of the vehicle would shake ash loose from the pile, settling new fuel into place. The fuel was called gazogene (or gasogene).

The generator was usually mounted in the rear, while the cleaning and cooling units were placed mostly in front of the radiator. To convert cars and trucks to use gazogene generators, considerable preliminary work had to be done. The springs and tires needed to be reinforced; the ignition system required a second battery; to compensate for reduced fuel



SOURCE: GRÄTZ

The Royal charcoal conversion set in Switzerland was either front or rear mounted. From left to right: Peugeot 402, Citroën 7 CV, Plymouth 3.3 litre.

efficiency, the compression ratio was increased by planing off the cylinder head; support frames for generators and ancillary units had to be mounted; modifications were made to the trunk lid, roof, and fenders; and for self-supporting bodies, extra plates had to be welded.

In 1922, the Automobile Club de France organized an endurance rally open to wood gas-powered trucks. The participants needed to cover about 62 km in two days. The technology advanced at such a rapid pace that the following year's event took participants on a 1440 km, in six weeks. In 1925, the rally was 2000 km long and lasted three weeks. At its peak, the wood gas industry attracted big names including Renault, Latil, Panhard, and Berliet. However, it soon became evident that the system's cons outweighed its pros. Gazogene trucks burned a phenomenal amount of wood, the fuel required cleaning and cooling to be used, and the whole setup was incredibly heavy. Because of this, it reduced the all-important payload. Compared to petroleum fuels, the gas generator was 40 percent less efficient. However, the French government subsidized gazogene trucks, resulting in sales jumping from 271 units in 1926 to 865 units in 1927, with further increase in 1928 and 1929. As the French continued to innovate better mobile systems to produce gazogene in vehicles, an increasing number of companies produced gazogene units. In the early 1930s, Gohin-Poulenc introduced a gazogene system for vehicles that eliminated the separate gas cooler and incorporated water injection to generate hydrogen for more power. Daimler-Benz AG used this French system as the basis for their charcoal gas model. In fact, Daimler-Benz AG was the only German car factory to have developed its own gas generator – though at a much later date. It was introduced in September 1943 as the "G136 charcoal gas generator system." The system was designed for the Mercedes-Benz 170V but was also suitable for the Opel Olympia 1.5-liter and Ford Eifel/Taunus 1.2-liter models. Opel and Ford were happy to leave the conversion of their passenger cars to the end customer, who in turn was dependent on the authorities and the generator manufacturer. It is known from BMW that two technicians from the 15-strong test department headed by Rudolf Schleicher (1897–1989) were seconded to wood gas technology.

The wood gas experiments must have triggered lasting resentment in Schleicher, because 40 years later he said to me: "You can do a great job if you urgently warn the experts against a repetition of the wood gas period from 1942 to perhaps 1950." Furthermore, for him, "There was only one way if you had to drive with wood: first process the wood into charcoal and then burn it with a good cleaning system in the vehicle generator." In fact, Schleicher and his technicians also tested a charcoal gas generator – from Mercedes. Initially, none of the engineers believed that a two-stroke engine could be converted to gazogene. That eliminated the common DKW cars. The oil required for lubrication could be premixed with petrol (outside the engine), but not with gazogene. Only after lengthy trials did the problems appear to be under control thanks to a separate lubricating oil pump, but it is doubtful whether the entire system worked in everyday use.

Foreign generator manufacturers tried to convert two-stroke motors as well: in Sweden, Philipsons, Svenska-Gengas, Helmer Pettersson/Lion/F license, and Bolinder-Munktell/Imbert license; in Switzerland, Kaga and Autropa. All tried

1 A 1934 Panhard with in-house, cleverly installed charcoal generator during refueling in the forest.

2 A graphic depicting a 1943 Mercedes 170 VG with a set by Gohin-Poulenc, one of the popular conversions.

3 A modern take was done by Ludwig Elsbett in 1980. His Elsbett three-cylinder Duotherm engine used vegetable oil.

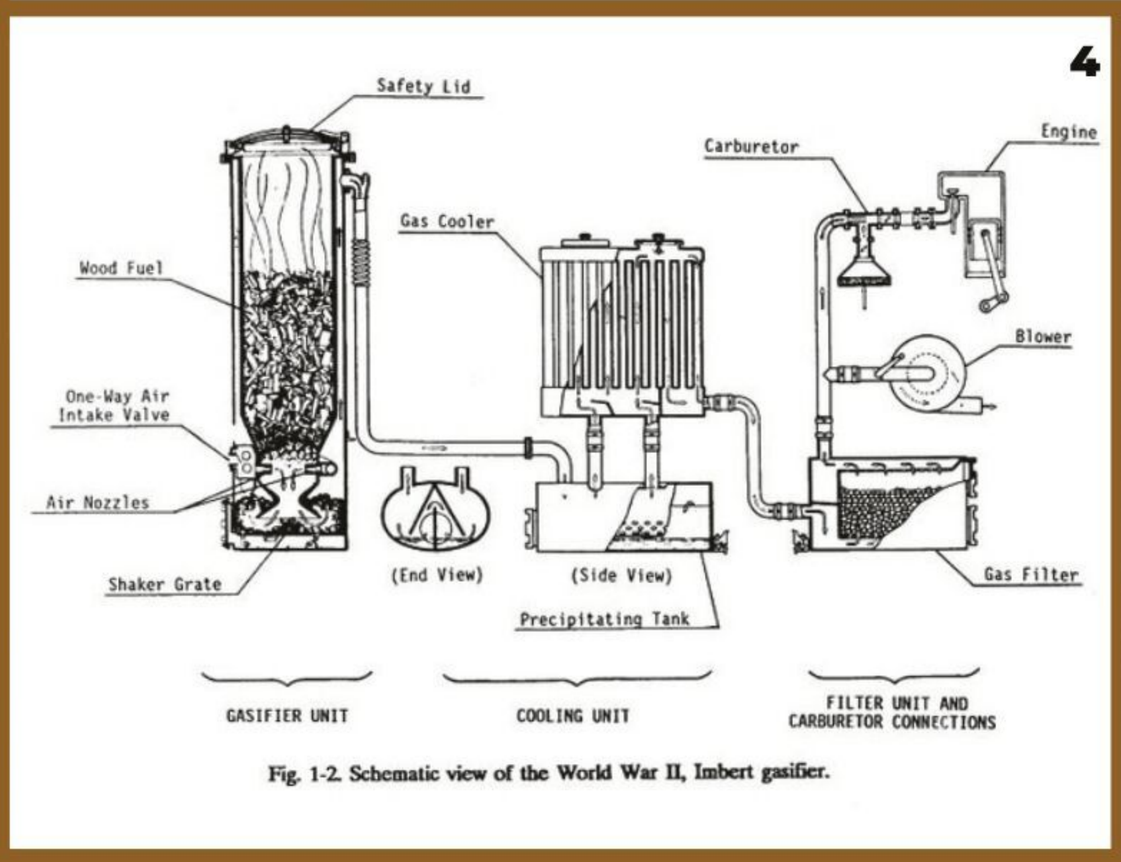


Fig. 1-2. Schematic view of the World War II, Imbert gasifier.

4 An overview of the Imbert GMR-kit including (from left to right) gas-producer, cooling and cleaning unit, gas-air-mixer, starting blower, and final scrubber.

5 1938/39 Ford V8 Spezial with Imbert wood gas-producer and steps to the roof box containing blocks of wood.

SOURCE: 1: ERIC ECKERMANN; 2: DEUTSCHES MUSEUM; 3: ERIC ECKERMANN; 4: DAVID COOPER

1 The Opel Blitz was available in many different variants, including factory-bodied or coachbuilt buses. This is a later conversion.

2 The Opel Blitz truck featured a generator on the platform and a filter mounted at the front.

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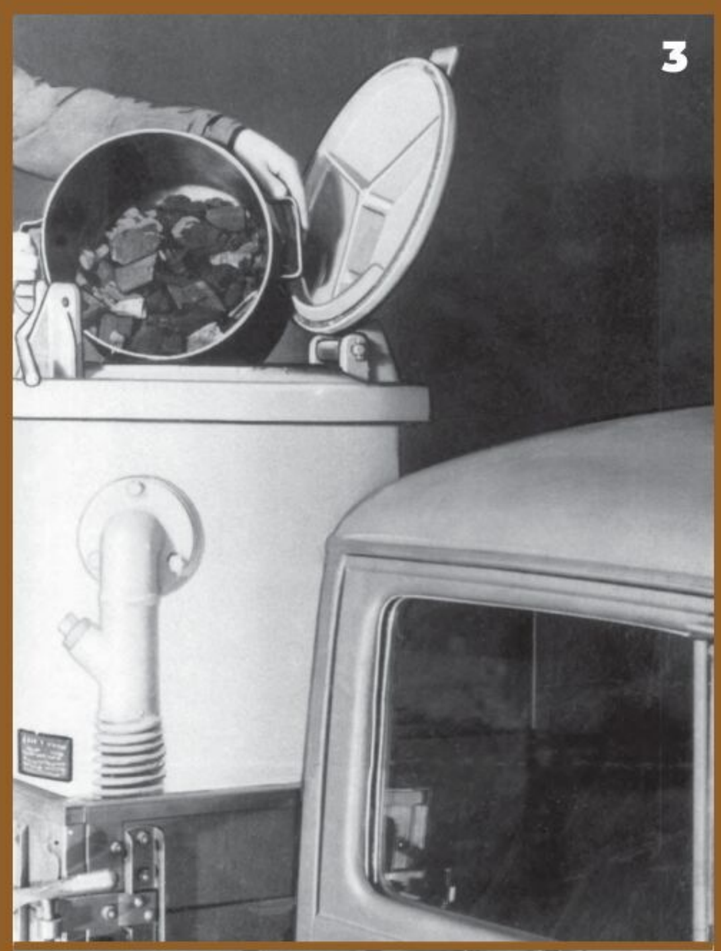

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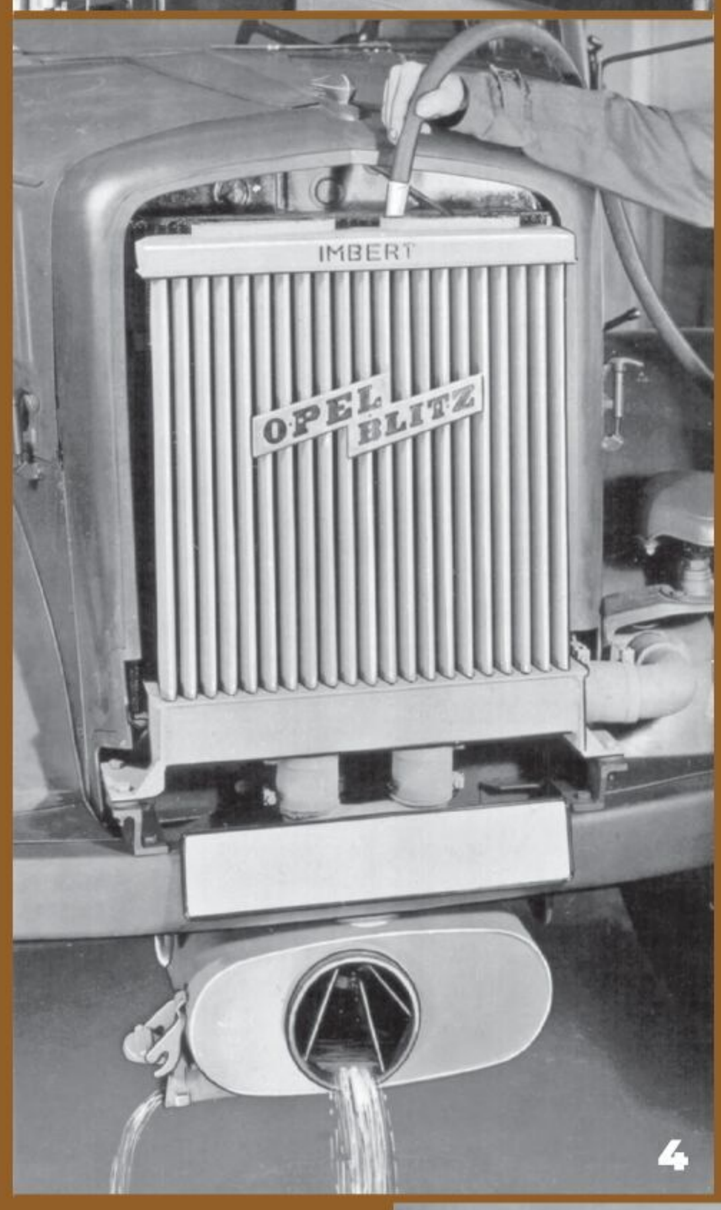
3 As part of the Imbert system the generator was at the back.

4 While petrol-engined trucks were capable of 68 hp, with wood gas power decreased to 30 hp.

5 Another way to fill the generator with charcoal.



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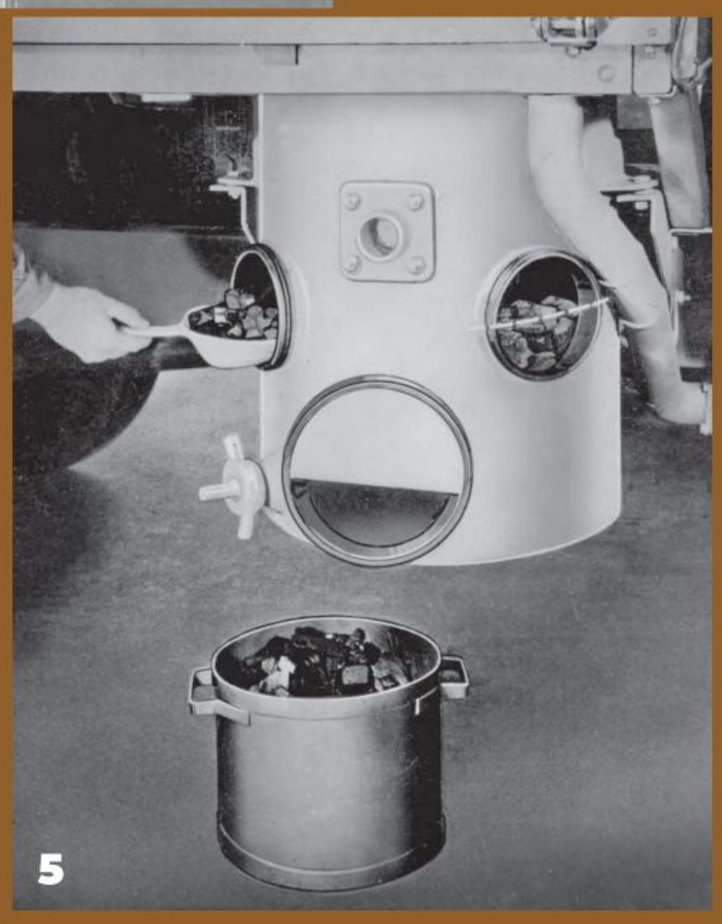

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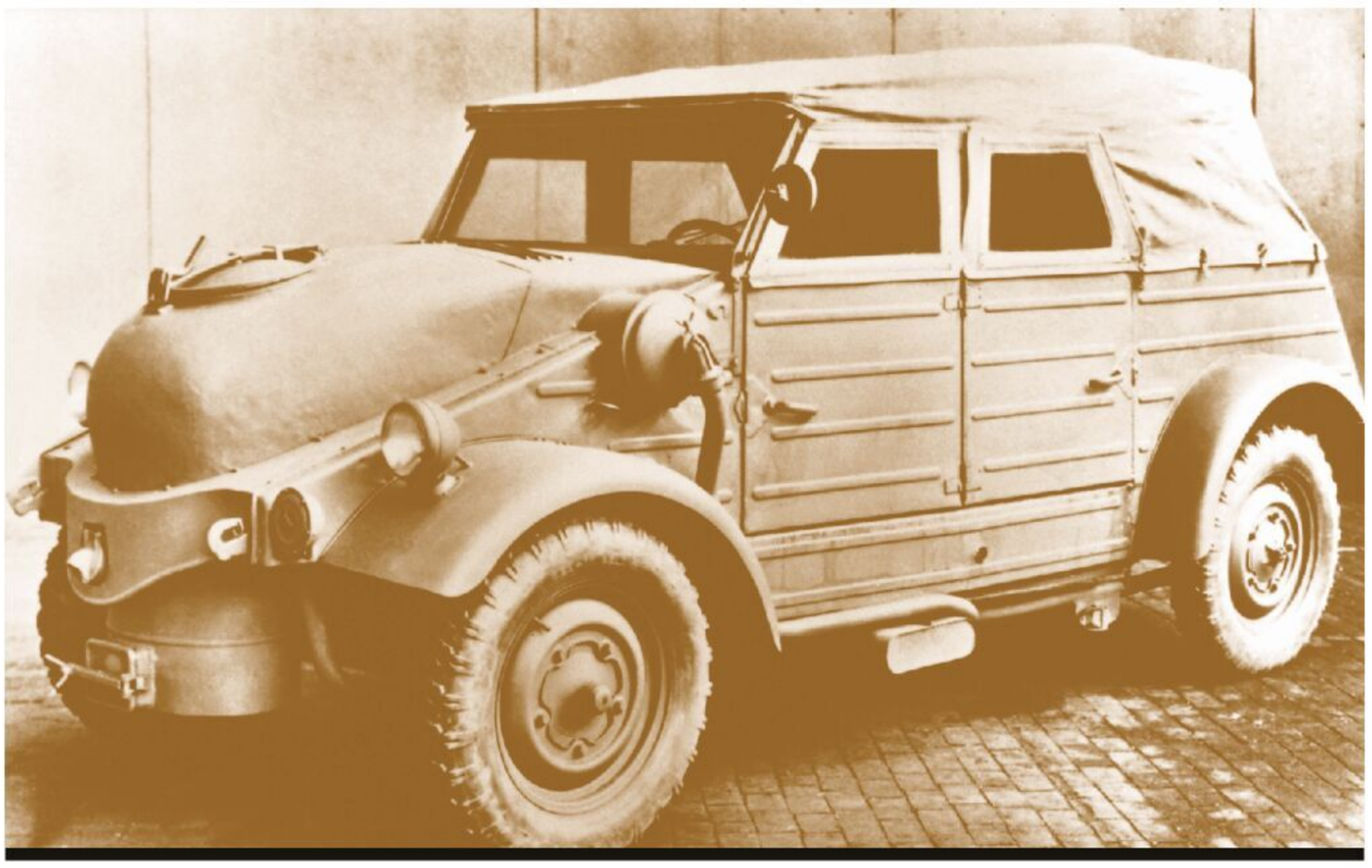
SOURCE: 1, 2, 3, 4, 5: OPEL



SOURCE: VOLKSWAGEN

A Volkswagen Kübelwagen, code named 239, with an in-house conversion.

to get the two-stroke's problems under control. However, two-stroke engines, which can also be found in tractors and motorboats in Sweden, only played a secondary role; the four-stroke petrol engines predominantly used in the transport sector had to be kept running. This was successful, at least in Sweden: only there did the 34,178 units of Gengas-powered passenger cars come close to the 35,373 units of Gengas-powered trucks produced (as of May 1, 1943). Incidentally, Swedish and Swiss systems were technically and aesthetically superior to the German ones.

In Italy in both 1933 and 1936, race cars powered by gazogene were entered in the Mille Miglia. With the power loss of gazogene, an Alfa Romeo was only able to complete the race at about half of the race winner's speed. In 1936, with international sanctions against Italy in place for its occupation of Ethiopia, Italians were particularly interested in alternative fuels. Six gazogene cars entered the 1936 Mille Miglia. Again, the reduced power left the one gazogene car that finished at less than half of the speed of the winning car. But it demonstrated that a race car could be powered by wood.

GAZOGENE DURING THE SECOND WORLD WAR

With the outbreak of the Second World War on September 1, 1939, the political and economic situation changed radically. In the same month, the German government rationed petrol for the private sector and at the same time ordered trucks and buses to be switched to liquid or generator gas. It set up wooden filling stations and provided conversion kits for road, rail, and water vehicles in all districts of Germany. The following year the government revived subsidies. From September 1942, petrol and diesel could only be sold to the Luftwaffe and the fighting troops. And let's not forget party leaders, who were labeled in bureaucratic German as "special fuel quota carriers."

Because the longevity of the war could not be foreseen and because there was a shortage of petrol in the countries invaded by Germany, gazogene was again the only alternative solution. It was the only viable alternative in areas with missing or destroyed fuel infrastructure.

After the Wehrmacht confiscated their mineral oil supplies, France, Belgium, and Holland had to convert to charcoal, peat coke, and anthracite plants, as did the wood-poor countries of Spain, Italy, and Denmark. Under the German occupation, there were 50,000 gazogene vehicles on the road in France by 1941. These gazogene cars and trucks consumed 150,000 tons of wood annually.

DIFFERENT SOLID FUELS AND GENERATORS

In order to save transport costs alone, the authorities in the individual countries resorted to regional solid fuels, which resulted in differently designed generators. HB generators (for peat, wood, lignite briquettes) were preferred in heavily forested areas and in areas with deposits of lignite and peat (tarry). In areas with hard coal (low tar), AK gas generators were used (for charcoal, peat coke, anthracite, and semi-coke). At the beginning of the 1930s, a generator could only gasify one specific fuel. A decade later, mixtures of fuels from the same group – i.e.,containing or low in tar – were easily possible. The near monopoly of the (Imbert) wood gas

SOURCE: STOCKHOLM TRANSPORT MUSEUM

A London bus with gas generator. Here the conversion kit was put on a trailer.

generator (HB) in Germany during the 1930s also shifted in favor of the charcoal gas generator (AK) a decade later. An "omnivore" system could not be realized by the end of the war. Also, the planned standardization and interchangeability of parts of the individual generator types never materialized. From decades of unsuccessful work by Rudolf Pawlikowski (1867–1942), Schichau AG, and IG Farben to operate engines directly with pulverized coal (coal dust engine), Johannes Linneborn (1899–1991), head of Imbert-Köln, concluded that solid fuel should not be crushed to dust, but only to the size of semolina grains, in order to be able to be kept in suspension at a pressure of 3 to 4 bar. He then developed a gas generator known as a "semolina" with the long-term goal of gasifying agroforestry waste such as coconut and rice shells, tree roots, and the like, popularly known as bio-mass. Stationary systems emerged. Around 1947 a Magirus three-ton truck with a gas generator for oil palm shells was delivered to the Congo.

But after the currency reform in June 1948, prices were no longer competitive, and it was almost impossible to sell any generators. Inventory fell dramatically because petrol and diesel were readily available again. After that, generator vehicles mostly disappeared. Ludwig Elsbett (1913–2003) proved that biomass bypassing a gas generator is suitable for vehicle powertrains. In 1980 he introduced a production-ready engine that could run on diesel as well as oils made from rapeseed, peanut, pumpkin oil, castor, sunflower, and other plants, with the cold-pressed, cleaned, otherwise untreated vegetable oil being injected via one or two injectors into a specially designed combustion chamber.

The Elsbett engine, which runs on cheap "salad oil," was installed in a few cars, trucks, and tractors, but it was not able to establish itself on a broader basis because of the "resistance and immobility of the automobile industry."

Instead, the car and petroleum industries have opted for what is known as biodiesel, which is mixed with toxic methanol obtained from natural gas and is therefore neither organic nor sustainable. In case of scarcity, it would not be available.

The generator today has returned to stationary power plants but remains a historical curiosity in cars and trucks. Conclusion: Gas generators make sense in stationary applications, but for vehicles, especially passenger cars, there may be better alternatives – unless other fuels become scarce again. ♦

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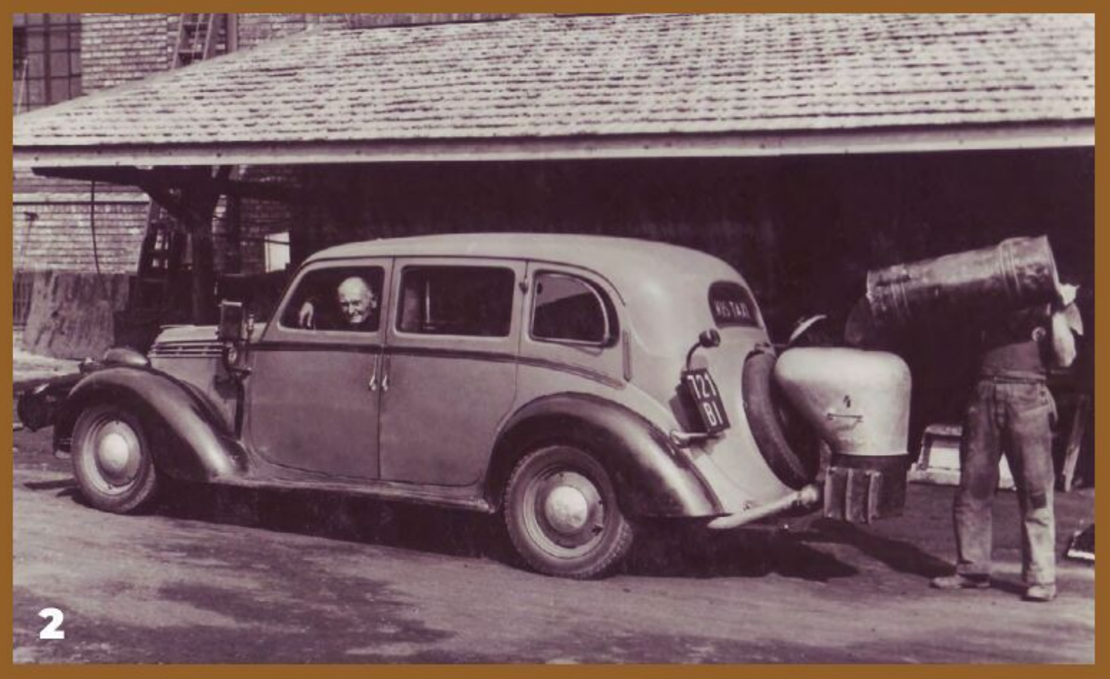
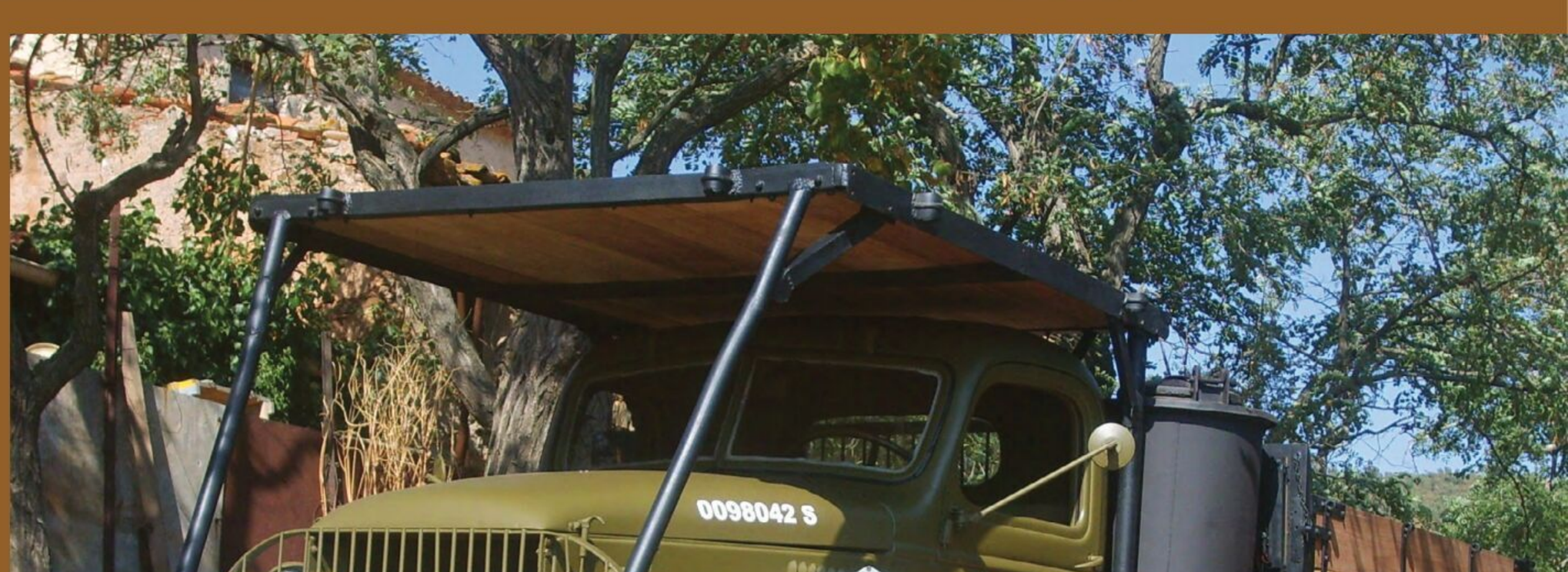
You want to **BUILD** your own **GAZOGENE**? Go to the url or scan the QR-Code: tinyurl.com/2p94nmzv

SOURCE: 1, 2: HUNGARIAN MUSEUM OF SCIENCE, TECHNOLOGY AND TRANSPORT; 3: BRUNO GROSSI



2 A Fiat is being refilled with gas at the Budapest taxi headquarters.



1 The Budapest taxi company used different methods to keep their vehicles running during World War 2.

3 Bruno Grossi's restored Chevrolet truck with an Imbert generator.

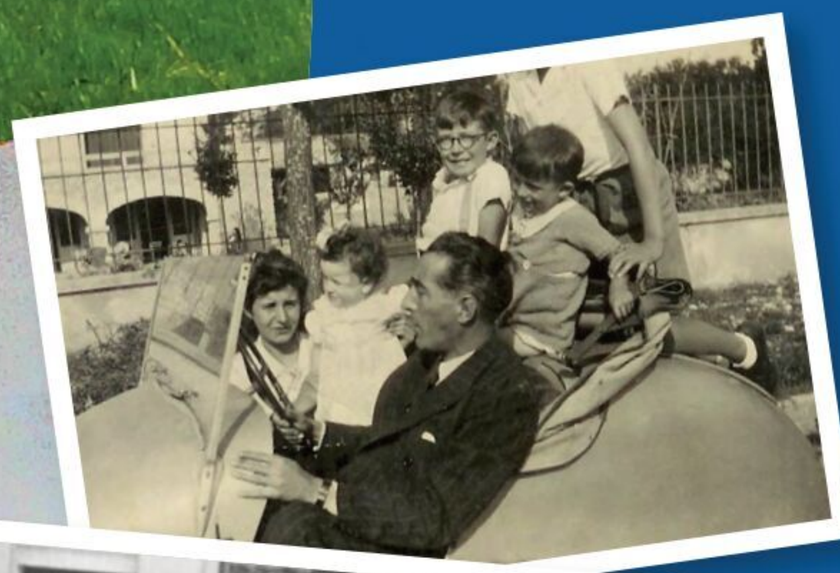
PHOTO MONTAGE: ROY QUERY

L'Oeuf was on loan from the Cité de l'Automobile at the Indianapolis Museum of Art for Ken Gross's Dream Car exhibition in 2015.

THE ELECTRIC EGG AND THE WHALE

THE WACKY, WONDERFÚL CARS OF PAUL ARZENS

Paul Arzens was a multi-talented artist, sculptor, and industrial designer. His concept cars were way ahead of their time, says Ken Gross.



Paul Arzens with his family in the 1940s.

The L'Oeuf always attracted a crowd.

Paul Arzens (1903–1990) was an accomplished and commercially successful artist and a sculptor, and in time he became a noted designer of railroad locomotives. He studied art at Paris's École des Beaux-Arts and became sufficiently wealthy as a painter. The revenue from his artistic work allowed him to pursue his many interests in engineering and industrial design. In 1935, Arzens designed and built a functional six-speed manual transmission, which he installed in a vintage Chrysler. Efforts to interest Peugeot in the new design for its Model 402 were unsuccessful. Peugeot was planning to use Cotal pre-selector four-speed semi-automatic gearboxes, so the company had no need for Arzens's invention.

Undaunted, Arzens built a dramatic-looking cabriolet in 1938 on an old Buick chassis. The two-seater body was streamlined, with an extremely long hood, sweeping fenders, slab sides, and a panoramic (wraparound) plexiglass windshield. The headlights were integrated into the vertical grille. Painted gray, and widely viewed by many people in France, the car was nicknamed "La Baleine" (the whale), and its sleek, advanced styling foreshadowed that of 1950s to 1960s sports cars. (It's currently in the Cité de l'Automobile, the French National Motor Museum in Mulhouse, France.)

As reported on Viaretro.com, "La Baleine has starred briefly in Franco-Belgian literature – or more accurately, in a comic-book periodical that has been published since 1938 – coincidentally the year it was built – describing the adventures of bellboy Spirou and later, his sidekick Fantasio, usually set during wartime. In a reflection of the peculiar one-off nature of La Baleine, it features on the cover of a special Brussels-dialect edition published in 2014 and part of La Femme Léopard (the Leopard Woman) series, called "Le Fetichke du Kongo" or "The Congo Fetish." The car is depicted being driven by said Leopard Woman with our hero – and his pet squirrel Spip (the name Spirou means "squirrel" in Walloon) – standing on the vast bonnet trying to catch a flying robot…" .

In 2018 Autocult made a 333-piece series in 1:43 scale of La Baleine.

Arzens used La Baleine to transport his artist materials. Historic photos of the car prove it was seen by many Parisians, and it probably served as a rolling advertisement for its creator. But this was just the beginning…

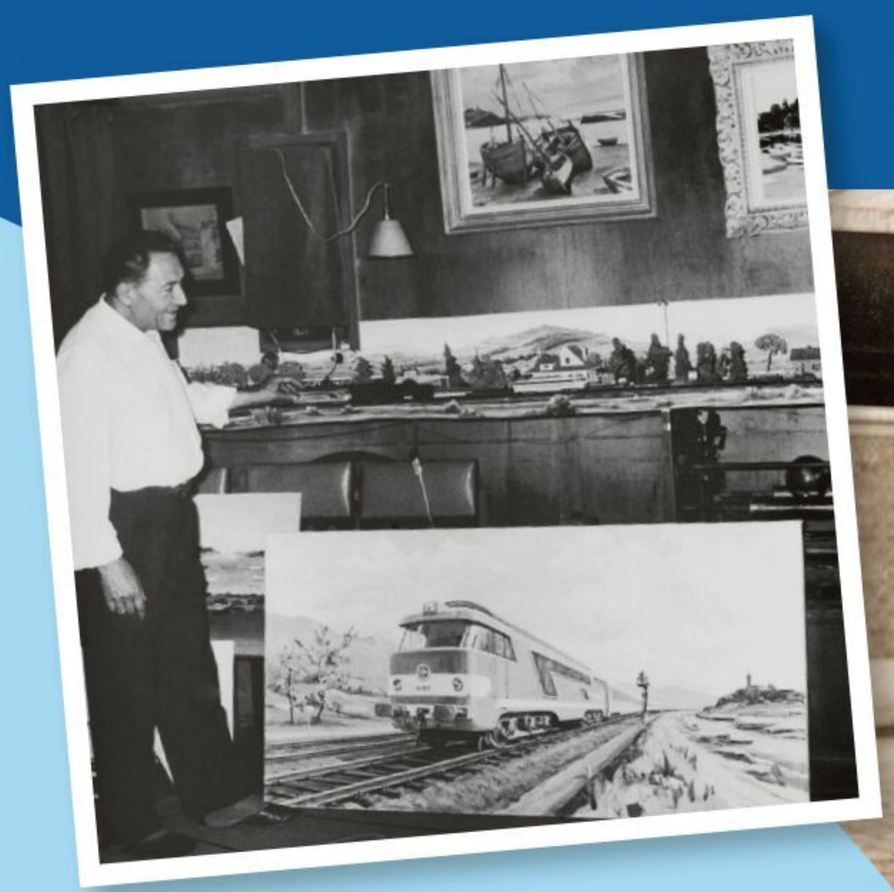
After the German invasion of France in 1940, when motor fuel for civilian use was in short supply, Arzens developed a smaller version of La Baleine based upon a vintage Fiat chassis. Instead of an internal-combustion engine, there was a 10-hp electric motor and 1,100 kg of accumulator batteries. Despite its heft, Arzens claimed his electric "whale" had a usable range of 125 miles at 65 to 70 kph (about 40 mph).

In 1942, Arzens released another innovative electric vehicle that proved to be remarkably ahead of its time. His newest prototype consisted of a clear plexiglass sphere with a hand-formed aluminum body, mounted on a lightweight aluminum chassis, with tiny wheels – two in front, one in back. It was instantly christened "l'Oeuf" (the egg). The body weighed 60 kg (132 pounds), and with a small electric motor added, the weight rose to 90 kg (198 pounds), and with batteries on board, L'Oeuf Électrique (the electric egg) weighed 350 kg (770 pounds). Arzens claimed a 100-km range (about 60 miles) at 70 kph (44 mph). Curiously, even with two passengers, if the speed dropped to 37 mph, the car's range remained constant.

Reportedly, Arzens received a good deal of notoriety in wartime Paris when he drove his near-spherical bubble car. His design preceded the postwar minicar trend by several years. L'Oeuf never went into production, and the prototype, which thankfully survives, remains a one-of-a-kind car. L'Oeuf Électrique remains a fascinating mobility solution. It must have captivated onlookers in Paris, providing a moment's brief amusement and marvel in a war-torn and oppressed era. There was no reverse gear. Historic photos show that Arzens picked up the rear of the car and turned it around to change direction. Looking at L'Oeuf Électrique today, if you set aside present-day crash safety considerations it was a very clever approach to low-cost, lightweight, fuel-efficient transportation. But the fact that its materials, plexiglass and aluminum, were highly sought after for the wartime aircraft industry ensured that copies would not be built in occupied France.

On a personal note, I was able to borrow the "Electric Egg" for two Dream Car exhibitions – one in Atlanta, at the High Museum of Art (2014), and the second at the Indianapolis Museum of Art (2015). The French National Motor Museum, formerly the Schlumpf collection, kindly loaned the vehicle and sent over a curator to accompany installation and de-installation. Overall it was remarkably preserved. The plexiglass body was crudely repaired in a few places, but the car remains in good condition. It does not run.

After the war, in 1951 Arzens developed "La Carrosse," a lightweight, 125-cc, easy-to-produce everyman's car with flat sheetmetal panels and a simple tubular chassis. It was



Paul Arzens in his apartment in 1964 with his own paintings, including one which he did on the CC locomotive which he designed for SNCF.

intended for mass production, but it was ultimately not marketed. La Carrosse was constructed with bent tubing, steel bars, and rubber sleeves. It was powered by a 125-cc one-cylinder, two-stroke Pauvert engine, and it resembled a more modern version of L'Oeuf Électrique. Interestingly, Le Corbusier developed a similar-looking lightweight affordable vehicle in the postwar years, when many inventors were seeking to solve the challenges of easy-to-produce, affordable transport vehicles.

Remarkably inventive across a wide range of genres, Paul Arzens later worked for the French National Railway Company (SNCF) where he designed the famous BB and CC locomotives, which were widely used in France for a generation, up through the 1970s. Arzens's CC7017 broke French speed records for electric locomotives in 1955. That speed was not exceeded until the TGV in 1981. Arzens possessed an artist's sensibilities, and his unusual designs reflected his bold imagination. His distinctive "broken nose" ("Nez Cassé") configuration for electric locomotives, such as the memorable BB15000 with its reverse-sloping front windshield, is fondly remembered by French rail enthusiasts.

Summing up, Paul Arzens was a remarkable talent on many fronts. He'd probably be delighted that his wartime transportation invention may have inspired the Smart Fortwo car, and certainly his curious egg may have pioneered more universal acceptance of electrically powered vehicles. ♦

Top: The second version of La Baleine was based on a Fiat chassis and featured an electric powertrain.

Today the Buick-based La Baleine (The Whale) is part of the Cité de l'Automobile collection with L'Ouef in Mulhouse.

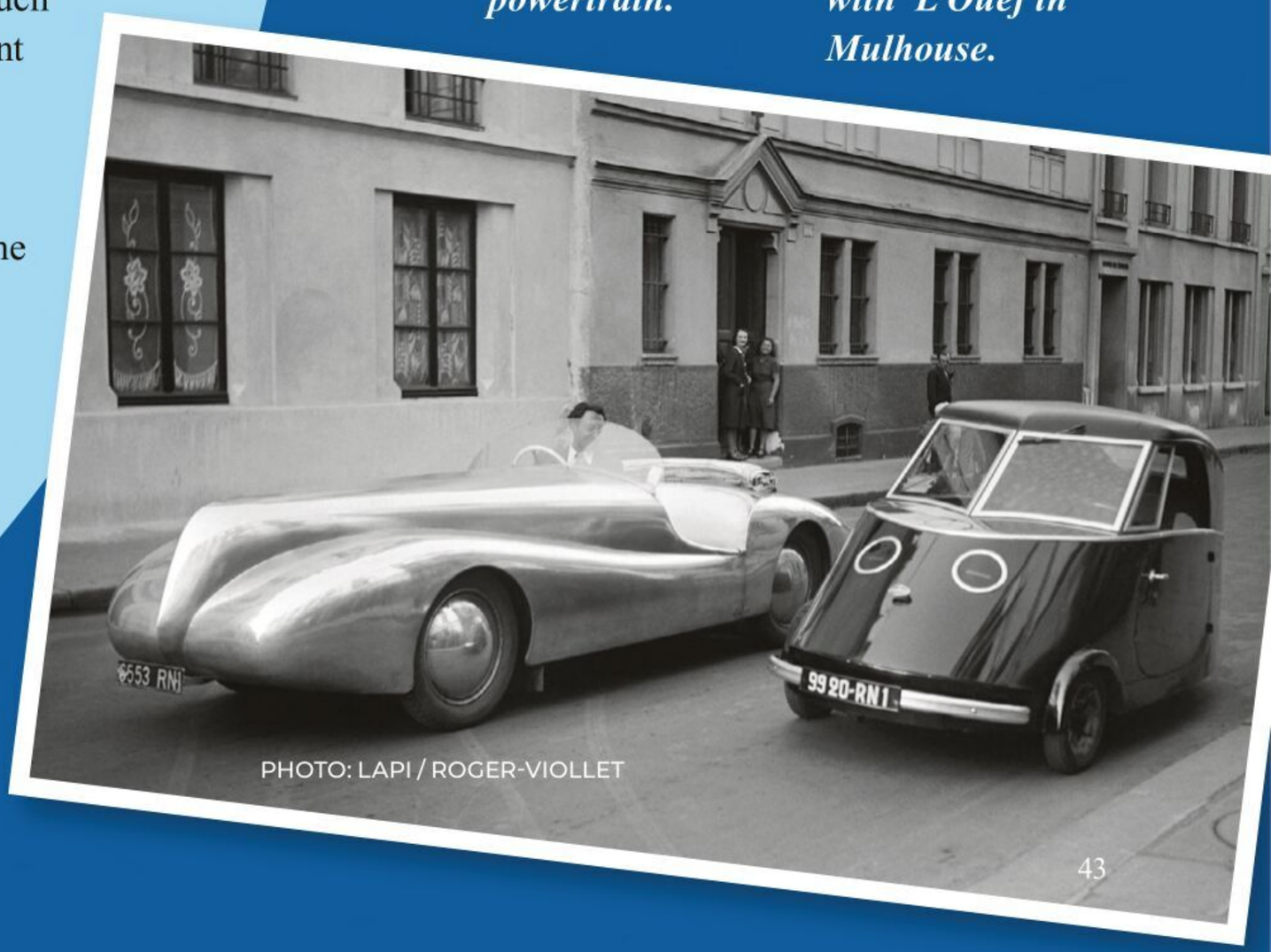
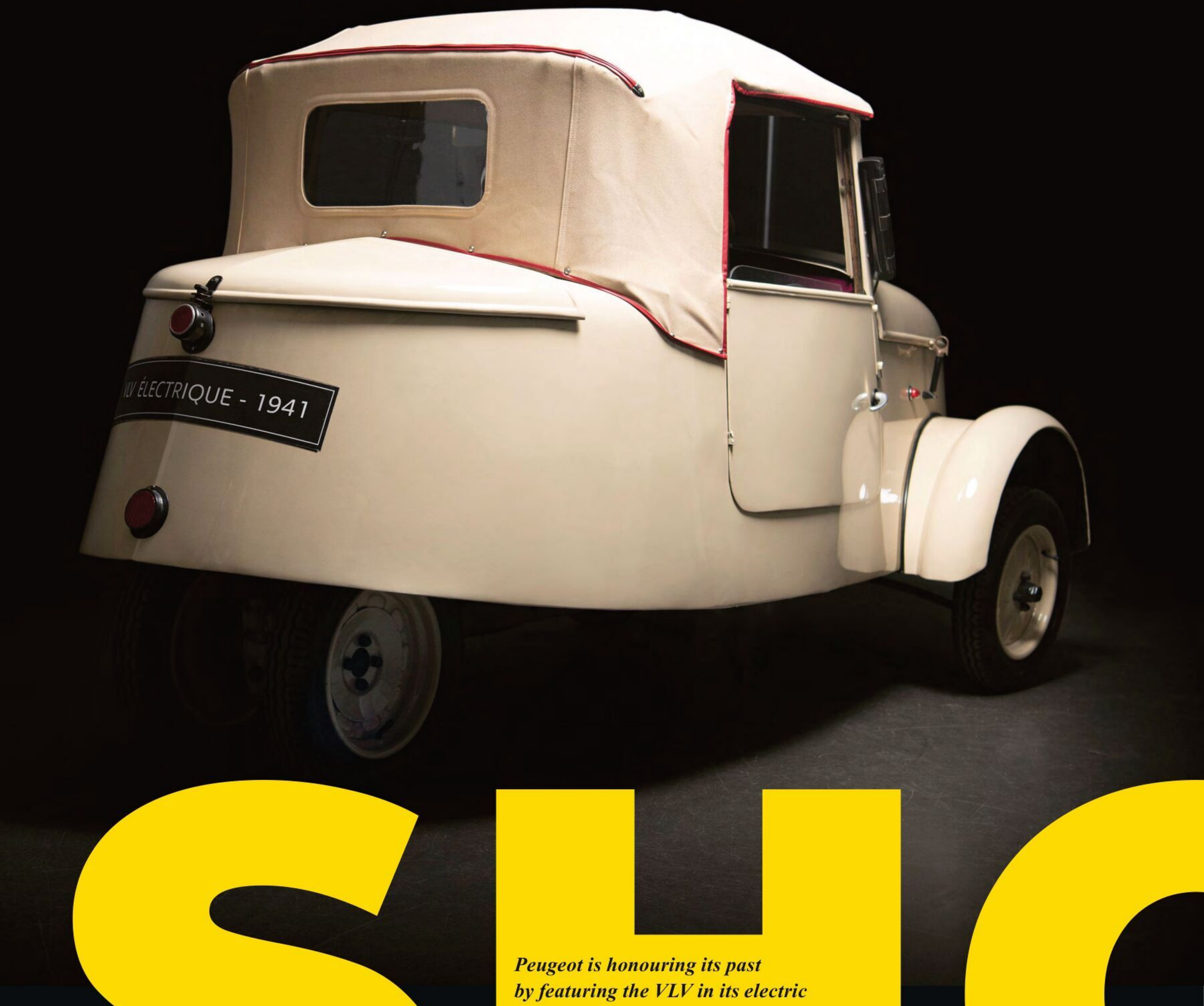


PHOTO: LAPI / ROGER-VIOLLET

Arzens with his Le Baleine on the streets of Paris in 1942 alongside Pierre Faure's electric minicar (see next story).

FORBIDDEN

Alternative Power



SUS

Peugeot is honouring its past by featuring the VLV in its electric vehicle media campaigns.

FRENCH ELECTRIC VEHICLES DURING WORLD WAR II

SOURCE: STELLANTIS (2)

Between 1941 and 1943 377 units were built of the VLV which stands for Light City Vehicle.

In 1940, Germany occupied France, which brought with it – among other things – rationing of petrol. In addition to wood gas conversions, plenty of French companies tried to circumvent rules by offering electric vehicles, reports **Dr. Pál Négyesi**.

BACK TO THE SYSTEM

PASSENGER CARS

The wheel arrangement resurfaced in 1950s bubble cars.

PEUGEOT

PEUGEOT VLV

Peugeot had been forced to turn its factories to war production for the Nazis, but the development office was buzzing with secret postwar projects. The VLV, a.k.a. Voiture Légère de Ville (Light City Car), was produced overtly and described in the press. It was a small two-seater cabriolet with a folding roof and doors, incorporating side windows that were raised by a lever in the door. It was of revolutionary construction, a steel monocoque with only two reinforcing strips under the floor. Front suspension was by a transverse leaf spring, and the two rear wheels were only a foot apart, sharing a single brake drum. The electric motor was powered by four batteries under the front hood, totaling 48 volts and 82-amp-hour capacity. These constituted half of the 350-kg weight of the car, which was 2.67 meters long, 1.12 meters wide, and was able to carry two adults. The VLV was unveiled in 1941 and produced at the Garenne factory. Its clientele consisted of doctors and the French postal service. Total production amounted to 377 units.

SOURCE: STELLANTIS

With the German Occupation of France in 1940 came rationing of many different items, including food, petrol, and even tires. For drivers, the most coveted item was the "Ausweis," or permission-to-drive slip, yet a permitted driver was still subject to numerous inspections at stations or mobile patrols throughout the city. Being resourceful people, the French dealt with their austerity in pragmatic terms. Human-powered vehicles like the Velocar were greatly in demand during this time. Some vehicles were converted to run on wood gas (see our story on page 30). France had about 65,000 "gazogene"-powered cars on the roads. Other cars were seen with compressed acetylene gas cylinders on the roof or mounted behind.

Finally, there were the electrics. While Paul Arzéns produced just one experimental bubble car, a lot of other companies, including large industrial firms including the aviation company Breguet, electrical equipment manufacturers like Mildé-Kriéger, and small car manufacturers such as Georges Irat, had a go at making electric cars. Even Jaeger, which produced watches and instruments for vehicles, tried its hand on electric cars. Peugeot was the only one of the large car companies to build an electric model. The decision of the German GBK organization, which managed industrial production in the occupied territories to prohibit production of electric vehicles, put an end to these experiments in 1942. ♦

The sole surviving Breguet is part of the Dutch Louwman collection today.

BREGUET

BREGUET A1 AND A2

The Société Anonyme des Ateliers d'Aviation Louis Breguet was founded in 1911. The company distinguished itself during the First World War by its many innovations. Unlike many similar companies, Breguet remained in this field after the First World War, and developed civil aviation by supplying Aéropostale. Founder Louis Breguet even created an airline in the 1920s that was later merged with others to form Air France. With the occupation of France in 1940, Breguet suddenly lost all of its orders. New business areas had to be found so production of bicycle frames, metal works, and electric cars was contemplated.

The first electric Breguet was made in 1940. Called the A1, it featured a Paris-Rhône-sourced 72-volt electric motor and six 6-volt batteries. It probably remained a one-off. The production-ready A2 was introduced in 1941 with the same specifications, but this time the six batteries had 12 volts each. The car was equipped with a three-speed gearbox. Reversing was possible by changing the polarity.

The exterior featured two headlights and a rounded front end, while the interior was inspired by an airplane cockpit, particularly with regard to the windscreen divided into three parts. As for the rear, it was tapered since the rear track is narrower than the front track, in order to incorporate the electric motor between the two wheels and omit the differential, saving weight. But more surprisingly, one of the two wheels was driving; the other provided braking! The body of the A2 was made of duralumin, a type of alloy. One would have thought that the occupying forces had prohibited the use of such delicate material, but Breguet had probably stockpiled it much earlier. For cost reasons the front axle, brakes, and steering came from the Simca 5. Driving at a maximum speed of 20 km/h, the car had a range of 100 km, which dropped to 65 km when somebody attempted to do 50 km/h. Around 200 units were produced, and it is estimated that there are seven survivors.

SOURCE: LOUWMAN MUSEUM (2)

Each CGE cost three times as much as a Citroën Traction Avant.

CGE TUDOR

The CGE resulted from a meeting between Pierre Quoirez, a director of Compagnie Générale d'Électricité, a diversified manufacturer of electrical equipment, a primary supplier to utilities, and itself an important distributor of electricity; and Jean Albert Grégoire, who had designed the Tracta front-wheel-drive car and, in collaboration with Aluminum Pechiney, produced cast-aluminum chassis for the Amilcar Compound of 1938/39. Development of their proposed electric car began in 1939 and even at this early stage a system of energy recovery was under consideration. The project was officially launched in 1940 at the request of the French government, with Hotchkiss recruited to supply the bodywork and Tudor the batteries. Aluminum was chosen for the two-seater cabriolet bodywork because of its lack of weight and relative resistance to the corrosive effects of spilled battery acid. The CGE was rated at 4 horsepower for taxation purposes and carried its electric motor at the rear. Energy was supplied by two groups of eight traction batteries each, which were located at the front and rear of the car. The four-speeds-plus-reverse gearbox was foot operated, a light on the dashboard indicating to the driver what gear had been selected, while four-wheel drum brakes and perforated steel disc wheels completed the chassis specification. The first car was completed in February 1941 and the following year a CGE set a new record, completing the journey from Paris to Tours (a distance of 250 kilometers) at the average speed of 58 km/h (36 mph). Allocated to civil servants, industrialists, and other important citizens, the 200 cars produced each cost three times as much as a Citroën Traction Avant. There are just three survivors known.

This car features a period battery charger.

SOURCE: BONHAMS (3)

TUDOR

The original owner was the director of a battery company.


1

1 In 1970 CGE comisioned an electric utility vehicle.
2 The angular body was designed by Philippe Charbonneaux.
3 Grégoire strongly supported electric vehicles.


2


3

PHOTOS: THIERRY RENAUX (3)

A CGE Tudor is part of the IHA collection today.

JEAN-ALBERT GRÉGOIRE

The C.G.E. Tudor was not the only dalliance Jean-Albert Grégoire (1899–1992) had with electric vehicles. Grégoire is best known as the inventor of the "universal joint" for front-wheel-drive vehicles. It was called the "Tracta joint" by Pierre Fenaille and Jean-Albert Grégoire in 1926. They adopted and improved the principles of the transmission shaft elaborated by the Italian scientist Gerolamo Cardano in the 16th century. Grégoire set up his own company to produce front-wheel-drive cars, but he also sold his patent to other manufacturers, such as DKW and Adler.

In the early 1930s he worked on cast alloy frames and their automotive applications. During World War II he worked on the CGE Tudor, but also on perfecting his alloy constructions. His second electric-car contract came 25 years later, again via CGE. The company wanted to develop an electric light utility vehicle in 1970. While the vehicle's structure was to be made from an internal aluminum alloy frame, the body was to be made from reinforced polyester, as the manufacturing process for that material was much cheaper than that used for steel or light alloy bodies. The Philippe Charbonneaux–penned body was not to Grégoire's liking; he labeled it "anti-aerodynamic". This vehicle remained a prototype.

FAURÉ

SOURCE: PS SPEICHER

FAURÉ

Pierre Fauré, a former employee of the Breguet company, struck out on his own in 1940. He wanted to develop a unique electric car. As we have seen, he knew Paul Arzens as well, but eventually his streamlined electric car was designed by an architect, Michel Duffet. With a capacity of 100 amps at a voltage of 72 volts, six batteries ensured power to the motor. The car could reach 40 km/h, and its autonomy was estimated from 50 to 70 km depending on the number of starts, load, and road conditions. Recharging was possible from any 110-volt household outlet, which took 12 hours. As an option, Pierre Fauré also marketed a transformer that allowed the car to be recharged with 220 volts in less time.

As for the bodywork, it was made from wood, with the front headlights under the bonnet. The cars were available in "two-seater sedan," "three-seater sedan," and van guises. However, only around 20 cars were made before the car fell into complete oblivion.

1 An unrestored Fauré is now part of the PS Speicher collection in Germany.
2 The streamlined shape was designed by an architect.

MILDE KRIEGER

Louis Krieger set up its original company in 1891 which built electric vehicles.

SOURCE: SERGE BELLU

MILDÉ-KRIÉGER

Louis Krieger and Charles Milde already manufactured electric taxicabs at the dawn of the 20th century.
In 1940 they were approached by the La Licorne company to convert their A163 model to electric propulsion. Mildé and Kriéger accepted the task with one condition: the car would be marketed as a Mildé-Krieger. This is how the La Licorne Mildé-Krieger AEK was born in 1941. It looked a bit like a Peugeot 202 and was similar in size. In place of the gearbox sat a powerful electric motor sourced from Safi (Société d'Application de Fabrications Industrielles) which propelled the rear wheels. Equipped with 16 units of 96V batteries the car weighed almost two tons! There were around 150 AEK cars assembled and some were used in Paris as taxicabs.
In addition to the passenger-car version, there were a few pickup trucks built on the chassis of La Licorne with a payload of either 600 or 1200 kg and a range of around 70 to 100 km.

SOURCE: GÉVÉ WEK

A Chapron-bodied, La Licorne-based Mildé Krieger van today.

STELA

STELA RCA

On September 27, 1941, the International Fair opened its doors in Lyon, France, with Marshal Pétain, president of Vichy, or occupied France, and Admiral Darlan, head of the government in Vichy under German occupation, in attendance. The fair was intended to demonstrate the efficiency of the French industry despite the wartime occupation and rationing. One of the highlights of the exhibition was a new electric car called the Stela RCA. Stela stands for Service de la Traction Électrique Légère et Agricole. It was designed by Hubert Pascal and his company, FAL (Forges & Ateliers de Lyon), in Villeurbanne outside Lyon.

It was a fairly advanced design with strange propor-tions that were dictated by the large package of batteries, which weighed a whole ton. Pascal also developed a system which enabled the exchange of batteries quickly. Stela had a maximum speed of 50 km/h and a range of about 140 km. It was also very expensive at 148,000 Francs. For that money, you could buy four Citroen Traction Avants, but as there was no petrol available this comparison was moot.

In 1942, the southern part of France was also occupied, but Stela was able to continue small-scale production until the end of the war.

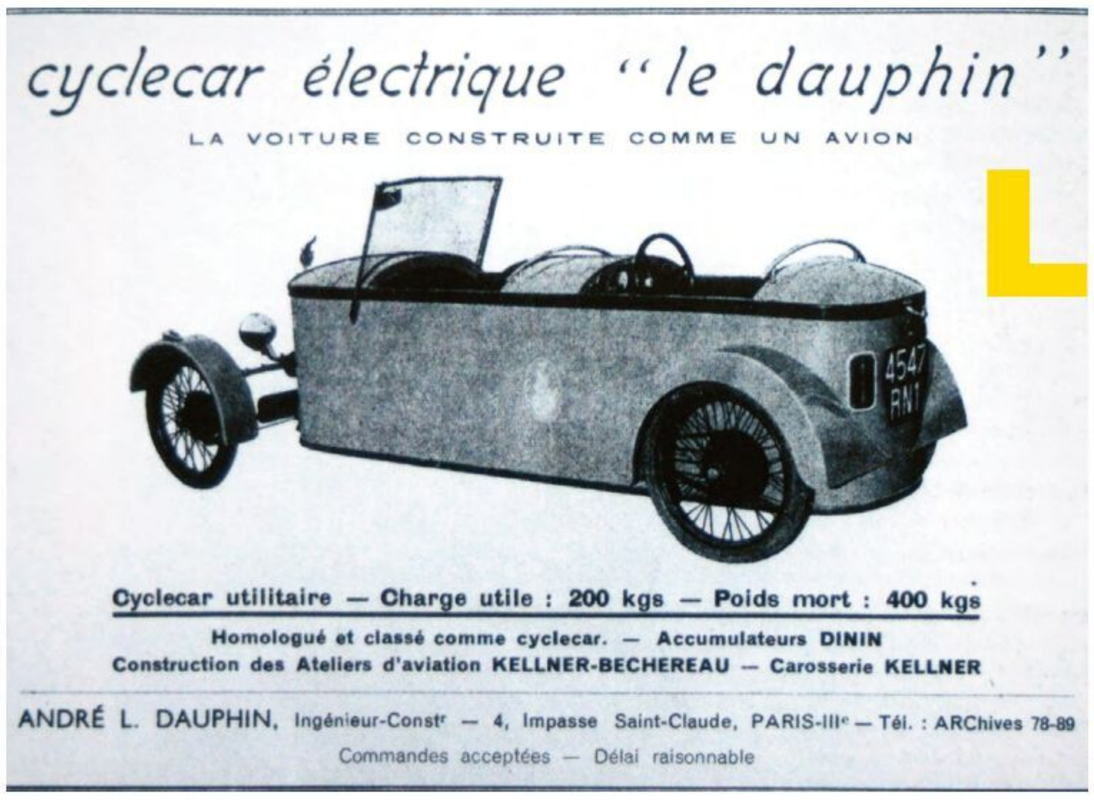
Altogether around 220 Stela RCA cars were sold – two of which were bought by Admiral Darlan right at the Lyon expo! The sole survivor today is being preserved at the Henri Malartre Museum in Rochetaillée, France.

Government officials and taxi drivers used the Stela.

Pascal developed a system to ex-change the batter-ies quickly.

PHOTOS: BERTRAND STOFLETH (2)

LE DAUPHIN



Even Kellner, one of the most prestigious coachbuilders of the prewar era worked on the Le Dauphin.

LE DAUPHIN

André L. Dauphin was a former car salesman who looked at the petrol shortage from a different angle. His idea was to offer a simple cycle car or vélomobile, which was equipped with pedals and an auxiliary engine. Called the Dauphin, the first prototype was completed in the winter of 1940–1941. It featured a wooden body and a simple roof. First versions featured petrol engines, then compressed-gas versions. In the spring of 1941, Dauphin built an electric version with a range of 50 to 70 km and a maximum speed of 30 km/h.

COMMERCIAL VEHICLES

By the end of 1940, there were about 20 electric truck builders in Occupied France, including SOVEL, SCF, Labinal, Stella, Laffly, Vetra, and others.

FENWICK URBEL

FENWICK URBEL

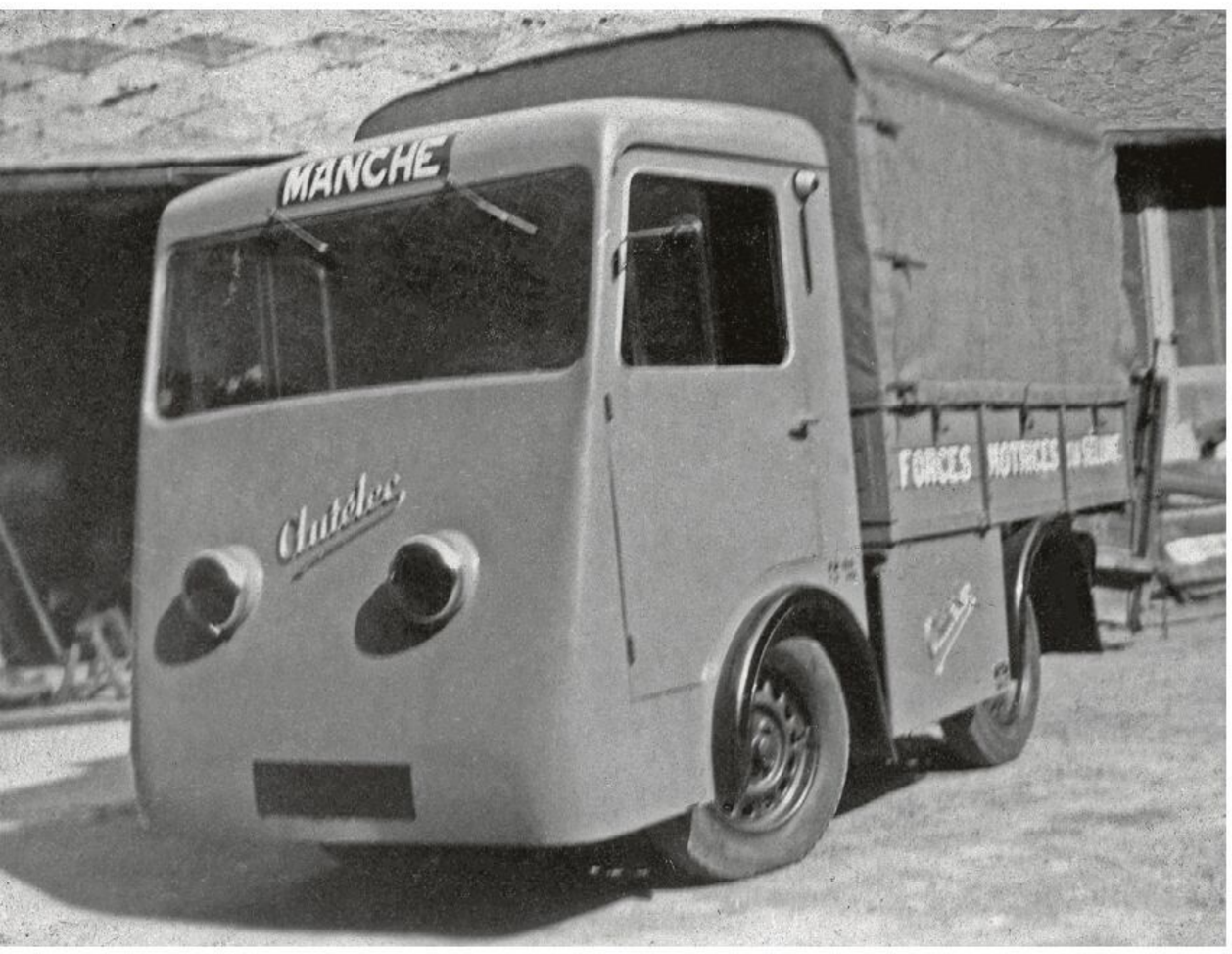
Citroën had just finished development of its new small van, called the TUB (Traction Utilitaire Basse), when hostilities broke out. Only a handful of petrol-powered vans were handed over to customers, who were quickly facing rationing and fuel shortages. Citroën asked Fenwick, which was a supplier of repair tools and also a specialist in forklift production, to retrofit the TUB series with their modified electric truck motor. Although it reduced the payload, it was still a workable solution. Citroën required the company to change the model name to Urbel (Urban Électrique). With a weight of about 1825 kg, the Urbel could reach a maximum speed of 50 km/h, but it was advisable not to exceed 25 km/h because the batteries would deplete quickly. Production ceased in 1942 when the stock of TUB parts was finished.

Batteries are being put in place in this Urbel ambulance.

SOURCE: FENWICK

AUTÉLEC

AUTÉLEC



SOURCE: FONDATION BERLIET

Société Freins Jourdain Monneret was a manufacturer of industrial trucks that introduced its small Autélec electric truck in 1940. With a maximum speed of 25 km/h, it had a range of just 65 km.
While the Autelec was offered at the prohibitive price of 46,300 Francs in 1940, it was relatively successful, due partly to lack of competition, and given the possibilities opened up by using an electric vehicle, the price did not put off candidates for the purchase of a utility vehicle in this period of crisis.

The Autélec range was available with payloads ranging from 500 to 1200 kg.

SOVEL

SOVEL

SOURCE: FONDATION BERLIET

SOVEL (Société de Véhicules Électriques) was set up in the mid-1920s by Banque Schlumberger to serve the municipal-vehicle market with electric trucks. By the outbreak of World War II, it had produced around 300 such vehicles.
Compagnie Générale d'Électricité took over 50 percent of shares in 1939. In addition to the existing facility in Saint-Étienne, a new factory was erected in Villeurbanne. In 1941, a small assembly line was put into operation. This enabled the company to increase production from 40 units to 800 units a year. Also in 1941 a third assembly site was opened in Ivry-sur-Seine to meet increased demand. Here assembly of electric trucks took place from mechanical elements supplied by renowned manufacturers of gas vehicles, such as 200 Chausson pickup trucks with a payload of 600 to 700 kg, 400 Citroën and 400 Latil used for garbage collection. The ban on electric vehicle production put an end to SOVEL's activities. The Saint-Étienne plant was destroyed in 1943 by Allied bombs. However, SOVEL resumed production after the war. The company closed its doors in 1977.

An electric Sovel garbage truck, which was used in Paris in 1942.

SOURCES:

- Serge Bellu, Bonhams, RM Sotheby's, Artcurial, Fondation Berliet, PS Speicher, Louwman Museum
- http://lautomobileancienne.com/les-voitures-electriques-sous-loccupation/
- Kevin Desmond: Electric Trucks: A History of Delivery Vehicles, Semis, Forklifts and Others
- Institut pour l'historie de l'aluminium
- Musée de l'Automobile Henri Malartre

NO FUEL?

NO PROBLEM!

EARLY JAPANESE ELECTRIC CARS

Most enthusiasts of motoring history will be aware of Tama electric cars. They were the best-known early Japanese electrics, but there were many more. Extending back to the 1920s, they gained popularity in the 1930s and for a few years after the Second World War. Supplied in small sedan, van, or pickup form, all were intended for business users, with sedans aimed squarely at taxi operators; manufacturers saw no point in pursuing nonexistent private buyers.

Text: **Jeremy Risdon**

A group of Tama engineers test-drive the EOT-47 truck and the E4S-47 passenger version in March, 1948.

SOURCE: NISSAN

HOMEGROWN electrics began to appear in the 1920s, although no completely domestic effort sold beyond tiny numbers. The only volume seller was the Slaby-Beringer from Germany, which supplied significant numbers in chassis form to Japan where locally built bodies were applied. These sold under the SB or sound-alike Esubi marque names because of Japanese pronunciation problems with Slaby-Beringer.

The late 1930s brought renewed interest in electric vehicles when increased military activity led to severe fuel shortages. Performance and range issues limited demand and interest from mainstream manufacturers, but not from some business users. Poor road conditions resulted in limited travel opportunities, and businesses often restricted activities to a small area. Electric-vehicle manufacturers targeted this niche free from mainstream competition.

Key manufacturers during this period, all producing in small volumes, included Denka, Matsuo, Nagoya, Nakajima, Nichiden, OS, Shinko, and Takara. Most disappeared during the Second World War, and the few remaining at the end were supported by other business interests.

Fuel shortages worsened postwar, so a niche market remained for electrics, keeping it sufficiently healthy to attract new entrants. Electrics remained of little interest to mainstream manufacturers. Toyota experimented with EC and BA prototypes during the war but did not proceed beyond these. Tama, an offspring of the Tachikawa aircraft company, was the most professional effort to emerge postwar.

Several Japanese aircraft manufacturers, now banned from making their main product, turned to making an alternative form of transport. Road transport was an obvious route for Tachikawa, building on their experience repairing U.S. military vehicles in the latter part of the war. They were also in effective control of Ohta during the war, providing equipment to Tachikawa to assist the Japanese war effort. Following the Allies' postwar breakup of Tachikawa, Ohta regained independence, but the close relationship resulted in Ohta assisting with Tama development. As Ohta made petrol-powered products, it made sense for Tachikawa to concentrate on electrics, avoiding competition with Ohta. Tachikawa aimed to fill a gap in the market for a credible electric equivalent of the mainstream products Ohta was offering, in contrast to the oddballs being supplied by existing electric-vehicle manufacturers.

TAMA

In 2010 Nissan Motor Co. Ltd. restored a 1947 Tama E4S-47 to celebrate the launch of its new Leaf electric car

SOURCE: NISSAN

A Mr. Okuyama led the electric-vehicle project, with Ryoichi Nakagawa, engine designer of the Mitsubishi Zero airplane, as project director. By November 1946 two prototype EOT-46B trucks had been completed at a Tachikawa factory being used by Ohta, near the Tama River from which the brand took its name. These were essentially heavily modified Ohta products. Finding space too limited at the Tama River plant to continue the project, plant chief Tamiki Toyama set up an independent division utilizing 200 employees at an idle Ohta factory in Fuchu-cho.

Following the move to Fuchu-cho, Tama productionized the truck as the EOT47 model in April 1947, updated to distance it from its Ohta origins. In common with contemporaries, a significant amount of wood was used in its construction. Underfloor battery compartments were fitted on each side; these slid out

The Tama E4S-47 had a range of 65 km and was popular as a taxi in the late 1940s.

SOURCE: AMAGASAKI CITY ARCHIVE

Nippon Electric Car was one of the few electric car makers which survived World War II. Its Denka was made in various guises from the late 1930s to 1951

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on rollers, enabling easy exchange of depleted batteries. In May 1947 came the E4S-47, a sedan version of the truck. With both models in production, the vehicle division also changed its name to the Tokyo Electric Motorcar Company in June 1947.

Both models were heavy, thanks to hefty batteries. Powered by a 4.5-hp motor, their usefulness was limited: maximum speed was just 35 km/h and range a paltry 40 miles. For truck applications, this was inadequate. As economic activity increased, a depleted vehicle fleet was having to work harder, and electrics were not up to the job. Unsuitability for out-of-town work was a particular disadvantage. The truck sold slowly, and some new examples only found buyers following conversion to Ohta petrol power. The reverse situation is in effect today, when an active industry exists converting petrol and diesel vehicles to electric. Sedan (taxi) models coped better, proving popular for central-city collections and deliveries, so Tama concentrated on passenger-car production after 1948. The initial E4S-47-1 model was mildly modified later in 1947 to become the E4S-47-II with extended rear wings and a mesh grille. Although the performance figures seem unimpressive by modern standards, the E4S-47 obtained best results in the 1st Automobile Technical Association Electric Vehicle Performance Test conducted in March 1948 in Takatsuki City. The tests were important for manufacturers because the Ministry of Commerce and Industry used them as a basis to allocate scarce raw materials to producers of the best-performing products.

As the 1940s progressed, car design advanced and the Tama range with its prewar-influenced styling rapidly became dated. This changed in 1948 with the arrival of modern-looking Junior and Senior models. Initially in two-door format, these small and medium-size sedans featured front-wheel independent suspension and hydraulic brakes, but ongoing material shortages still meant significant wood content under the skin. A consequence of the sleeker looks was losing underfloor battery storage, with the batteries now residing under the bonnet and in the boot.

The Junior was modified several times during 1948–49. Improvements included light units fully integrated into wings, a flatter bonnet, and a longer wheelbase. Increased battery capacity improved range to 56 miles.

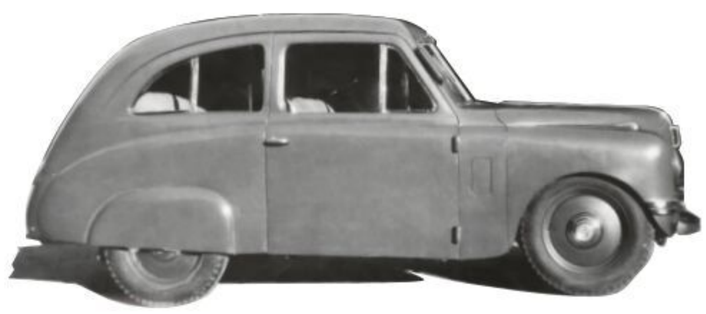
The larger Senior, launched in September 1948, was a clear sector leader. It boasted a useful 95-mile range, but the 5.5-hp motor still only allowed a maximum speed of 56 km/h. Bodywork metal content improved gradually on both models as material supplies allowed.

The initial Senior EMS-48 prototype was produced as the EMS-49-I. Although ostensibly a five-seater, rear-seat accommodation was lacking, rectified in the EMS-49-II launched in March 1949. Identified by squarer rear quarter-windows, its wheelbase increased by 180 mm, improving back-seat space. Other improvements included a more powerful 6-hp motor and bigger batteries that provided a range of 125 miles.

Ohta was not finding the assembly operation at its plant particularly fruitful. In December 1949, following a substantial investment from Bridgestone, production moved to a former Masuda airplane factory in Mitaka, and along came another name change, to Tama Electric Car Company.

The move came at the right time for Tama to react to changes in the taxi market. Operators preferred four-door models, traditionally from Western brands, but these were now difficult and expensive to obtain. Coachbuilders affiliated with Toyota filled the void with cheap and tough four-door taxis based on the

SOURCE: TETSU FUKUDA



UNIVERSAL

A mysterious small car from the Universal Electric Vehicle Company in Yokohoma, which remained a prototype

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SOURCE: NATIONAL DIET LIBRARY

NAGOYA

Nagoya was one of the many electric cars featured in the 1940 edition of the "Domestic Automobile Product Information" booklet

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Toyopet SB chassis. These quickly became very popular, demand for two-door models plummeted, and competitors scrambled to convert two-door models to four-door format.

The new factory's production system enabled manufacture of all-metal four-door bodies for both the new Junior E4S-49-II and Senior EMS-49-II four-door (Western texts usually refer to this model as the EMS-49-III). These were more stylish than previous offerings. The Senior displayed Western influence, although the Junior still had a somewhat dumpy appearance.

Just as things looked promising for electric cars, the Korean War broke out in 1950, and a byproduct was a sharp increase in the price of lead and therefore batteries. At the same time, the U.S. military made large quantities of fuel available. The viability of producing electric cars disappeared overnight.

For Tama, the only sensible option was to abandon production of electric vehicles. Tama sold leftover body shells to Ohta, which installed petrol engines and retailed them as the Ohta PC (Junior) and PD (Senior) in 1951 and 1952. The engineering work required for the conversions left Ohta facing a loss on the project.

Tama production estimates vary widely. The most probable figure is 1,099 units across all models until production ceased in June 1951.

Tama management wanted to continue vehicle production and recognized the future lay in petrol power. Tama became Prince in 1952, starting a significant new chapter in Japanese motoring history.

Of the other postwar electric car manufacturers, the most significant prewar survivor was Nippon Electric Car. Makers of Denka brand electrics since the late 1930s, they also converted petrol vehicles to electric, which kept them going through the war. Postwar, they offered sedan and truck models that were rehashes of prewar offerings. These gradually improved, but Denka faced similar issues to Tama: disappearing truck sales and cars needing modernization.

Lacking resources to perform a quick fix, Denka contracted production of a new model to coachbuilder Kanto Electric. Kanto added batteries and unique bodywork to a Toyopet SD chassis, an expanded SB chassis for taxi applications. The resulting BA model gave Denka a modern premium offering to sit alongside older products.

This bought time for Denka to develop its own smaller FC model, introduced in 1950. Denka intended to further develop the FC theme, being in a transitional phase of offering old models, the BA and FC, when the Korean War hit. Without resources to develop alternatives, the company succumbed to the electric-vehicle cull in 1951.

Another war survivor was Shinko Electric. Its main products were forklifts and electrical parts, but the company also offered electric commercial vehicles from around 1940. Shinko was part of Kobe Steel until 1949 when it broke away,

DENSO

Denso was spun off from Toyota in 1950. For a short while it produced electric vehicles. A few years ago the company built a replica of its self-developed electric sedan

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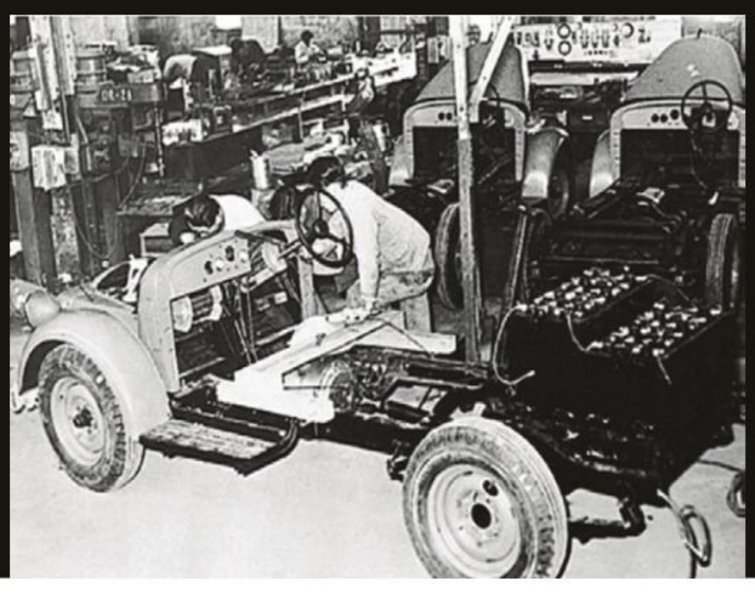

The Denso No 1 was a modified Toyopet SD, which was equipped with an electric powertrain.

SOURCE: DENSO

OS

OS was made by the Osaka Body Manufacturing Co. in the 1930s. The small car had a maximum speed of 40 km/h

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with plans to expand vehicle production while moving away from commercial vehicles in line with market requirements. When the Korean War axe fell, Shinko was working on the SK-1, an estate/van it commissioned Kanto Electric to produce, and a similar sedan. A tenfold increase in battery prices killed expansion hopes along with the trickle of commercial vehicles Shinko was still producing.

Denso, a brand created by Nippon Electric in 1950 following independence from Toyota, was another company that initially asked Kanto Electric to produce its products. The SBE, an electric version of Kanto's own SB-chassis SBP, was followed by the SDEX, a modified Kanto SDX on the SD chassis. Following these, Denso took on more work itself. The No.1, a modified Kanto-bodied Toyopet SD, was developed in-house by Denso but did not progress beyond prototypes.

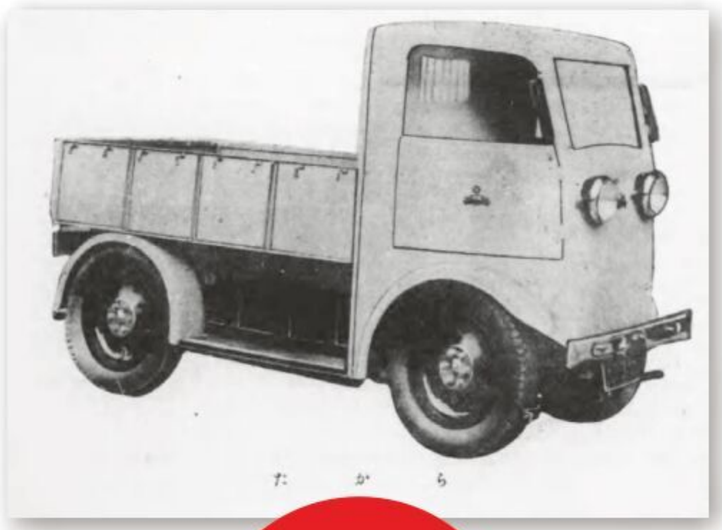
Ultimately, Denso opted to produce the EA purpose-built sedan. Denso concentrated on producing its power systems and batteries. The rest is believed to be Kanto supplied on an SD chassis. Approximately 50 had been made when battery cost issues took effect, ending Denso's short experiment as a car producer.

Teikoku (meaning Empire) was a manufacturer of electric pumps looking to expand into new areas. The company offered an oddball collection of vehicles aimed at specific buyer types but did not do much product development. At its peak in 1949, Teikoku planned expansion, concentrating on a four-door sedan that looked like quite a credible offering. Cash-flow issues curtailed activities, and inventive ways of finding homes for vehicles, including the creation of a taxi business, just delayed the inevitable. Production ceased in 1952. The brand remains largely unknown, with activities centered around the company base in Hyogo.

Nitta Sangyo, another short-lived manufacturer, made the Sun three-wheeler from 1950. An electric cabriolet until battery prices went up, it was then reworked to become the Sun Sedan, a petrol-powered coupe. This did not improve company fortunes, and the Sun faded in 1951.

The Universal Electric Vehicle Company of Yokohama aimed to produce a cheap two-door electric sedan, similar to lower-end Ohta models. Although it was planned to slot below key competitors' products, bad timing meant it did not get beyond the prototype stage.

The Korean War created a lot of disruption to Japanese manufacturers' product mixes. This included eliminating a healthy electric-vehicle industry virtually overnight, and by the end of 1951 little remained. This may have brought forward the inevitable. Road conditions in Japan improved throughout the 1950s, bringing an expectation that road vehicles should be capable of inter-city travel. Technology was not available at that time for electric vehicles to fulfil that requirement. Military activity kick-started a mini-electric-car boom in Japan, and it just as effectively killed it off. ♦



TAKARA

Another entry from the 1940 catalog is the Takara, which was produced by a forerunner of Mitsubishi Heavy Industries Forklift in the late 1940s

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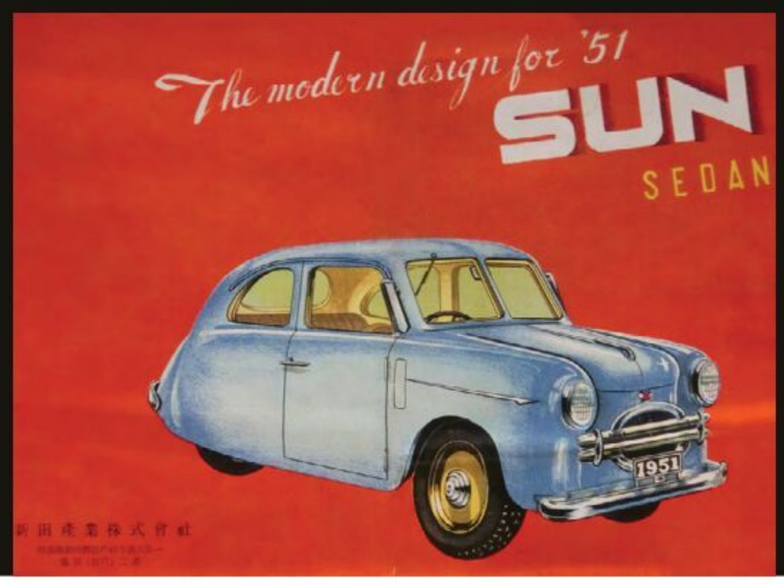
The Sun three-wheeler was produced by Nitta Sangyo in 1950-1951. It was first available with electric engine, then later came a petrol version.



SOURCE: TETSU FUKUDA

THE BRONZE BLOW TORCH

THE STORY OF CHRYSLER'S ILL-FATED TURBINE CAR PROGRAM

In the years immediately following the Second World War, Chrysler attempted to bring the auto industry into the jet age. This is the story of the most ambitious consumer test program of all time. 55 cars, 203 families, and one fantastic tale.

Text and images by **Richard Truesdell**.

TECHNICAL DATA

Length	*201.6 inches*
Width	*72.9 inches*
Height	*53.5 inches*
Wheelbase	*110.0 inches*
Horsepower	*130 (gross)*
Top Speed	*120 mph*
Price	*$ 50,000 (est)*

($ 385,000 adjusted to 2022)

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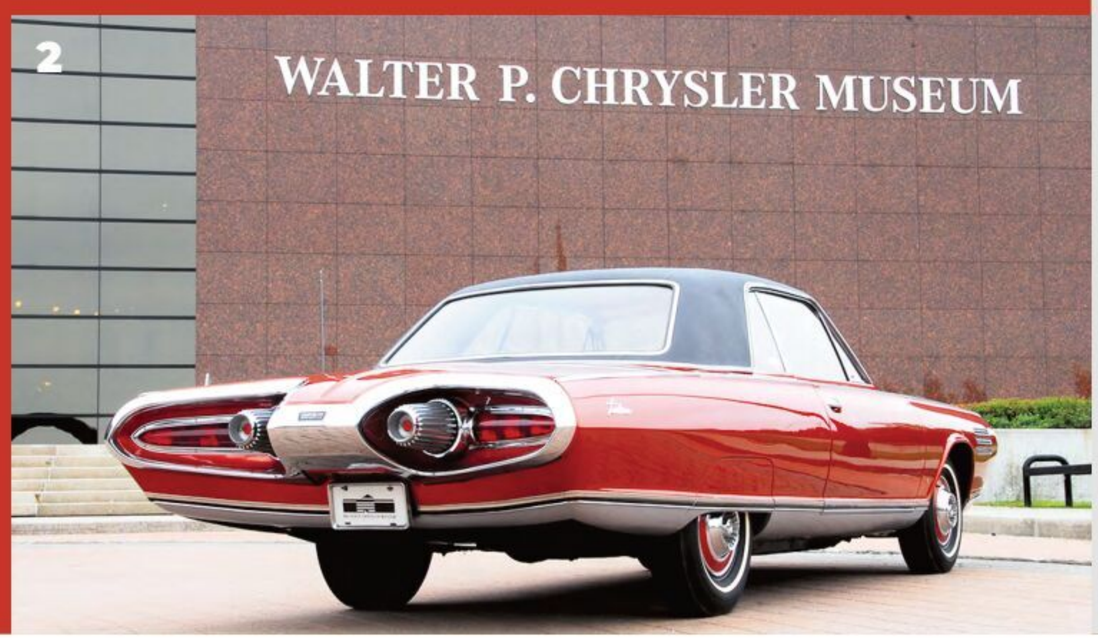
1 Forty-six years after seeing the Chrysler Turbine Car when he was just nine years old, author Richard Truesdell gets behind the wheel.

2 Rear view of the Walter P. Chrysler's Museum's remaining 1963 Ghia-bodied Turbine Car (their other Turbine Car was sold to comedian Jay Leno in 2010).



DRIVING THE TURBINE CAR (2006)

Back in the Spring of 2006, when visiting the U.S. headquarters of the DaimlerChrysler, I had the opportunity to fulfill one of my lifelong dreams. I got the chance to drive one of the two Chrysler Turbine Cars that was owned by the Walter P. Chrysler Museum, adjacent to the headquarters building in Auburn Hills, Michigan, one of those cars was sold five years later to comedian Jay Leno, to actually drive one of the Walter P. Chrysler Museum's two remaining 1963 Chrysler Ghia Turbine Cars.

My first encounter with the Chrysler Turbine Car happened when I was walking home from school back in the Winter of 1963, when I was nine years old, I saw a strange-looking car drive by. It looked a bit like my mom's 1961 Ford Thunderbird and it emitted a strange, almost jet-like sound when it drove by. And it was painted a wonderful shade of bronze that stood out on that cloudy day.

That night, at dinner, I told my dad about the sighting and then forgot about it. That was until the opening day of the 1964 World's Fair in New York's Flushing Meadow the following April. There, after driving through the Ford

WITH ITS distinctive Turbine Bronze paint and black vinyl top, Chrysler's Ghia-bodied Turbine Car was a head turner. To many, its exterior design language echoed that of Ford's Thunderbird. This should come as no surprise given that both were guided by Elwood P. Engel, who had moved from Dearborn to Highland Park in 1961 after having designed the 1961-1963 third-generation T-Bird. On May 15, 1962, Chrysler announced the limited-production build of 55 cars, including five prototypes, would be lent out to 203 drivers for three-month test drives over a period spanning more than two years.

Only 46 cars went to the general public. Two were held by Chrysler for marketing and dealer programs while two were stars of the Chrysler pavilion at the 1964-1965 New York World's Fair.

According to Chrysler's records, the first was provided to Richard Viaha of Chicago, Illinois, on October 29, 1963, and the last was driven by Patricia Anderson, also of Chicago, who returned her Turbine Car to Chrysler on January 28, 1966. Over the term of the program, the 203 families travelled more than 1.1 million miles.

To this day, the Chrysler Turbine Car consumer test drive remains one of the largest such programs ever undertaken by an automotive manufacturer. (It has been estimated that it cost Chrysler $50,000 to build each car owing to the expensive Ghia-sourced bodies. Converted to 2013 dollars, their cost today would be $385,385. And this doesn't factor in the

3 Designer Elwood Engel's turbine-inspired design motif was carried through to almost every element of the car from the headlights to the taillights.

3 4

Pavilion in a red Ford Mustang with a bench seat, with my mom, dad, and my brother Frank, we walked over to the Chrysler exhibit. And there it was, what looked like the same car, one of the 55 Turbine Cars, hand built by Ghia for Chrysler.

Fast forward 42 years into the future, and thanks to pulling some strings with my press contacts at the then Daimler-Chrysler and with Brandt Rosenbush, the long-time manager, since 1999, of the Walter P. Chrysler Museum in Auburn Hills (the building since 2017 now houses the U.S. headquarters of Maserati), I finally got my chance to drive Chrysler's bold experiment to bring automotive design and engineering into the jet age.

Even after having driven a Ford GT40 and the then new second-generation Ford GT at Le Mans just a few weeks previously, it was a singular experience. My time behind the wheel was short, a couple of laps around the ring road surrounding the complex, because the OEM bias-ply tires were feeding back some vibration. Brandt suggested we get the car on the trailer to be transported to our next photo location, a period-correct Mid-Century modern ranch home owned by a senior Chrysler executive.

5

4 Probably the most conventional design element of the car's interior, save for the white faces, is the car's instrument cluster.

5 The four-place interior, trimmed in Turbine Bronze leather, features four bucket seats.

program development costs spanning back to just after the end of the Second World War when gas turbine engines were finding their way into America's first jets.)

FIRST GENERATION
1954-1958

While the 1962-1966 Chrysler Ghia Turbine Cars are the best known of the program, starting in 1954 Chrysler installed prototype turbine car engines in a variety of Plymouth and Dodge vehicles. The first was a 1954 Plymouth Sport Coupe which sported a 100-horsepower gas turbine engine and is credited with being the first automotive gas turbine engine that solved two of its most challenging problems, high fuel consumption and scorching exhaust gas. The development of a revolutionary heat exchanger, or, as it would become known, a regenerator, addressed both issues. It extracted heat from the hot exhaust gases and transferred this energy to air coming into the engine's compressor.

Chrysler's turbine engines were capable of burning almost anything combustible, from jet fuel to distilled spirits. But the high levels of lead present in gasoline blends of the mid-Fifties were harmful to parts of the engine. Unleaded "white" gasoline was far better suited for use in these early gas turbine engines.

SECOND GENERATION
1958-1961

The next generation of Chrysler's gas turbine engine appeared in late 1958, installed in a 1959 Plymouth two-door hardtop. This engine produced approximately 200 horsepower and was improved in almost every way, especially concerning fuel consumption. Chrysler's engineers

The car's interior can best be described as functional yet futuristic.

This 1956 Plymouth Turbine Special completed a 3,020-mile cross-country trip in four days, demonstrating Chrysler's continued effort to develop a turbine car engine that could compete with existing traditional piston engines.

Chrysler's Executive Engineer, George Huebner, stands between the turbine-powered 1962 Dodge Turbo Dart and Plymouth Turbo Fury turbine cars, the immediate precursors to the 1963 Ghia-bodied Turbine for the consumer test program.

also made substantial improvements in turbine engine metallurgy. Instead of exotic materials used in jet aircraft gas turbine engines that would not be cost-effective for series automotive production, lower-cost materials were substituted for the combustion chamber liners, turbine wheels, and blades. The major public relations exposure of the second-generation engine came in December 1958, when a Plymouth Turbine Special embarked on a 576-mile test run from Detroit to New York City.

THIRD GENERATION 1961-1963

The next step in Chrysler's Turbine Car program was the CR2A third-generation engine. It incorporated a major innovation, a variable nozzle mechanism acting as a shutter that provided engine braking. This also improved efficiency and fuel economy while reducing throttle lag (similar to what was found on early turbocharged conventional engines) that had plagued the program from its inception. The first car in the third-gen program was the Turboflite concept car exhibited at major auto shows in New York City; Chicago; London, England; and Paris, France, in 1961. The second vehicle was a gas-turbine-powered 1960 Plymouth four-door hardtop.

And the last was a turbine-powered heavy-duty 1960 Dodge truck. All were powered by versions of the CR2A gas turbine engine. Next, the CR2A was installed in a 1962 Dodge Dart. Dubbed the Dodge Turbo Dart, it embarked on a four-day cross-country run that com-

PROMOTING AND MARKETING THE CHRYSLER TURBINE CAR

Whenever one talks about Chrysler's jet-age turbine car, one can't ignore the impact of the test program that built 50 of the 55 cars (five were used by Chrysler for promotional purpose, such as its display at the 1964-65 New York World Fair).

But 203 lucky families, many of whom owned Chrysler, DeSoto, Dodge, or Plymouth vehicles, got to participate in what was up until that time, the broadest consumer test program for a vehicle not in series production. Once selected, the family was responsible only for gas and oil. Everything else, like maintenance and insurance, was covered by Chrysler. Each family was assigned a representative from Chrysler. Think of it as the precursor of today's luxury-car after-sale service programs.


CHRYSLER CORPORATION PRESENTS

THE WORLD'S MOST REVOLUTIONARY NEW CAR

THE CHRYSLER TURBINE CAR

Chrysler's Turbine car represents a completely new idea in passenger cars. It is the result of a decade of intensive engineering research and development. Contemporarily and individually styled, this car was designed to suit the ordinary motorist. Its controls and instruments are the same as those in any conventional car. The real difference lies under the hood, where the turbine engine supplies vibrationless power immediately. It is light and compact with only a fraction of the parts of a piston engine. There is just one spark plug. No pistons. No cylinders. Only a fifth the moving parts of a conventional engine.

WHY SHOW THE WORLD'S MOST EXCITING CAR WHEN PEOPLE STILL CAN'T BUY IT? Because everyone likes a glimpse of the future. Particularly a glimpse of the automotive future. Call it a preview. Call it pride on the part of Chrysler. Personable pride, for Chrysler's engineers have solved the many problems associated with turbine power (noise, engine size and excessive heat), so that what you are looking at today is the perfect prototype of what you may be driving tomorrow. It starts instantly at subzero. No warm-up is necessary. Engine stays cool in the tropics. And its exhaust is cooler than from present cars—and cleaner. In short, Chrysler's Turbine announces a new era to the motoring world.

CHRYSLER TURBINE WORLD TOUR. Chrysler's revolutionary Turbine car was shown to the public for the first time in New York City in May 1960. Starting in Geneva, September 12, 1961, the Turbine made a world-wide tour covering five Continents with demonstrations in 20 major cities from Tokyo to Mexico D.F. It was transported by airlift over 47000 miles, making this project the largest single aircraft charter ever undertaken. Illustrations of this history-making 5 months world tour are on the following pages. A tour which gave a brilliant demonstration of Chrysler engineering leadership. The same leadership that developed the outstanding 1964 Plymouth, Valiant, Dodge, Dart, Chrysler and Imperial from Chrysler Corporation.

WHY BE AN AUTOMOBILE PIONEER? You might say it's in Chrysler's blood! Since 1924, Chrysler has had a long, successful history of creating new automotive improvements. In 1930, Chrysler introduced the first all-steel bodies. In 1934, automatic gearboxes. In 1951, hemispherical combustion chambers. In 1956, push-button control for automatic transmissions. In 1960, alternators which charge the battery at low engine speeds. So it isn't surprising that Chrysler Corporation should have developed the Turbine car, perhaps the most significant development in automotive engineering since the internal combustion engine.

CHRYSLER INTERNATIONAL

Jo-Han, a company that produced a variety of 1/25th scale models, produced three Chrysler Turbine Car variants. They included a friction toy as well as a promotional model that was given away at dealerships. But what was most noteworthy was Jo-Han's model kit. It was, at the time, the most complex and most expensive assembly kit. I know as it took me three kits to finally build one successfully.


What has 1 spark plug?
No pistons. No cylinders.
And runs on a
wide variety of fuels.

The Chrysler Corporation experimental Turbine Car. Only a few years ago, this stage in turbine car development seemed far away in a distant future.

It seemed, that for every potential advantage of a turbine-powered car, there was a very real disadvantage. But Chrysler engineering solved the problems one by one.

Chrysler metallurgists developed new low-cost alloys to handle the engine's "hot temper." Chrysler engineers designed a car that performs as well or better than a conventional car with comparable horsepower.

This car runs on diesel fuel, kerosene, white gas, or any mixture of them. It starts instantly even at sub-zero. No warm-up needed.

It has only about a fifth the moving parts of a piston engine. There is virtually no friction or vibration.

The exhaust is cooler and cleaner. And the sound of the engine is the most exciting new sound in travel.

Only 50 of these cars are being built as part of a public evaluation program. One of these days you may see our Turbine Car coming down the road. Watch for it. Listen for it.

Plymouth • Chrysler • Imperial • Dodge

CHRYSLER CORPORATION

The consumer advertisement above touted the low-maintenance aspect of a turbine car, that it has only one spark plug, reqired no anti-freeze coolant, and could run on just about anything that would burn, from low-octane jet fuel to distilled spirits.

Here are some of the statistics of the program. More than one million miles driven by the 203 families with an average fleet fuel economy of around 13 miles per gallon. That was about on par for a contemporary mid-sized domestic two-door hardtop powered by a small-block V-8. In Chrysler's case in 1963, that would have been a 318-cubic-inch V-8-powered Dodge Dart or Plymouth Fury. In addition to the domestic consumer program, several of the cars used by Chrysler for promotional purposes, beyond those serving duty at the New York's World's Fair participated in an around-the-world tour. It was obvious that Chrysler was giving serious consideration bringing turbine-powered cars to market, likely before the end of the 1960s. The advertisement at the left was used by Chrysler International in support of the 21-countries program.

menced in New York City on December 27, 1961, and arrived in Los Angeles on New Year's Eve.

Fuel economy was better than a conventionally powered Dodge that made the trip in tandem with the Turbo Dart. The Turbo Dart was joined by a 1962 Plymouth Turbo Fury, and together the twins toured major auto shows in Los Angeles and more than 80 other U.S. cities. Another Turbo Dart and Turbo Fury were added to the Turbine Car test fleet, allowing Chrysler to expand its promotional efforts to reach hundreds of thousands of potential customers.

FOURTH GENERATION 1962-1966

The Ghia-bodied Chrysler Turbine Car was powered by Chrysler's fourth-generation gas turbine engine. Producing 130 horsepower, it was the most efficient Chrysler gas turbine engine yet. Spinning at 44,500 revolutions per minute, this version could burn diesel fuel, unleaded gasoline (in very limited availability back in 1963), kerosene, JP-4 jet fuel (available at general aviation facilities), even vegetable oil. The president of Mexico ran a Chrysler Turbine Car on tequila. Best of all, no adjustment was required when changing fuels. Think of the Chrysler Turbine Car as being the first flex-fuel vehicle. With this advanced and refined drivetrain, the Turbine Car would sprint from zero to 60 miles per hour in 12 seconds, similar to a small-block-powered (318 cubic inch) Dodge Dart or Plymouth Fury. While that doesn't

Even the hub caps carry through the turbine design motif.

The fourth-generation Chrysler turbine engine looks something like a small nuclear reactor but produces 130 horsepower.

sound fast today, it was competitive with other similarly sized cars with small V-8 engines.

The exhaust did not produce measurable carbon monoxide or raw hydrocarbons, but it produced high levels of nitrogen oxides. Going forward, this issue would bedevil the program as increasingly stringent emission standards were introduced in the early 1970s. The Chrysler Turbine Cars were equipped with a slightly modified version of Chrysler's TorqueFlite automatic transmission, but because of the engine's design, it didn't require a torque converter but instead used a gear-reduction system. At the end of the program, more than one million miles in total, all, except for five cars that were donated to museums, were crushed. This was due to import duties that would have been assessed on their Italian-built Ghia bodies.

FIFTH, SIXTH, AND SEVENTH GENERATION 1966-1979

Following the conclusion of the Chrysler Turbine loaner-car program, which at the time was considered an unqualified success, Chrysler continued gas turbine engine development. Next up was a turbine-powered concept car that was a precursor to the fastback, mid-size 1966 Dodge Charger. A sixth-generation engine finally solved the nitrogen oxide issue and was installed in a 1966 Dodge Coronet. A lighter, even more efficient seventh-generation gas turbine engine was produced in the early 1970s when Chrysler received a grant from the Environmental Protection Agency. The next application was to install an updated ver-

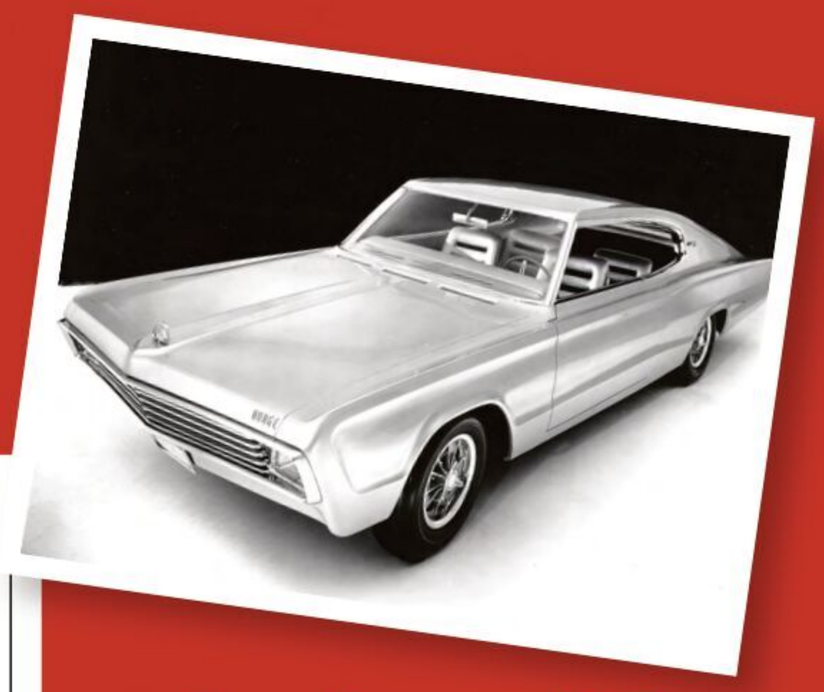
At a dedicated facility in Highland Park, Michigan, the turbine engines and driveline components, such as a modified TorqueFlite three-speed automatic transmission, were installed in the Ghia-built bodies that had been shipped from Turin, Italy (in much the same way as the Cadillac Allanté was assembled, more than 20 years later).

sion into a specially bodied 1977 Chrysler LeBaron coupe. But by this time Chrysler had become mired in another financial crisis, requiring U.S. government loan guarantees to avoid bankruptcy. One stipulation of the loan was to abandon its gas turbine engine program, with the thinking being that Chrysler needed to spend its resources on mainstream cars like the ubiquitous K-car.

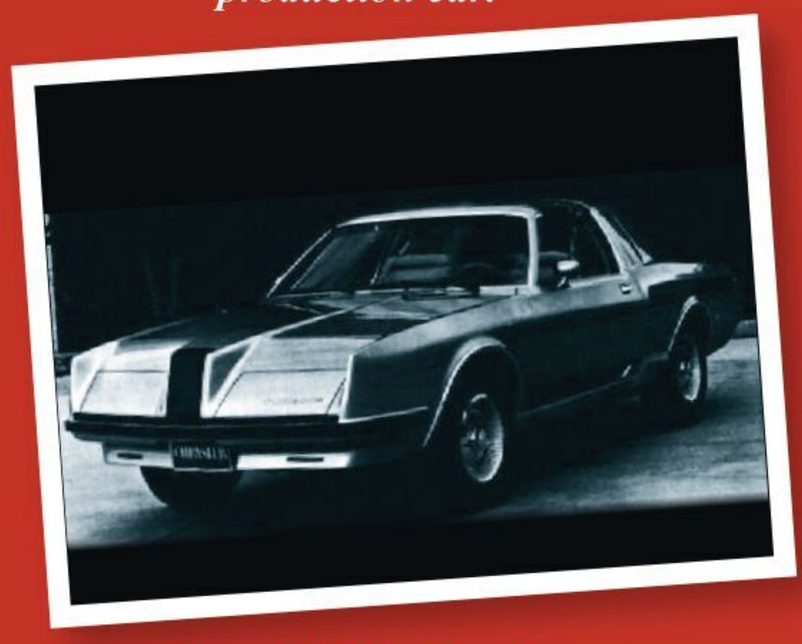
While Chrysler's work with turbine engines never resulted in a true production gas-turbine-powered car, its legacy lives on. Defense contractor Honeywell

THE LIVELY SET

In 1964, as part of its continuing efforts to promote the idea of turbine-powered passenger cars, Chrysler provided one of its turbine cars to Universal Studios. This resulted in car-culture cult classic, **The Lively Set.** ***This movie starred teen idol James Darren, the beautiful Pamela Tiffin, Doug McClure, singer Joanie Sommers, and a host of real-life racing stars including Mickey Thompson. Darren stars as a Craig Breedlove-like car designer/racer. After a failed attempt at a Bonneville, built in his father's automotive shop, a car that looks suspiciously like a Chrysler Turbine Car, albeit painted white (the only one of the 55 built not painted Turbine Bronze). The highlight of the movie is a race through Death Valley (something that could never happen today). Although there has never been a commercially-authorized release sanctioned by Universal, a DVD is available from a small specialty producer of rock and roll videos: thevideobeat.com ($20).***



The turbine-powered 1965 Dodge Turbo II concept car that served as a preview for the styling of the conventionally powered 1966 Dodge Charger production car.



The end of the line for Chrsler's turbine program, the Le Baron-based 1977 Turbine concept produced for the U.S. Department of Energy.

Do you want to know more about TURBINE CAR? Look at:

continued the development of larger gas turbine engines. Its AGR1500 gas turbine engine was ultimately installed in the Abrams M1 Battle Tank developed by Chrysler's Defense Division that was ultimately sold to General Dynamics. In the First Gulf War, the Abrams M1 Battle Tank was instrumental in the overwhelming defeat of the Iraqi Army in just 100 hours. ♦

Thanks for the cooperation of **Mark Olson**. Make sure to check out his site, turbinecar.com.

AMERICAN ELECTRICS AND HYBRIDS
FROM THE 1950s TO THE 1980s

GOING NOT SO FAR

The Briggs-Stratton experimental vehicle has recently been taken out of hibernation by Jay Leno.

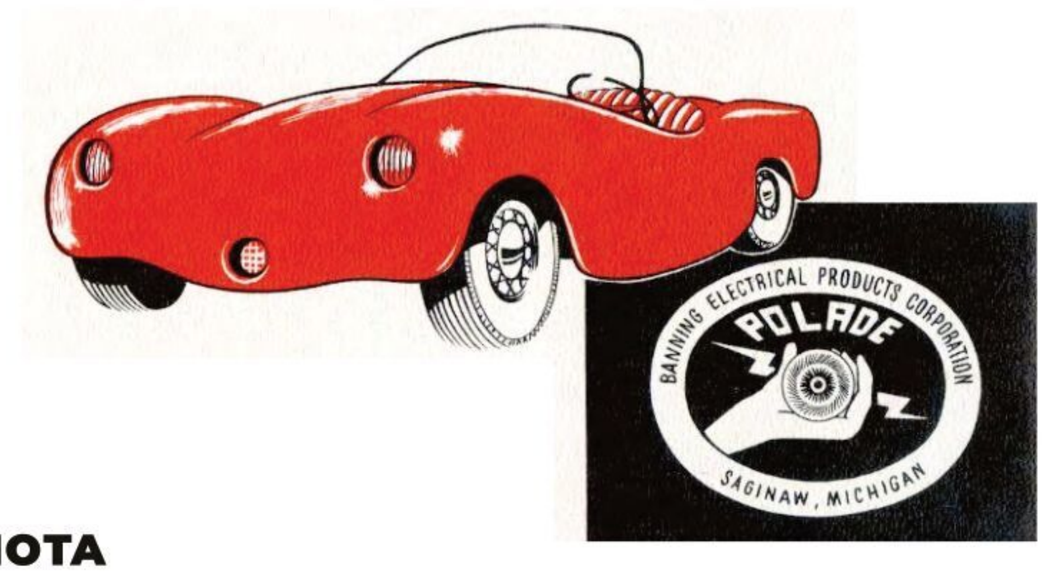
SOURCE: NBC

Between the 1930s, when electric vehicles went out of fashion, and 1990, when General Motors introduced its Impact concept car, there were a lot of efforts directed at developing an affordable electric.

Dr. Pál Négyesi takes stock.

Starting in 1930, Detroit Electric, the best-known and longest-lived American electric-vehicle company, only produced such cars for custom orders. Smaller companies still offered delivery vehicles, but it seemed the greater flexibility and efficiency of the internal-combustion engine and the lack of a suitable battery spelled the end of electric vehicles in North America.

A new breed of electric autos emerged after World War II. Many independent manufacturers tried their hand at building an electric that could operate cheaply and travel farther on a charge. But the battery weight and a range that was still lacking remained problems.



MOTA

In 1953 New York-based Gerald Banning, a "correspondence-school-trained electrical engineer," showcased a concept car called Mota, powered by Polade – "the magnetic force of the universe." The brochure to accompany the exhibition explained that the Mota is "motivated by the magnetic forces which produce the speed of light." The brochure makes clear that magnetism (as in a Maglev – magnetic levitation train – for instance), by reducing friction, can make a vehicle highly efficient. "Reducing motive force to its simplest and most basic form, the MOTA engineering formula of Polade Power propulsion eliminates scores of working parts required by cars of standard design." However, reading the fine print, we realize that the motor, mounted just above the rear wheels, is driven by an economical air-cooled gasoline engine/alternator combination that converts passive energy to positive energy at the wheels with the additional traction and acceleration of the increased torque. Though the Mota used the fiberglass shell of a Glasspar sports car, it was still very heavy – it weighed around two tons. After a show appearance, the car disappeared.

Nu-Klea caption: Kish Industries even produced a brochure for the Nu-Klea Starlite.

NU-KLEA STARLITE

In 1960, a report in Industrial and Engineering Chemistry magazine claimed that "12 U.S. manufacturers are said to be considering production of electric cars and trucks in the near future. Most promising prospect seems to be the Nu-Klea, a modern, stylish battery-powered auto …The Nu-Klea is designed to be the 'second car' in a modern household (just the thing for shopping, chauffeuring kids, going to the hairdresser)." The Nu-Klea Starlite was developed by Kish Industries, a tooling supplier in Michigan. In 1961 a letter was sent to potential customers claiming a price of $3,950 without a radio or a heater, promising "a well-designed body and chassis using lead-acid batteries to supply the motive energy, a serviceable range of 40 miles (about 64 km), with speeds on the order of 40 miles an hour." Nu-Klea never managed to make good on its promise.

BRIGGS & STRATTON HYBRID

Briggs & Stratton is best known for making lawnmower engines. In the 1920s they built a very simple two-seater vehicle called the Flyer. More than half a century later, the company returned to the field and built a one-off six-wheeled hybrid to prove that the company's engines could power a car on a highway. Work on the car began in 1978 and was completed in 1980. The car is powered by a 688-cc opposed-twin from Briggs & Stratton, making just 18 horsepower, and an electric drive motor. Transmission, suspension pieces, and the steering rack were sourced from a Ford Pinto. Doors, dashboard, and windshield came from a Volkswagen Scirocco. Due to the weight of the lead-acid batteries, the car has two rear axles.

The car has been in the company's museum since 1988 but came back to the limelight in 2020 when Jay Leno featured it on his Jay Leno's Garage series.

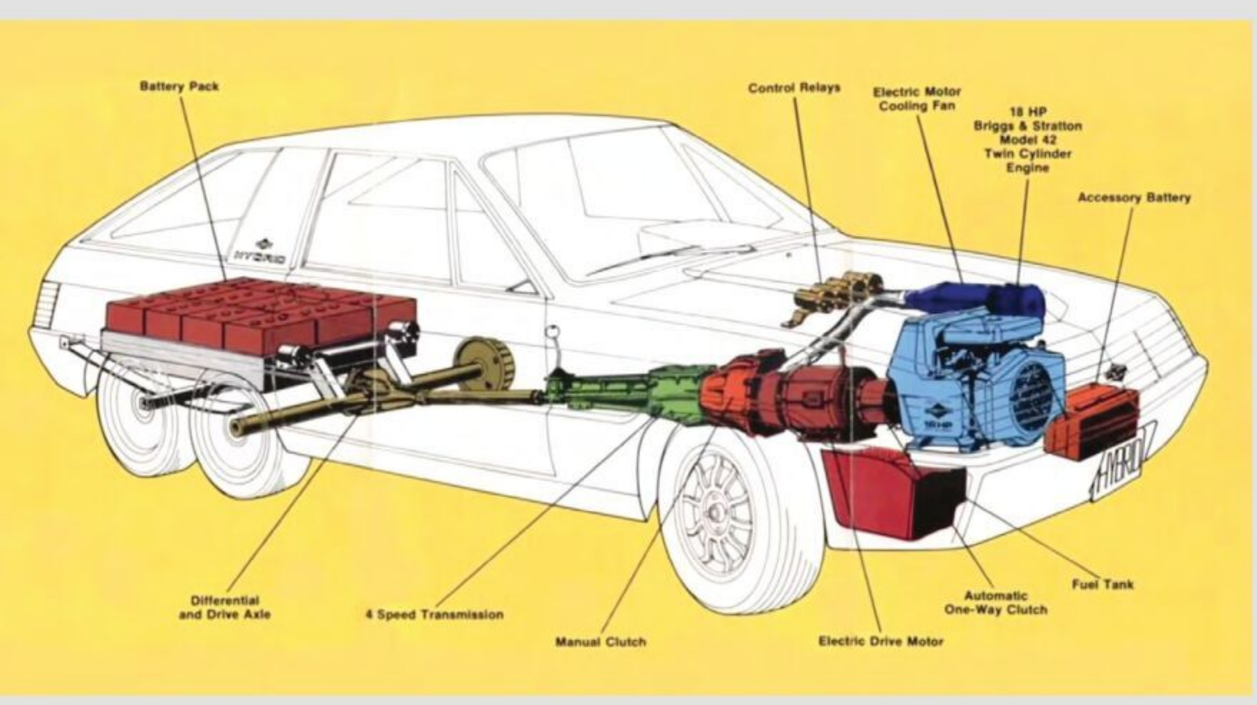
HENNEY KILOWATT

The late 1950s saw an influx of small imported cars like the VW Beetle and Renault Dauphine into the U.S., and the directors of National Union Electric Company, which produced Exide batteries, thought an electrically powered Dauphine would be a perfect vehicle to promote these. Victor Wouk, who had a Ph.D. in electrical engineering from CalTech, was commissioned to develop the car. Another subsidiary, Henney, a coachbuilder, was contracted to build it. The car, called the Kilowatt, had a 7-horsepower electric motor and was originally powered in 1959 by six 6-volt lead-acid batteries wired in series for a total of 36 volts. There was no gearbox, just a forward-reverse switch sitting between two electrical meters on the dashboard. Priced at $3,600, it was about double the cost of a regular Dauphine. It had an advertised range of 40 miles with a top speed of 35 mph. About 43-47 cars were completed.

At its debut in 1960 the Henney Kilowatt was presented alongside a 1923 Detroit Electric and a golf cart.

The Henney was exclusively sold to the utility industry.

The Briggs-Stratton was a parallel hybrid, which could run solely on the gas engine, the electric motor, or a combination of both.



The last attempt by Battronic in the 1980s was to convert Volkswagen Golf cars to electric.

BATTRONIC

Boyertown Auto Body Works, a coachbuilder in Boyertown, Pennsylvania, entered into a partnership with Smith Delivery Vehicles, Ltd., of Gateshead-on-Tyne, Gateshead, England, and the Exide Division of the Electric Storage Battery Co. of Philadelphia, Pennsylvania, to produce an electric-powered route delivery truck. At that time Smith was the world's leader in electric vehicles. The new company was organized as the Battronic Truck Corporation: "Bat" for battery-powered, "tronic" for its electronic power delivery system. Exide's parent company had been a pioneer in motor vehicle storage batteries, and Smith was a pioneer in the production of electric route delivery vehicles. Boyertown's contribution was its high-strength, corrosion-resistant "Multalloy" body. Early Battronics had a top speed of 25 mph and could carry a 2,500-pound payload up to 62 miles (later 75) on a single charge.

Things got off to a slow start, and in 1966 Smith withdrew from the partnership, followed by Exide in 1969. Afterward the company utilized the engineering services of General Electric to help manufacture the complex electrical systems. Between 1963 and 1983, the Battronic Corp. produced approximately 175 vans, 20 passenger buses (available for 11, 15, or 25 passengers), and at least one pickup truck called the Volta. In the 1980s the company also offered a conversion of the Volkswagen Golf before eventually folding in 1990.

Battronics' first products were electric utility trucks with corrosion-resistant "Multalloy" bodies.

SOURCE: FREE LIBRARY OF PHILADELPHIA

SOURCE: BOYERTOWN MUSEUM OF HISTORIC VEHICLES.

Robert R. Aronson with one of the experimental Silver Volts.

ROBERT R. ARONSON

Robert R. Aronson (1923–2020) dedicated his life to the electric car and produced more than 100 different models, beginning with the Mars I in 1966. Aronson had a battery plant in New Orleans in the 1960s. "In doing some research work for the Army ordnance and in developing special batteries for the General Services Administration, we discovered a rather unique characteristic in a battery that was constructed entirely differently from any other battery that we had knowledge of. The plates in this tripolar lead-cobalt are connected electrically and mechanically to one another in three places. Each group of plates within the cell, the negative group and the positive group are, therefore connected by three bus bars or current collectors. The normal resistance to the flow of electrons, or to recharging or discharging of the batteries, is thereby cut to one-third of what it is in ordinary lead-acid batteries. Therefore, the batteries are capable of very high charging or discharging currents," explained Aronson later.

He set up the Electric Fuel Propulsion, Inc., in Ferndale, Michigan, and got to work on a car using the new type of battery. Following the Mars I prototype, the Mars II was made between 1967 and 1968 in 45 copies. It used a Renault 10 base and was used by public fleets such as the Los Angeles Water Department and the electric companies of Wisconsin, Pennsylvania, and Illinois. Its general use was hindered by the lack of recharging points. But a Mars II managed to go without notable problems from Detroit to Phoenix to attend the first international congress of the Electric Vehicle Council on November 7, 1969. The Mars II had a range of 110 km thanks to its lead and cobalt batteries, which raised the weight of the vehicle from 775 kilos to 1651 kg!

Aronson set up "World's First Electric Car Expressway" between Detroit and Chicago, a distance of about 300 miles (483 km), in 1969 with six 50-kW charging stations that were located at Holiday Inn hotels near the highway. Additional charging stations were planned.

At the same time EFP produced 12 Mars Van delivery vehicles, using a DAF Kalmar shell from Sweden.

Between 1971 and 1974, EFP built several experimental electrics based on AMC shells, such as the Electrosport. This was a combination of an American Motors Hornet shell and an electric motor borrowed from a forklift truck with a range of 70 miles (112 km) and a maximum speed of 65 mph (100 km/h) with a price tag of U.S. $11,900. Just for comparison: a Chevrolet Corvette had a sticker price of U.S. $5,496!

When the supply of AMC bodies dried up, Aronson turned to General Motors. Thus came the Transformer 1 using a Chevy Chevelle body, which was shown at the Los Angeles Auto Show in 1977. Yehudi Menuhin, the world famous violinist, became the first customer.

In 1978, the Silver Volt was designed to showcase Aronsson's advanced battery technology, utilizing a GM A-body. Two years later a subsidiary called Electric Auto Corporation (Bahamas) Ltd. assembled a dozen of these cars in Freeport before moving the operation to Florida. There were ongoing road tests and demonstration projects in the ensuing years, but eventually EAC also collapsed. Aronson spent the next few years defending himself in U.S. Tax Court and in the end came out victorious; however, he had lost all of the momentum that had been built up since the mid-1960s. He tried to revive his company in 2001 as Apollo Energy Systems without success.

The Silver Volt was Aronson's most ambitious project, which eventually caused his downfall.

The AMC Hornet-based Electrosport was offered for US$11,900 but there were no takers.

SOURCE: FACEBOOK

Tom Woods Wisconsin Electric Power took delivery of this Mars II in January 1968 in Michigan, then drove it to Milwaukee, Wisconsin.

The DAF Kalmar-based electric delivery van remained a one-off.

The EFP Mars II after a lengthy journey.

SOURCE: FREE LIBRARY OF PHILADELPHIA

In a strange turn of events, a Marathon C-300 was shipped to the Csepel truck factory in Hungary for inspection!

SOURCE: FORTEPAN

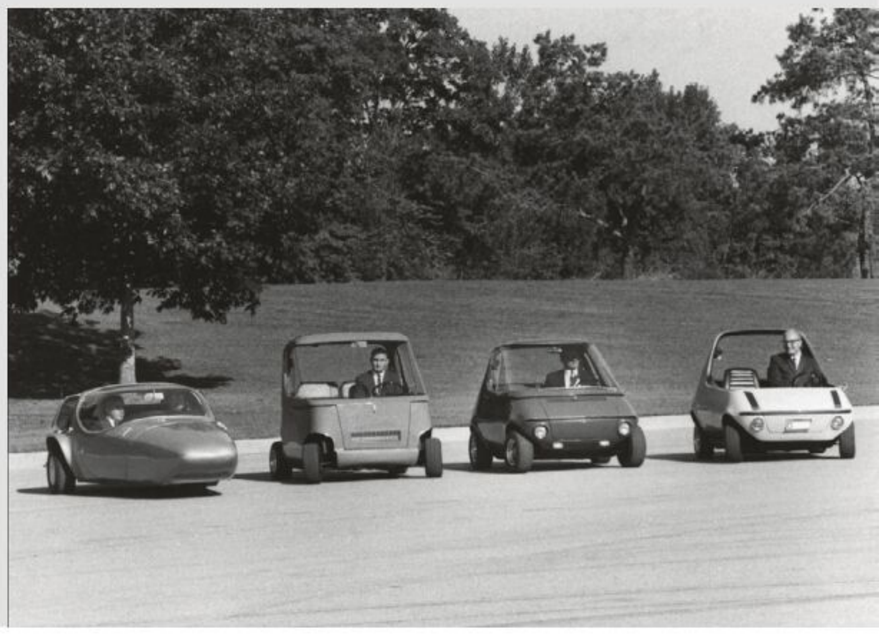
MARATHON

There were electric vehicle pioneers in Canada as well! Marathon Electric Car Co. in Montreal, Quebec, produced a series of electric golf carts and small industrial vehicles before entering the on-road electric vehicle market in the 1970s. While most production occurred in Montreal, a second manufacturing facility was established in South Carolina to service the expected demand in the U.S. Marathon supplied an electric-powered television camera platform for the Olympic marathon race at the 1976 Summer Olympic Games, held in Montreal.

Their main model, the C-300, was cobbled together with parts from other manufacturers. Reaching a top speed of 60 kilometers per hour, this four-speed EV could travel about 50 km between charges. It had a dozen six-volt batteries in the back, taking eight to 10 hours to recharge, and ran on a Baldor 8-hp DC electric motor. It could go from 0 to 25 km/h in five seconds and to 50 km/h in 20 seconds. The company also made a six-wheel electric van named the C-360. It had a slightly longer range due to its four extra batteries and could reach a top speed of 69 km/h. The Marathon Electric Car Company sold over 600 battery-powered vehicles by 1978 but closed its doors in 1980.

1966 GM Electrovan is credited with being the first hydrogen fuel cell car ever produced.

In 1969 GM developed several different future mobility concepts, including the XP-512 city cars, which were presented in electric, gasoline, and hybrid versions.



Titan Inc in California offered plans for electric cars, tricycles and bicycles.

Mike Corbin built and piloted the first electric motorcycle to set a record over 100 mph (160 km/h) on the Bonneville Salt Flats in 1972. In the mid-1970s he offered electric conversions for the Volkswagen Beetle.

SOURCE: FREE LIBRARY OF PHILADELPHIA

GENERAL MOTORS

The 1966 GM Electrovan is credited with being the first hydrogen fuel-cell car ever produced. Though fuel cells have been around since the early 1800s, General Motors was the first to use a fuel cell to power the wheels of a vehicle. The GM Electrovan was the brainchild of Dr. Craig Marks, who headed up most of General Motors' advanced engineering projects. Marks, along with a staff of 250, developed the Electrovan for over two years before attaining a drivable vehicle. NASA had previously used fuel cells to power onboard systems in their Gemini spacecraft. Those hydrogen fuel cells produced water as a byproduct, which the astronauts were then able to drink. The GM Electrovan used a fuel cell produced by Union Carbide, which was fueled by both super-cooled liquid hydrogen and liquid oxygen. This enabled the GM Electrovan to achieve top speeds between 63 and 70 mph (105 to 112 km/h). The Electrovan also had a range of 120 miles (193 km). After the GM Electrovan was built, tested, and shown off to journalists in 1966, the project was scrapped largely because it was cost-prohibitive.

SOURCE: AUTOHISTORIAN

KARL KORDESCH

Karl Kordesch (1922–2011) was a contemporary of Robert Aronson's. He is recognized as a pioneer of battery and fuel-cell technology. Through his invention of the alkaline primary battery cell, work with rechargeable batteries, and development of fuel cell/battery hybrid vehicle systems, Karl Kordesch contributed greatly to the reduction of energy waste and the global use of compact, portable energy sources.

Kordesch was born in Austria. He graduated in 1948 with a doctorate in chemistry and worked as a university assistant at the University of Vienna. In 1953, Karl accepted a position with the U.S. Army Signal Corps, an Office of Strategic Services program designed to supplement American scientific research with Axis personnel in exchange for U.S. citizenship and other benefits. He moved to the United States, where he joined Union Carbide Corp. in 1955. There, he developed the manganese dioxide-zinc primary cell, which became the leading consumer battery worldwide. He also worked extensively with fuel cells, contributing new technology to the Apollo space missions. Kordesch spent most of his Union Carbide years improving rechargeable batteries for electric vehicles and promoting prototypes.

In 1970 he privately built a fuel cell/battery hybrid vehicle based on the Austin A40 and used it for his personal transportation on public roads for three years.

In 1986, Kordesch co-founded Battery Technologies Inc. in Toronto and kept working on rechargeable batteries, hoping to avoid the waste of disposable ones.

SOURCE: OREGON STATE UNIV. SPECIAL COLLECTIONS / ARCHIVES RESEARCH CENTER, CORVALLIS, OREGON

For years Kordesch used his Austin A40 as a fuel-cell hybrid.

In 1967, Karl Kordesch built a hybrid motorcycle with hydrazine as the fuel.

CITICAR

One of the best-selling electrics was the CitiCar, built from 1974 to 1976 by the Sebring-Vanguard Company in Sebring, Florida. Basically a golf cart with horn, lights, turn signals, and wipers, the CitiCar featured an enclosed cabin with optional heater and radio, and rather tight accommodations for two. The CitiCar was succeeded by the Comuta-car, an identically styled two-seater.

The CitiCar made by Sebring-Vanguard was a battery powered, 2-passenger runabout that for a short time captured the imagination of fuel crisis-hit America.

JET INDUSTRIES ELECTRAVAN

Operating in Austin, Texas, in the late 1970s and early 1980s, Jet Industries was known primarily for the conversion of a variety of vehicles to electric power, which were then marketed under their own name with new model names. They are believed to have produced several hundred conversions in total. Their primary markets were universities, utilities, and other urban situations that wished to appear to be more environmentally friendly. The Jet 600 ElectraVan is a converted Subaru 600 minivan. At least 100 were produced.

Jet Industries electrified the Subaru minivan.

AMECTRAN

Edmund Xavier Ramirez (1936-) set up his Amectran Corp. in 1973. The abbreviation stands for "American Ecological Transportation." His vision was an innovative luxury coupe with an electric drivetrain: "A totally new concept in automotive design that embodies advanced construction, safety and electronic power systems that deliver the most economical transportation in automotive history." The vehicle should also be intelligent through an onboard computer, as well as being virtually maintenance-free. The bold claims were to be supported by a body styled in Europe. After years of development work, Ramirez turned to the then 66-year-old Italian designer Pietro Frua in Turin. Frua used the wedge-shaped design and the wooden buck of his 1975 BMW 3.0 Si Coupe and built the modified sheet-steel body for the prototype of the electric two-door, four-seater fastback coupé on the floor assembly of a BMW E3 sedan in a very short time.

The prototype, called Exar-1, had a 27-horsepower motor from General Electric that transmitted power to the rear wheels via a four-speed manual-select automatic transmission. The electric motor was powered by 24 6-volt lead-acid batteries, which were stowed under the front bonnet and behind the rear seats. They could be recharged by using a common 110-volt or 220-volt AC outlet.

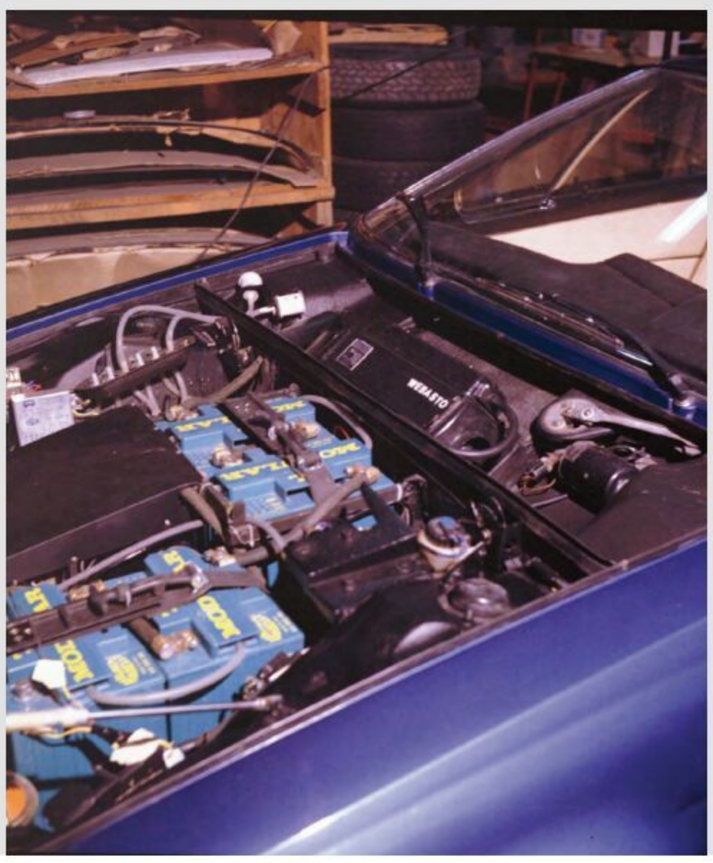
The top speed of the two-ton prototype was given as 137 km/h, and thanks to regenerative braking a target range of 120 to 160 kilometers was promised. However, there were no independent test reports of the Frua prototype. In the four-page color brochure with the slogan "Anything Else is Obsolete," the car was announced with a "vacuum-formed Acrylic/Kevlar body with multi-tubular 4130 Chrome/Alloy steel frame" and a weight of 1,360 kg. The purchase price was quoted at U.S. $7,800.

The car was shown in several European cities (Rome, Monte-Carlo, Paris, London) in 1980 and, after its transfer to the United States, was shown at the 73rd Chicago Auto Show in February 1981. But despite a reported 22,000 pre-orders (with a corresponding number of U.S. $1,000), series production never took place. In 1996, the prototype was seized by the government. After several court cases, Ramirez was finally sentenced to eight and a half years in prison and fined $1.3 million for defrauding his investors. Ramirez, on the other hand, saw himself as a victim of the government and said in 2007: "Certain government agencies support the EXAR-1 while others, with interests in gasoline automobiles and oil, opposed it." Today the gutted body of the Amectran Exar-1 still exists without its drivetrain and onboard computer.

STEFAN DIERKES

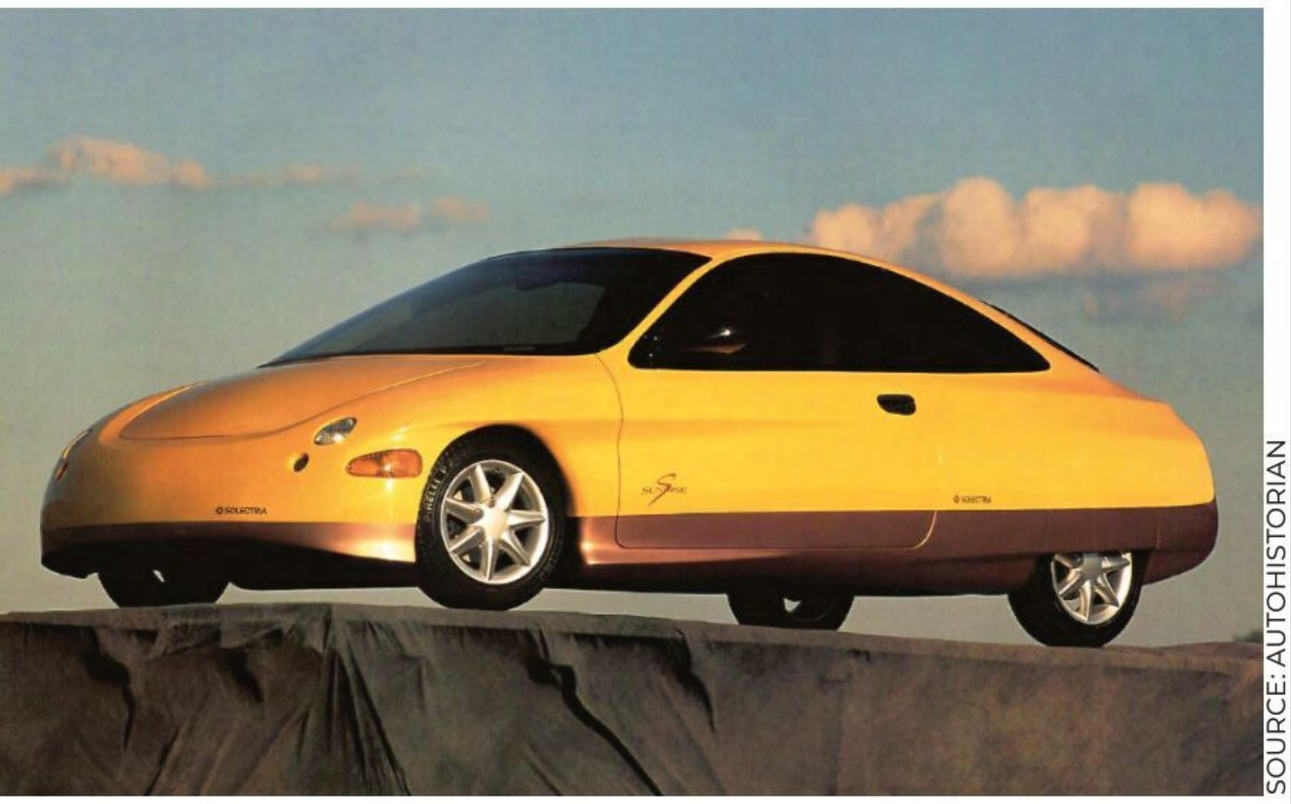
SOURCE: PIETRO-FRUA.DE

Pietro Frua built the EXAR-1 prototype on the basis of a BMW E3 sedan.



The engine compartment featured a General Electric sourced 27-hp motor.

Edmund X Ramirez had very bold plans with the attractive EXAR-1.



SOURCE: AUTOHISTORIAN

Solectria's self-styled Sunrise achieved 375 miles (604 km) on a single charge, during the 1996 American Tour de Sol competition.

SOLECTRIA

James Worden, a graduate of the Massachusetts Institute of Technology, set up Solectria in 1989. In the 1990s, Solectria won the Northeast Sustainable Energy Association's American Tour de Sol rally numerous times. The company's main product was the Force, a Geo Metro–based electric sedan that was capable of top speeds of almost 70 mph (112 km/h) and needed around nine seconds to accelerate from 0 to 50 mph (80 km/h). The range was as high as 80 miles (120 km) at a constant speed of around 45 mph. The Solectria Force also included a regenerative braking system. Around 400 cars were converted and offered as pilot-program cars or sold to regular customers. Worden sold Solectria in 2004, but it continues to work in the new energy field.

Unique Mobility had very prestigious board members, such as Lee Iacocca and Carroll Shelby!

UNIQUE MOBILITY

In 1967, John Gould started the company Unique Mobility. A decade later (!) it unveiled its first ever electric car, the Electrek Uncar. The Electrek sported a 32-horsepower General Electrics motor connected to a Volkswagen Fox four-speed manual transmission. The Electrek was one of the first commercial vehicles to include regenerative braking. The car was powered by 16 6-volt batteries wired in series which ran into a custom motor controller designed specifically for the Electrek.

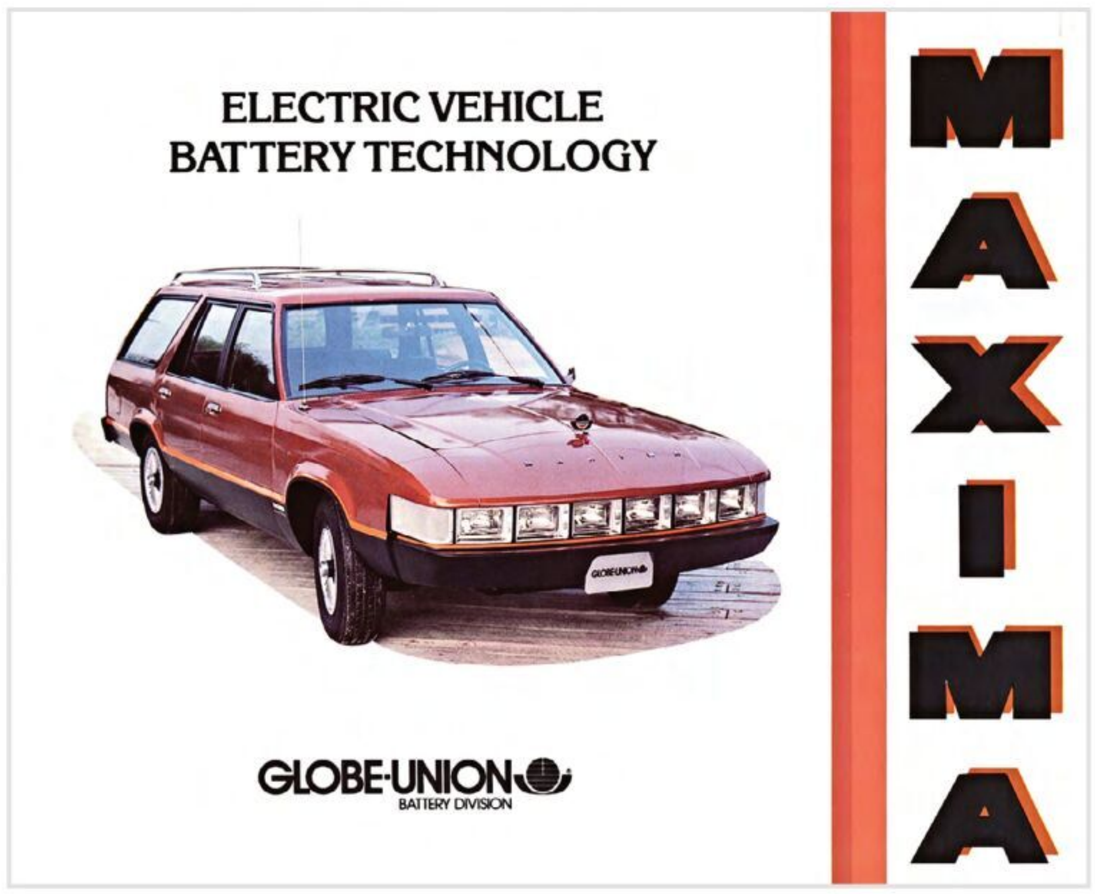
Parts for the Electrek were sourced from many different places. The transmission and suspension came out of a Volkswagen Fox, and the windscreen came from a Chevrolet Monza. The custom fiberglass body was placed on a custom frame. About 35 to 50 units were produced.

LECTRIC LEOPARD

The U.S. Electricar Corporation made electrified versions of the Fiat Strada (Ritmo) and the Renault Le Car (R5) for the U.S. market in 1980–1981. After more than a decade of silence, the company returned with a bang in 1994 announcing a new plant where up to 60 cars a month could have been converted. The plans were overly ambitious, and the company closed down for good a year later.

SOURCE: AUTOHISTORIAN

In 1980 U.S. Electricar offered an electric version of the Renault 5, the Fiat Ritmo and a four-seater sports coupe, called Leopard 960, priced at US 11,995.



Globe Union built a few electric cars to showcase their battery technology.

GLOBE-UNION MAXIMA

At one time Globe Union was the United States' leading battery manufacturer and consequently became involved in experiments with electric cars. The 1979 Maxima was a prototype based on the 1978 Ford Fairmont station wagon, modified by Globe-Union using 20 lead-acid batteries driving a 20-hp G.E. motor.

SOURCES:

- https://www.flickr.com/photos/autohistorian/albums/72157623970921368/with/27162258013/
- https://www.hagerty.com/media/car-profiles/henney-kilowatt-tesla-model-3-ancestor/
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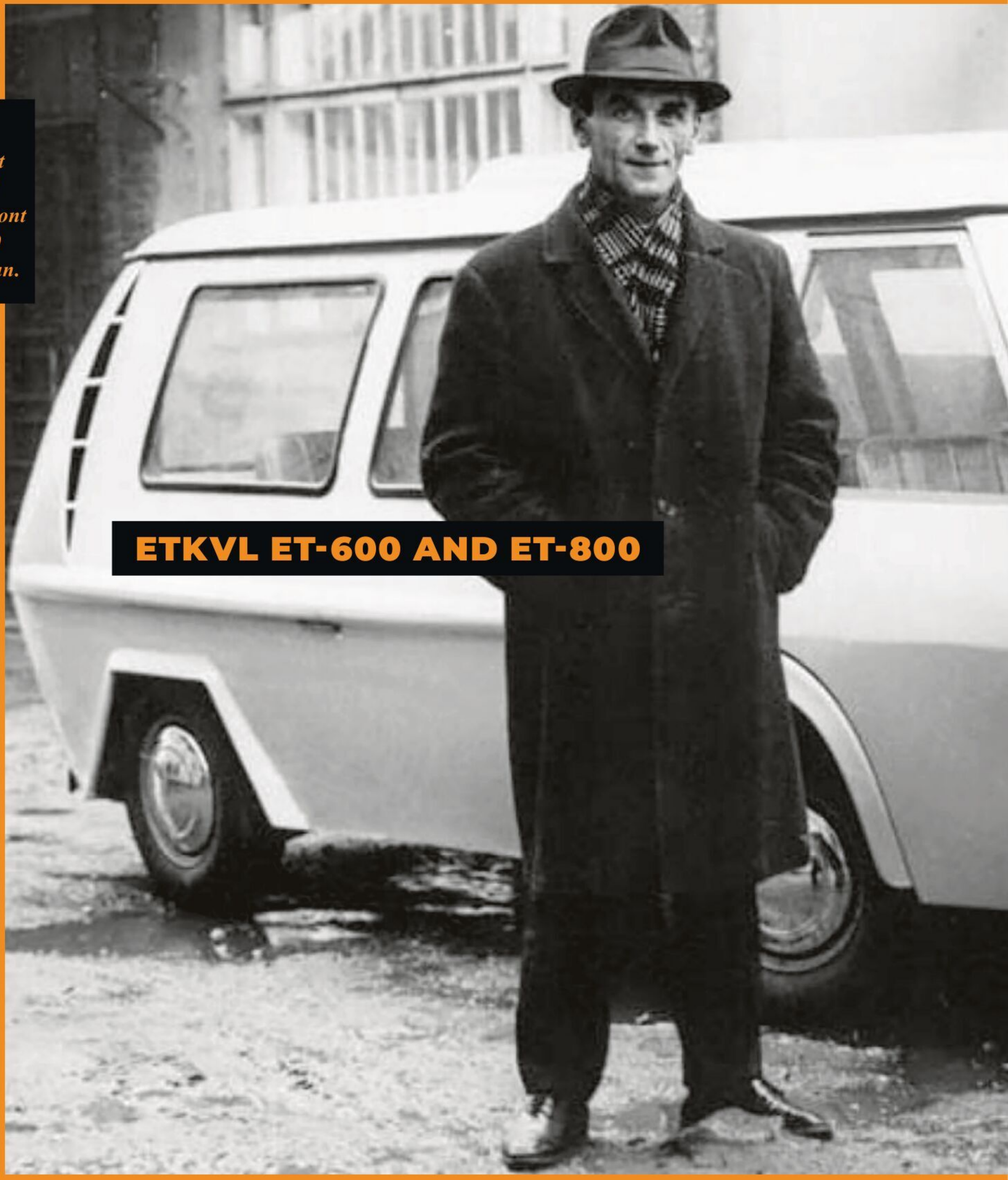
ECSTATIC ESTONIAN

Pitersky, a leading Soviet engineer and Bertelov in front of the ET-800 hybrid minivan.

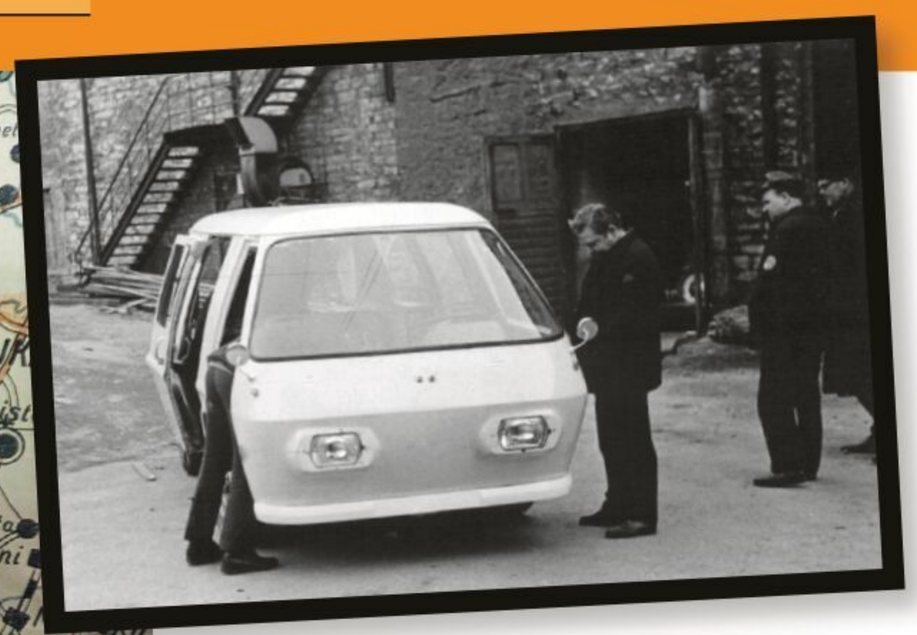


ETKVL ET-600 AND ET-800

While Soviet research institutes and car manufacturers experimented with electric vehicles, Roman Bertelov, a talented engineer in the Estonian administrative subdivision, went many steps further. **Dr. Pál Négyesi** and **Tõnu Ojala** look at plastic-bodied trucks and a hybrid minivan.

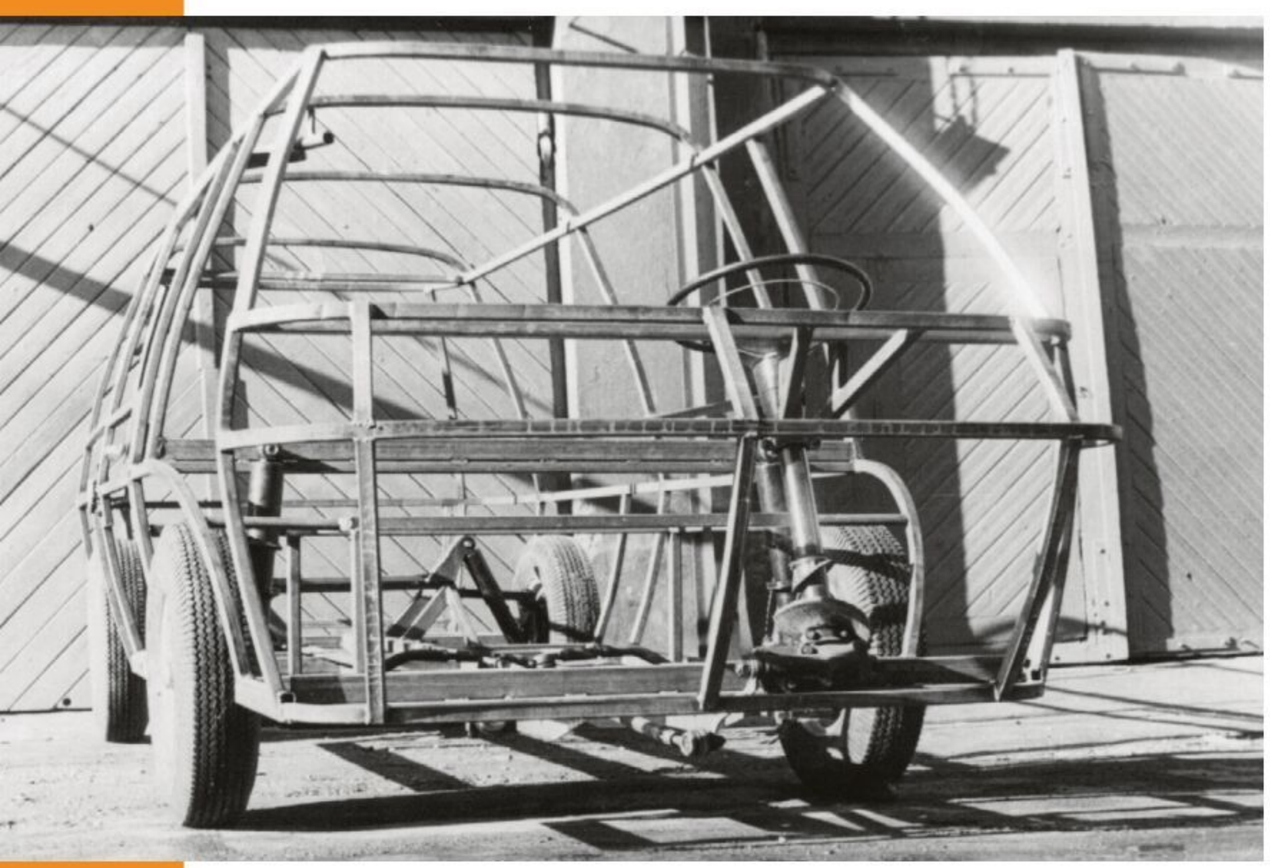
The lineup of ETKVL vehicles featuring plastic-bodied trucks and a minivan.

A survivor is now exhibited in the Estonian Road Museum.

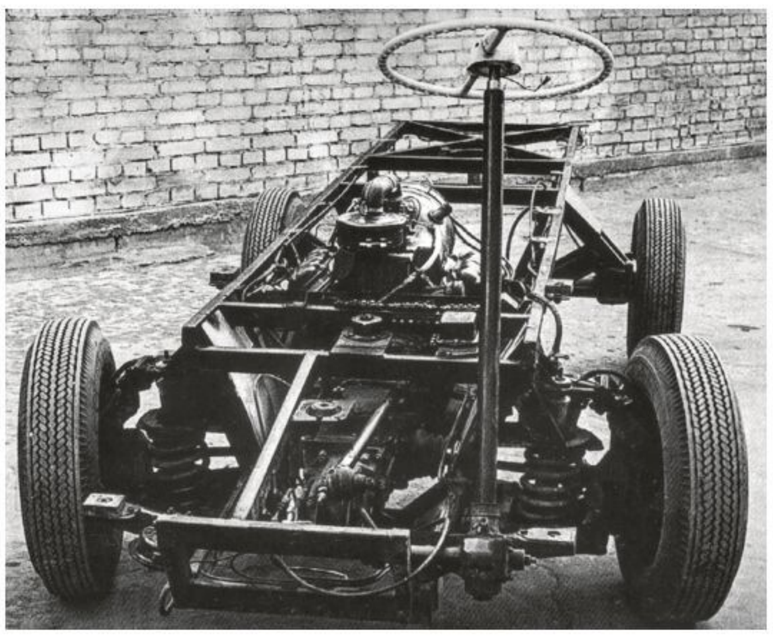


The ET-800 had conventional front doors and sliding rear doors.

The ET-800 was way ahead of its time.



The custom-made chassis of the ET-600.



ETKVL ET-600

In the 1970s, the truck landscape was pretty bleak in the Soviet Union. The bigger GAZ and ZIL trucks, which were joined by the heavy-duty KAMAZ, could not fulfill the requirements of smaller shops and facilities. This segment was covered partly by UAZ; however their preferred customer was the Red Army, so the civilian sector was never properly served.

It was in this environment that Roman Bertelov and his colleague, Dmitri Suigusaar, started thinking about a small, economical pickup. Bertelov, who previously worked on Estonian racing cars, was head of the automobile workshop at ETKVL, the Estonian Republican Union of Consumer Societies, the government-controlled grocery chain in the region. In this capacity, he saw the need for a truck with a payload of 500 to 600 kg. He was also inspired by an article in Inventor and Rationalizer about such cars.

The vehicle, originally called the ET-500, utilized a custom-made chassis with a fiberglass cab (!) and an engine from the Zaporozhets small car. By the time development was finished in 1967, it became the ET-600 – the first front-wheel-drive vehicle in the Soviet Union.

The car was subjected to extensive tests. Bertelov drove it personally to the mighty NAMI institute in Moscow, which oversaw development of the automobile industry. He also visited the Melitopol Engine Plant, tested the truck on windy Crimean roads, and even climbed the Ai-Petri peak. Altogether he covered over 20,000 kilometers.

Miraculously, the ET-600 received approval from the responsible government agencies for small-scale production. Between 1967 and 1969, around several dozens of these trucks were put together.

The whole cabin tilted forward to provide access to the engine compartment.

Altogether 30 such trucks were built.

The ET-600 had a carrying capacity of 600 kg.

ETKVL ET-800

In the meantime, Bertelov decided to take his idea one step further and build a hybrid car, which would enable a longer range compared to electric cars. As you can see in our sidebar story, there were plenty of experiments with electrics, but these were hampered by technical difficulties.

Bertelov thought that a hybrid solution combining a petrol engine and an electric motor would solve questions about recharging and range. He was again ahead of his time as he came up with the idea for an eight-seater minivan. Thus the ET-800 Elektra was born in 1969. He recruited Vadim Pitersky, head of the VNII-ET electric vehicle project, to help with the intricacies of the powertrain.

A large 24-volt nickel-cadmium battery allowed the ET-800 to cover a distance of 80 kilometers at speeds up to 60 km/h. When it was necessary to gain speed over 60 km/h (for example, on the highway) or if the batteries began to discharge, the ZAZ-sourced petrol engine kicked in, which also charged the battery along the way. At the same time, according to Bertelov, at first the hybrid minibus had excessively sharp acceleration due to its electric motor. As he later recalled: “Despite the fact that I very carefully pressed the pedal, the car took off like a bullet, and black traces of rubber remained from the wheels on the pavement.”

ETKVL wanted nothing to do with this project, as their task was to provide the rural population with food and other consumer goods. However, in the end, consent was obtained, because all the necessary funds for the construction of a hybrid car came from Moscow.

It took 14 months to complete the prototype. The car participated in the celebrations of Lenin’s 100th birthday on April 22, 1970, carrying four top-ranking party officials. Bertelov later cheekily said that they “weighed the same as four ordinary passengers.”

Though the Elektra fared brilliantly, its Achilles’ heel – just like with other electric car projects – was the battery technology.

With the demise of the Elektra, production of the ET-600 also had to be stopped. Bertelov bitterly wrote in his autobiography: “If the hybrid car project were approved, an automobile plant similar to the RAF plant in Riga could have been created in Estonia. And electric cars made in Estonia would have been used as fixed-route taxis.”

Bertelov even visited the Melitopol Engine plant during testing.

SOVIET ELECTRIC CARS

In 1947-1948 NAMI built two electric van prototypes, called the 750 and 751.

Between 1974 and 1986 the Yerevan Automobil Factory produced 26 prototypes of various electric models, including the 3731 van.

The first prototype of the VAZ-2702 was built in 1979 but it proved to be too heavy.

While a few experimental trucks were built before World War II, NAMI, the research institute for the automobile industry, received its first proper task to develop a small electric van in 1947. The vehicle was to have a payload of 500 to 1500 kg, a range of 65 km, and a maximum speed of 30 km/h. While NAMI 750 and 751 prototypes used lead-acid batteries, the 20 units produced by the Lviv Bus plant featured iron-nickel batteries. This project failed because total costs were twice as expensive as those of a bigger ZIS 5 truck and the vehicles were very unreliable. Other prototypes from other institutes followed, such as the EMO-2 by VNII-ET in Kaliningrad, which used silver-zinc batteries and asynchronous AC motors. The range of the car was 100 km.

The honor of the first electric car produced in a smaller series belongs to VAZ, maker of the Lada. Their 2802 two-door van used a 25-kW electric motor, which was supported by nickel-zinc batteries, the weight of which reached 380 kg. The power reserve did not exceed 130 km, and the maximum speed was 87 km/h. Between 1976 and 1984, 47 such cars were built.

After years, even decades of experiments perfecting an electric minivan, the UAZ plant came up with the 3801 in 1980. This minivan had a range of 70 km. Its batteries were stored in special compartments with easy access from the side of the vehicle. Between 1980 and 1985 65 units were built.

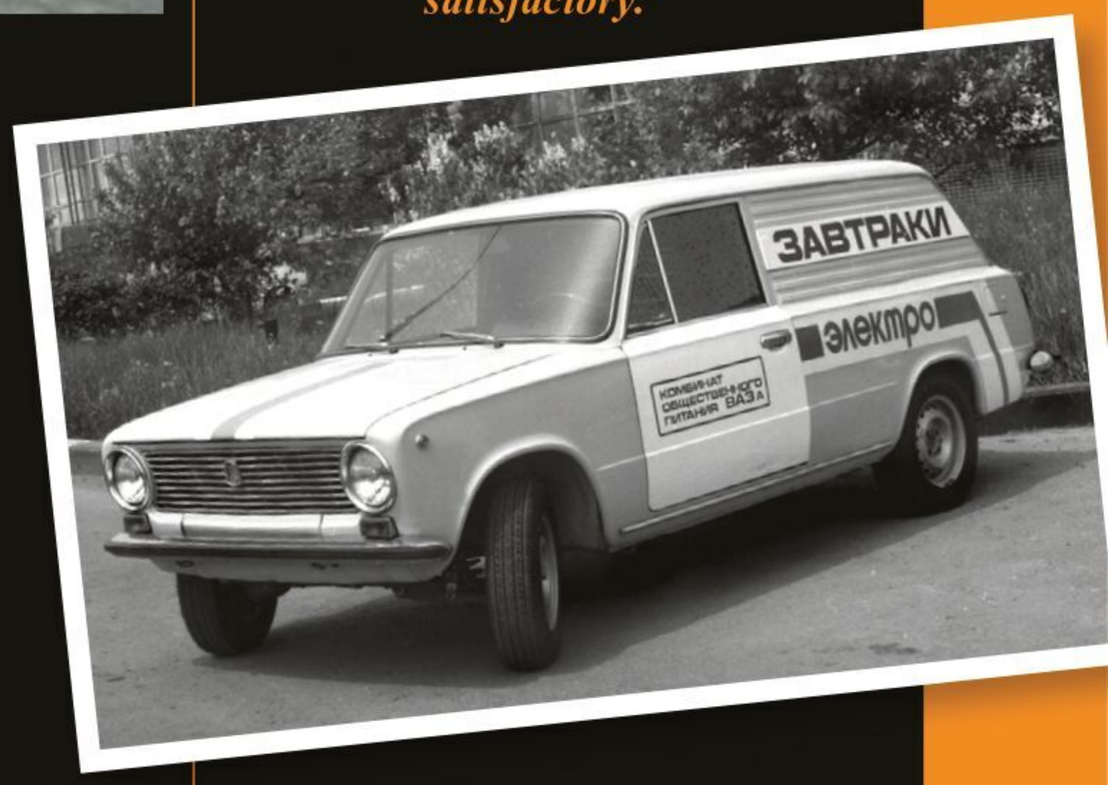
Another electric commercial vehicle concept from AvtoVAZ was the 1980 VAZ-2802-02 designed for urban driving.

SOURCE: RUSSIANPHOTO.RU

The VNIIET research institute in Kaliningrad built a few prototypes between 1967 and 1970 with asynchronous AC motors.

UAZ worked on its electric program for decades, but the end result was never satisfactory.

The Lviv Bus Plant built 20 units of the NAMI 750.



SOURCE: RUSSIANPHOTO.RU

SOURCES:

- Tehnikamaailm
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- https://www.rbth.com/history/334125-electric-cars-made-in-ussr-soviet
- https://www.drive2.ru/b/5584697194897749 12/

Between 1976 and 1986 AvtoVAZ built a series of 47 units of the 2802 two-door electric van, which again was heavy and unreliable.

Anyone who still doubts whether propeller-driven cars can drive at all should take a look at the French Leyat from the 1920s, which is currently causing a stir with various replicas and restoration of the surviving models. V. Christian Manz offers an overview of the past, present, and future of propeller-driven cars.

PHOTO: ROY D QUERY

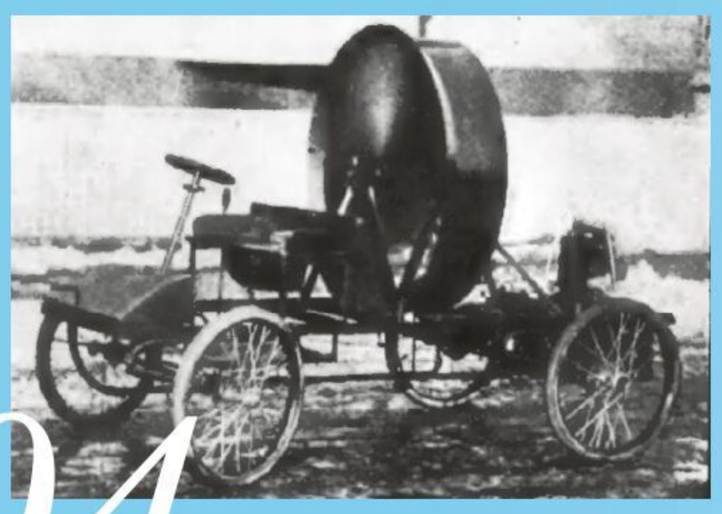
The Helicron was built in France in 1932 on a Rosengart chassis. Today it is part of the Lane Motor Museum Collection.

WIND AIDED

PROPELLER-DRIVEN CARS

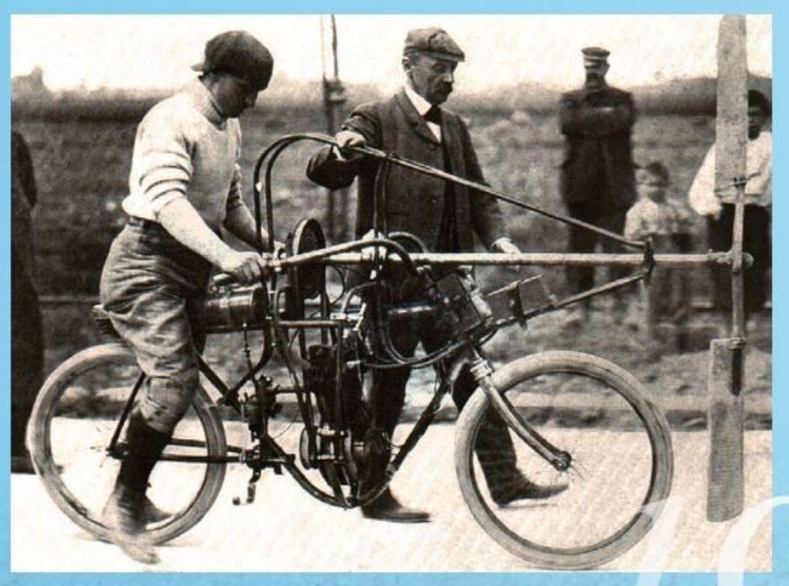
SPINNING POWER

Alternative Power



1904

The Pneumoslito or Aeropinion was designed to travel on ice.



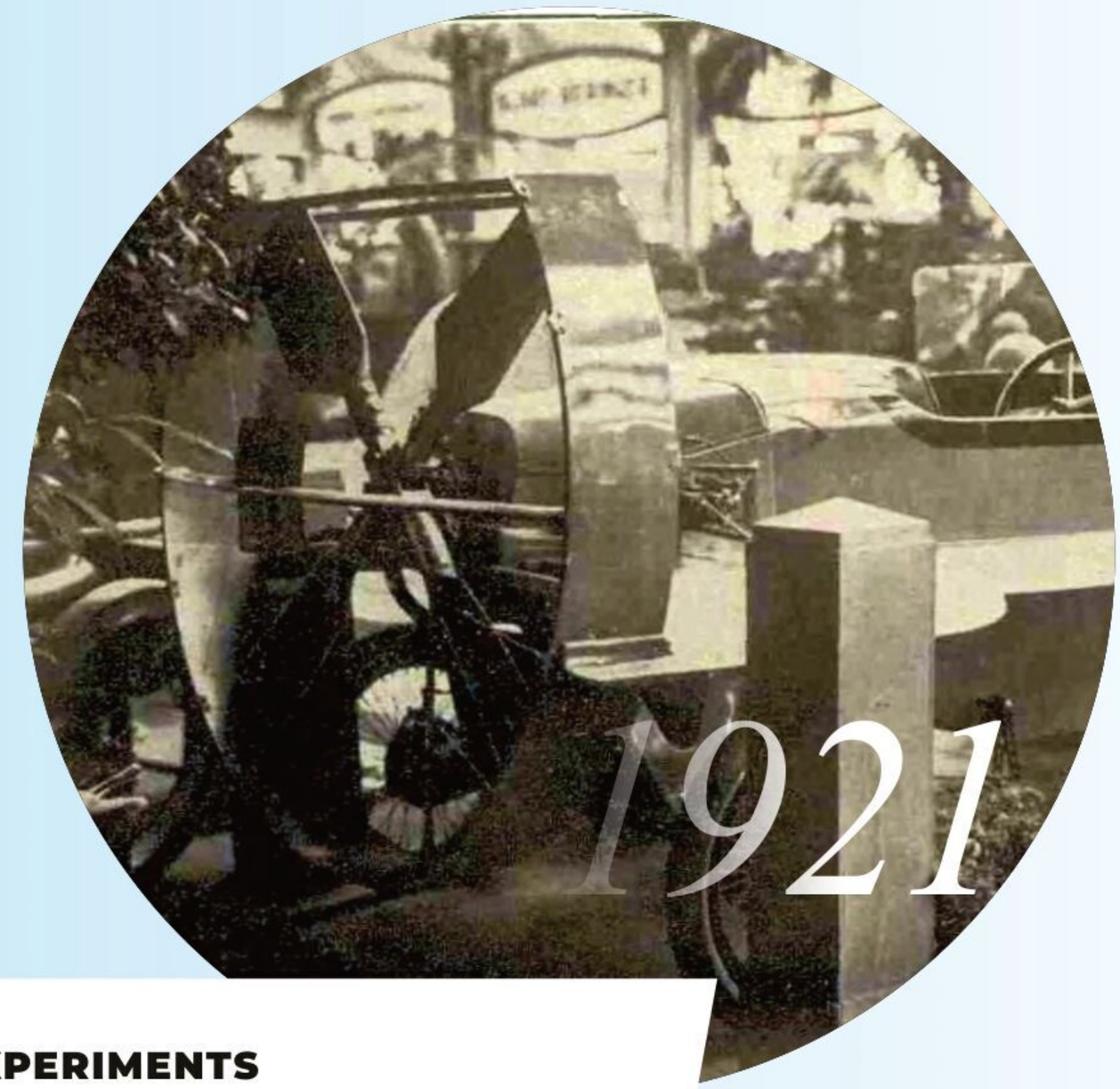
1906

Ernest Archdeacon's aero-motocyclette used the frame and engine of a Buchet motorcycle.

1912

This vehicle was designed by Count Bertrand de Lesseps, son of Ferdinand de Lesseps, who developed the Suez Canal.

SOURCE: FONDATION BERLIET

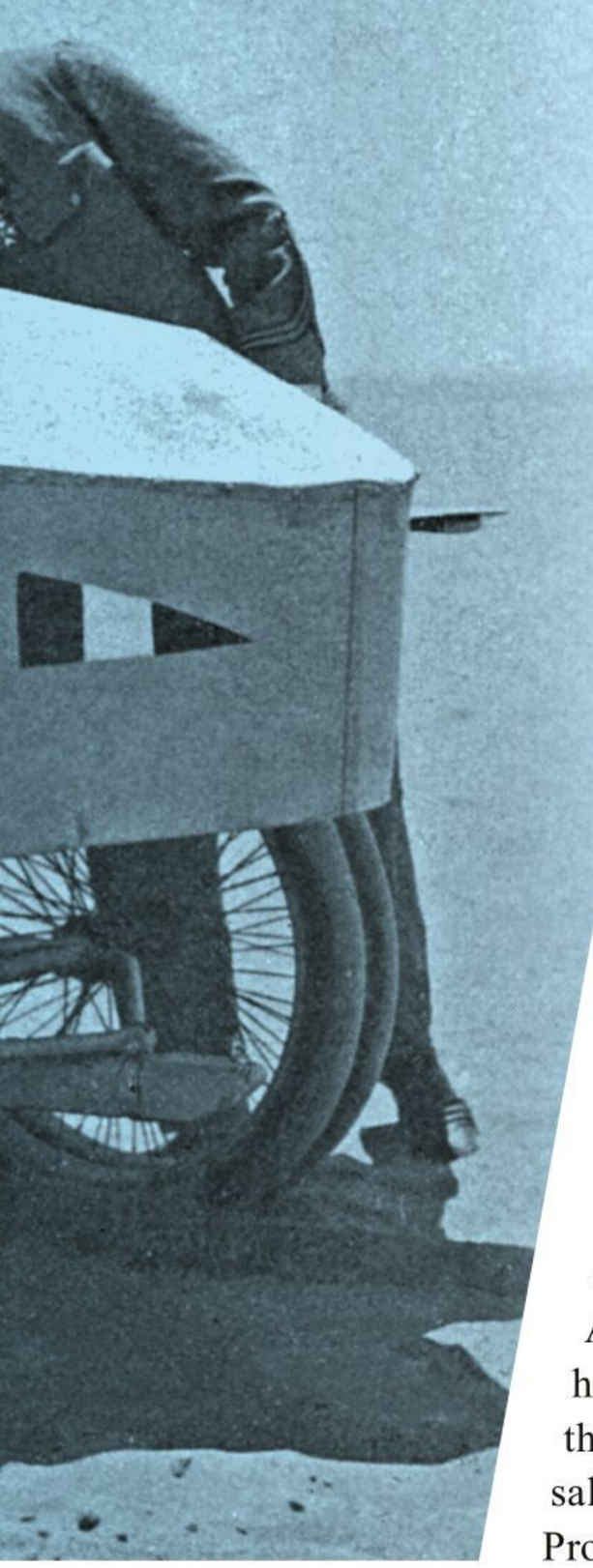


1921

Richard Vogt, a German pilot and aircraft builder, exhibited his Rivo at the 1921 Berlin Motor Show. It failed to garner interest.

1913

Second version of Lafarque's Aerosable, which was used in the Sahara.



EARLY EXPERIMENTS

The car was still in its infancy when Brooklyn, New York, realtor J.B. MacDuff, with the help of a local automobile repair shop, fitted a cart with a propeller in 1904. Called either the Aeropinion or the Pneumoslito ("slito" being the German word for sled), the vehicle featured a 4-hp engine at the rear and propeller in the middle. A complicated water cooling system took up most of the power, but in the first attempts the vehicle already achieved a speed of 25 km/h, and for a short time it was reported that it managed 40 km/h against the wind, which was due to the shape of the propeller blades.

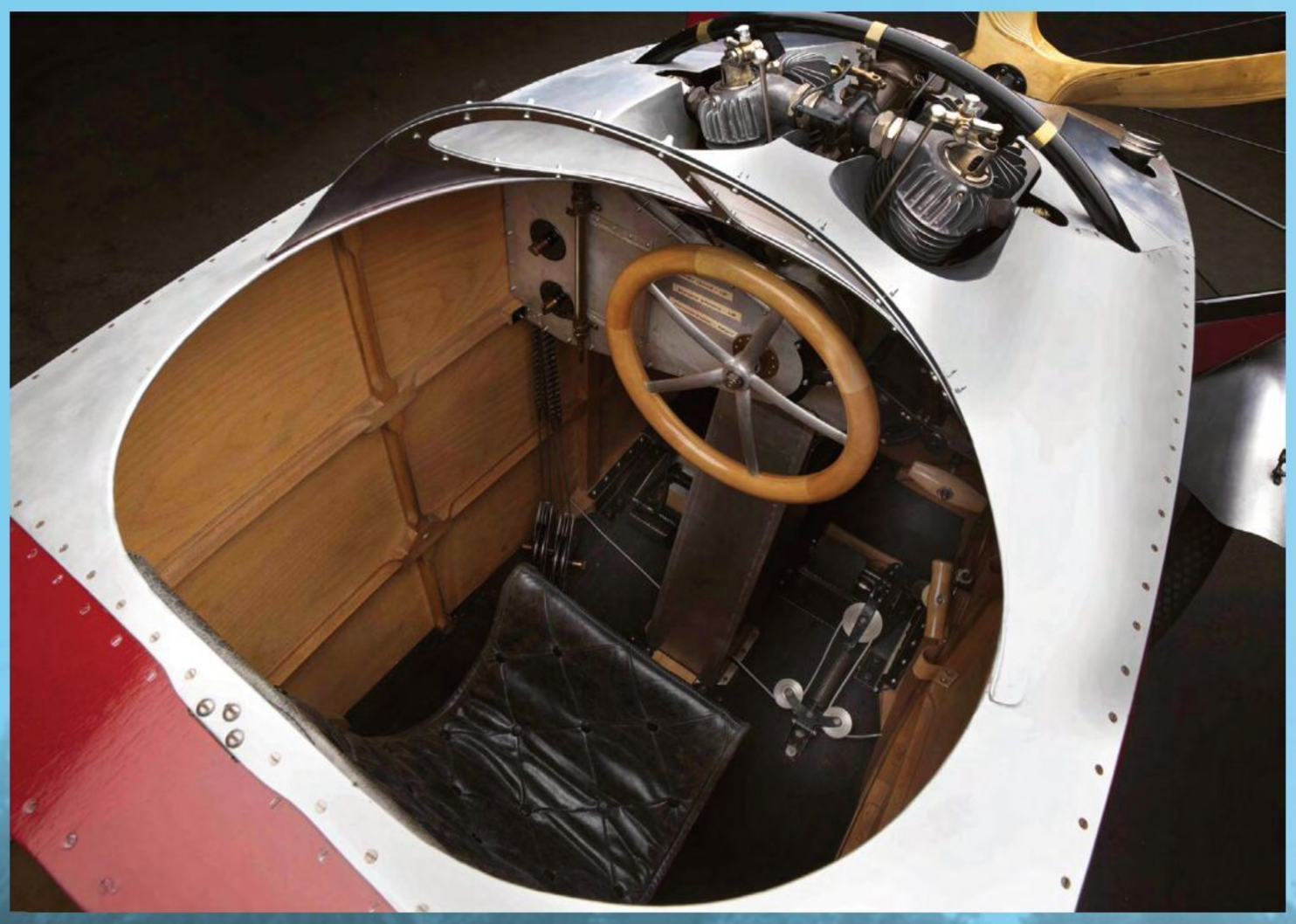
These were the years of the first aircraft projects, so it was not surprising that new ideas in aircraft construction also had to serve the automotive industry. Two years after MacDuff, Ernest Archdeacon, a French inventor who built aircraft with propellers, crafted a similar device onto a motorcycle. The propeller was at the front, held by a long steel tube, and the driver's seat was on the rear wheel. In front of numerous spectators, the motorcycle reached a speed of over 80 km/h, even though the two-cylinder engine only produced 6 hp.

In 1911, Lafargue, a French military officer, stood in the Sahara in front of the remains of a crashed plane and took the parts to build a strange six-wheeled land vehicle that, thanks to its propeller drive and star-shaped seven-cylinder aircraft engine, was supposed to hop over the dunes. But he hadn't counted on the sand, which whirled up wildly and soiled the mechanics. Two years later he built another prototype on the chassis of a Berliet with a 60-hp four-cylinder engine and a huge 3.7-meter propeller. The contraption, called Aérosable, worked better. Encouraged by this achievement, he went on to consider an amphibious vehicle with wheels that could be replaced by a wooden hull for sliding over the salty Saharan chotts where even camels feared to tread.

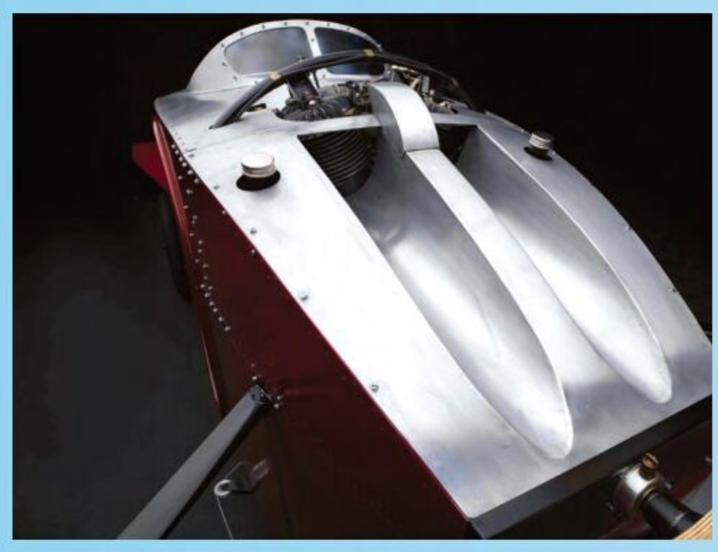
Propulsion via propellers was also used to build simple and

1922

An unknown propeller car on the streets of Berlin in 1922.



PHOTOS: PETER HARHOLDT (3)



Every inch of the Leyat Helica oozed airplane-inspired design.

Naturally there was no radiator, so engine cooling had to be solved in innovative ways.

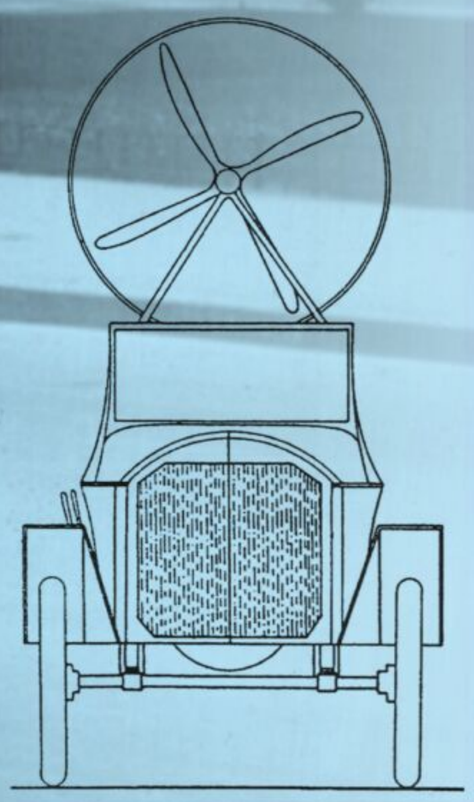
1921

Lack of windshield meant that the debris raised by the propeller hit the driver and passenger.

SOURCE: GALLICA

Only the rear wheels were driven.

cheap vehicles, as you didn't need a clutch, gearbox, cardan shaft, or chains. The complicated gears were also superfluous. Just look at the Franchomme, which was presented at the Brussels trade fair in 1912. Here the propeller was attached directly to the motor shaft, the three-cylinder unit was air-cooled in front of the propeller, and for aerodynamic reasons the front and rear were pointed – a practice taken from airplane design. The one-shot was neither beautiful nor safe; the propeller turned freely without any protection. Another Frenchman, Bertrand de Lessep, heated up the discussion about wind chariots again. In 1913 he drove from Paris to Lyon in his propeller car, demonstrating the suitability of his creation. The Conservatoire National des Arts et Métiers then undertook detailed investigations, theoretically working with different types of propellers and motors. A senior engineer came to the interesting conclusion that the "wind car" could have a bright future. One was certain that the propeller would have to have mechanical protection around its wings in order to prevent unsafe contact with people and in order to have a chance for homologation.



A contemporary of the Leyat, this German design never got off the drawing board.

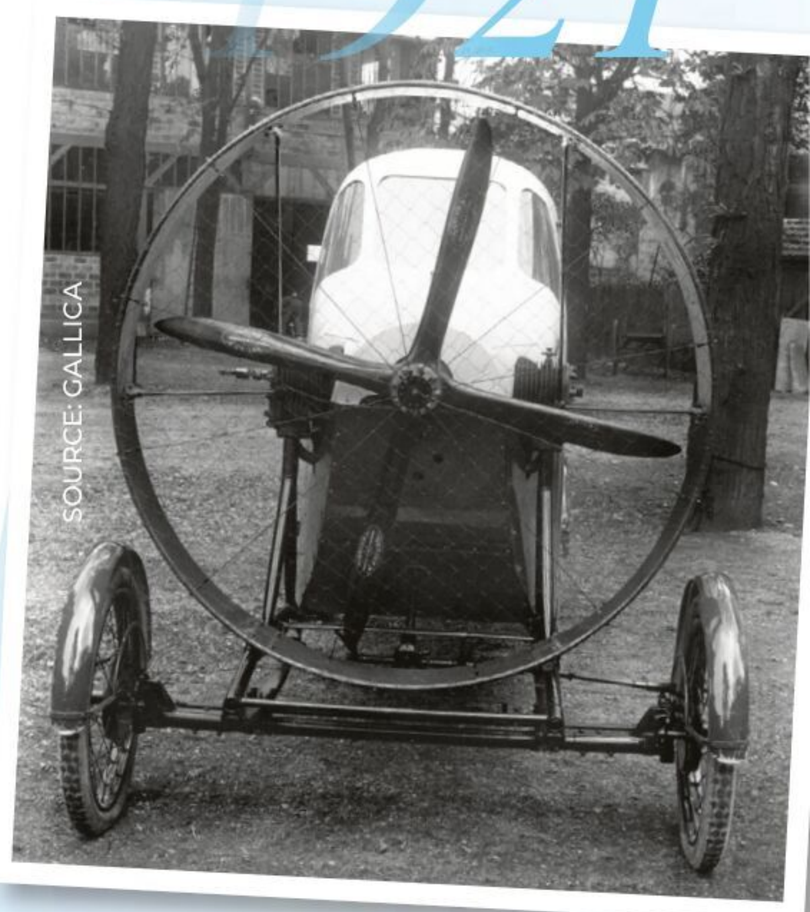
LEYAT HELICA

Marcel Leyat was a degreed engineer who designed, built, and flew his first airplane in 1909. Leyat developed the belief that propeller-driven vehicles were the wave of the future, and in 1913 he built his first propeller-driven car. He tested this 1913 car extensively, and in 1919 Leyat launched serial production of the vehicle.

For its name, Leyat was inspired by the ancient Greek word for spiral, as in helix and helicopter, which was undoubtedly less demonic-sounding to Parisians than to modern English speakers. Pamphlets advertised the "Hélica" or "Hélicycle" as a stylish new vehicle designed by the science of the sky: it embodied speed, safety, and elegance. Leyat paid very close attention to aerodynamics and weight. The body, resembling that of an airplane, is fully streamlined – as is the front

Propeller car made by a certain Toha in 1921.

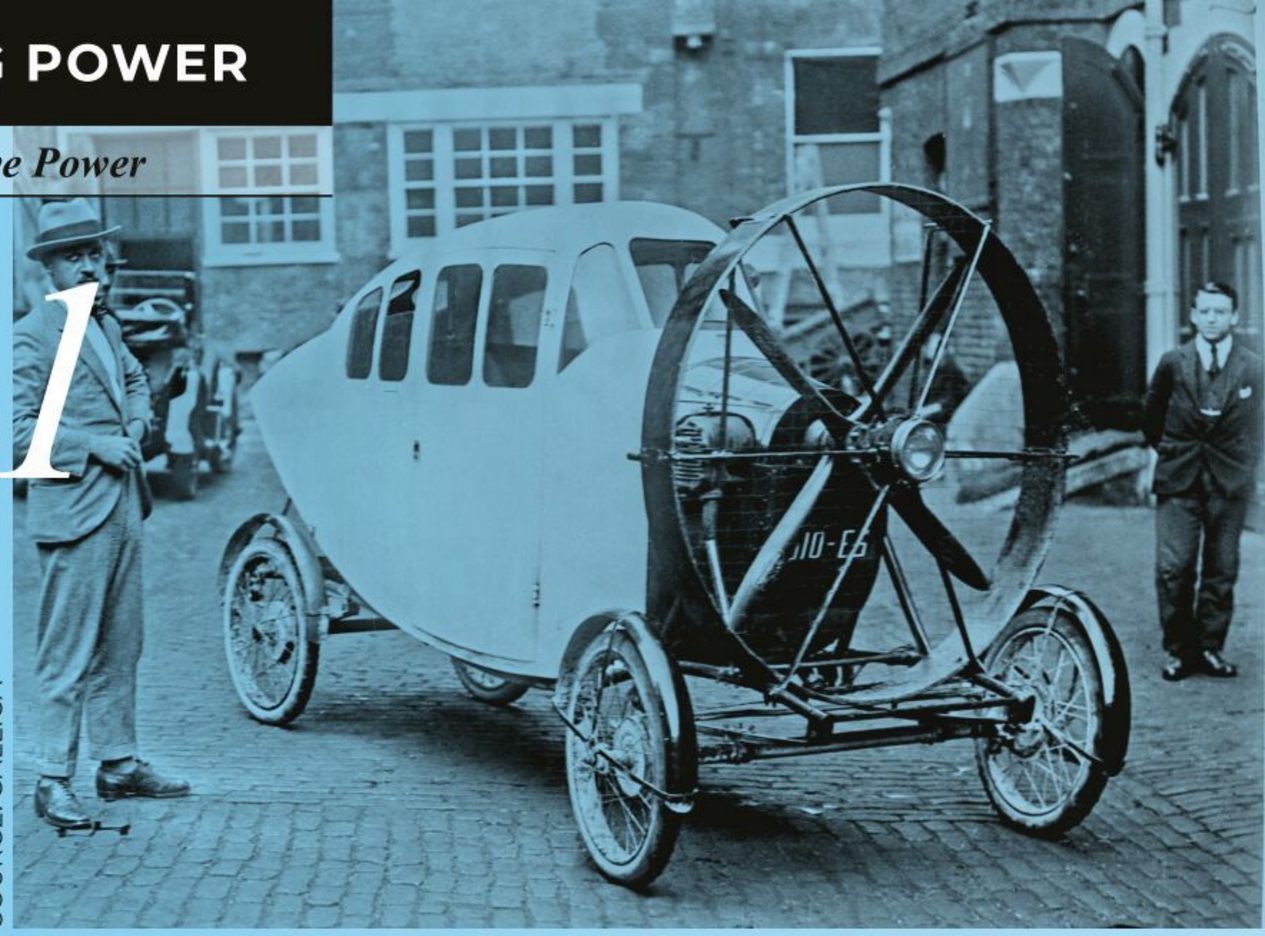
1921



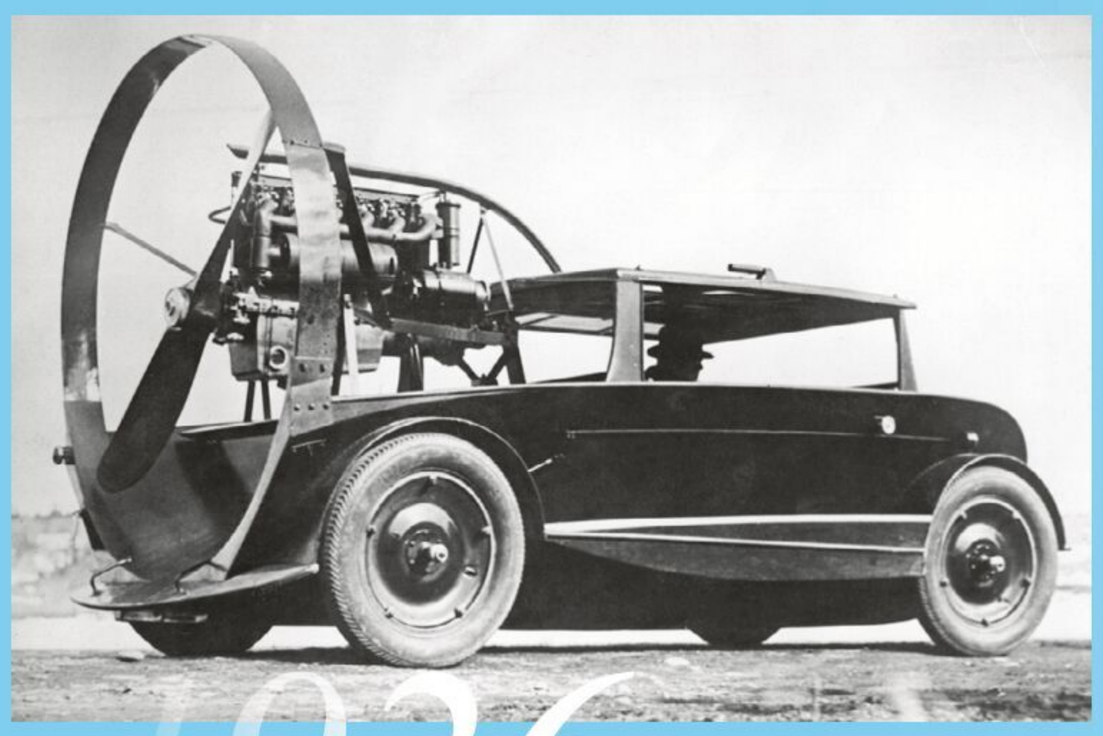
SOURCE: GALLICA

1921

Joseph Archer offered a closed propeller car through his Traction Aérienne company. A few were built until 1926.

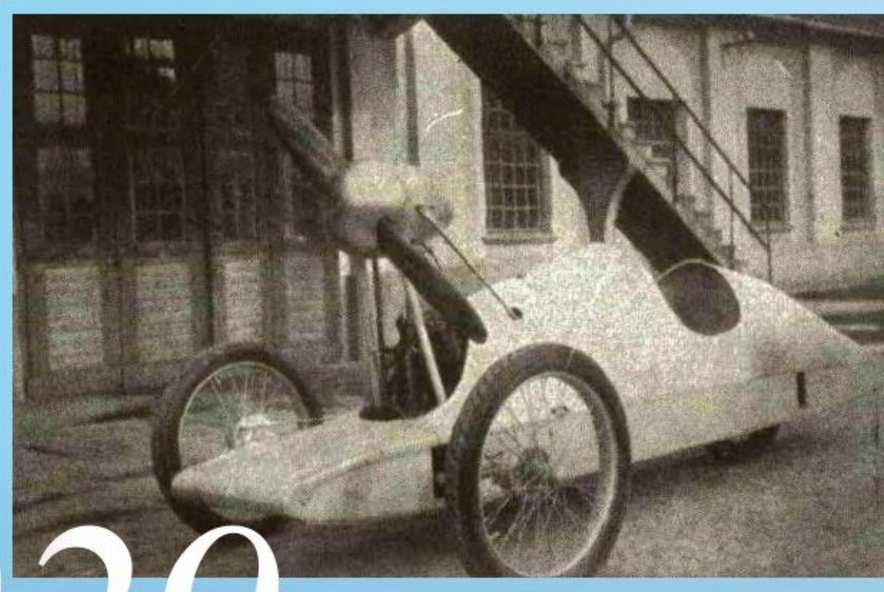


SOURCE: GALLICA



1926

George McLaughlin, a garage owner in Bangor, Maine, USA built this vehicle which "was equally at home on land or water" – or even snow. Power came from a 70-hp airplane engine.



1929

This three-wheeler was designed by S. Reder in Austria, who claimed a max speed of 90 km/h!

1968

The first prototype built at the FEI technical university in Brazil featured a propeller to attract more attention.

No Gearbox, No Clutch, He Goes by Prop

OVERCOMING "low-altitude drag" with a push propeller geared to a Ford V-8 engine, Clifford Robins pilots his homemade motor car along the roads of Yeovil, England, at a top speed of 70 m.p.h.

Robins, a grocer, used no rear-axle drive, no gearbox and no clutch. He estimates that the car cost him £200 ($560).

One of the few postwar propeller cars was built by Clifford Robins in the United Kingdom.

1955

The builder of the Helicron flipped the chassis 180 degrees.

axle – to reduce drag. Instead of using traditional wheels, Leyat built his own with aluminum discs and integrated the brakes to further reduce drag. Weight was also reduced to a minimum by using a full monocoque chassis and many aluminum parts to obtain a total vehicle weight of 280 kg. Leyat showed his car at the 1921 Paris auto show and claims to have received 600 inquiries. Unfortunately, Leyat was never able to get funding to go into large-scale production, but he continued to build propeller-driven cars until about 1926, with a total production of about 25 cars.

According to an article in Popular Mechanics, "The driving experience was hardly relaxing for the driver. The view of the road was perpetually obscured by the top half of the five-meter-wide airplane propeller; the unprotected bottom half threatened to slice up any slow-moving pedestrians. Like an airplane, the Hélica featured cable-operated rear-wheel steering, which is ideal for high-speed turns in midair but completely unmanageable on the ground."

OTHER PROPELLER CARS

In the 1920s and 1930s there were several one-off propeller-driven cars, such as the McLaughlin Maine Mobile in 1926, the Helicron in 1932, and so on. We have already covered the Schlörwagen by Karl Schlör in our first issue. Another lesser-known designer was Max Schulz, who equipped a Maybach Zeppelin luxury car with a 96-hp seven-cylinder Maybach radial engine complete with its propeller, in 1938!

Post-war experimental vehicles included a three-wheeler built by Clifford Robins in the United Kingdom in 1955 and the 1968 FEI X-1 from Brazil.

The latter was the work of Rigoberto Soler, a professor at the Department of Vehicle Studies and Research at the Centro Universitário da FEI, with a group of students. The X-1 was an aerodynamic, amphibious prototype with a wooden body which was shown at the 1968 São Paulo Motor Show to draw attention to the university. ♦

L'Eclair was built by Jean Legeay in France. He even carved the propeller himself!

1930

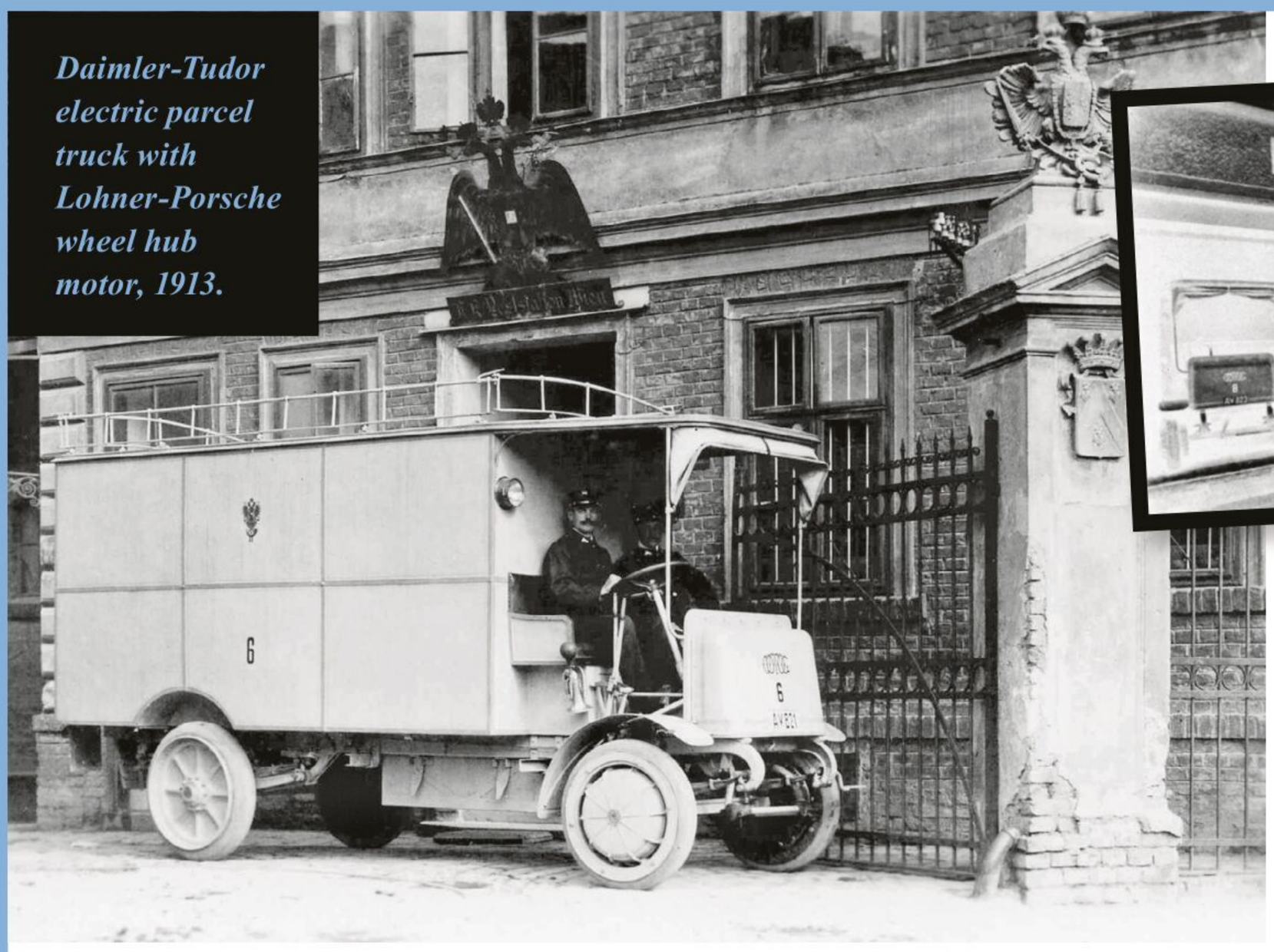
PHOTO: PETER HARHOLDT

ELECTRIC CARS OF THE AUSTRIAN POST

PARCELS AND BATTERIES

An experimental electric delivery van from "Wiener Automobilfabrik AG, formerly Gräf & Stift" during testing in 1935.

In the early 20th century, both the Hungarian and Austrian postal services were quite technologically advanced. In Austria, electric vehicles were employed as early as 1905, reports **Alexander Trimmel**.



Daimler-Tudor electric parcel truck with Lohner-Porsche wheel hub motor, 1913.

In the garage a sliding plateau moved the vehicles to the loading bay or the battery changing area.

Once the foundations of e-mobility were laid in the 19th century, the post office was quick to adapt to electric vehicles. These vehicles were particularly convenient on short routes and with low payloads, so the postal service mainly used them for local and suburban transport.

FROM HORSE-DRAWN CARRIAGES TO THE AUTOMOBILE

In 1905, a group of industry experts encouraged the authorities to add automobiles to the postal vehicle fleet in the Austrian part of the Austro-Hungarian Monarchy. After lengthy discussions, the city of Vienna decided to go ahead with electric vehicles, citing economic reasons: maintenance costs were low, and electricity was cheaper than petrol. Furthermore, the “electric vehicle was considered the cleanest of all self-propelled vehicles, without a bad exhaust smell.” according to a contemporary report. Quiet running was also an important argument for the decision, as the parcel vans were on 24-hour service.

The Austrian Post's first electric parcel vans went into service in June 1913. In the June 20 edition of the Zeitschrift für Post und Teleographie, a lengthy article, titled “Introduction of the Electric Vehicle in the Vienna Postal Service,” was featured:

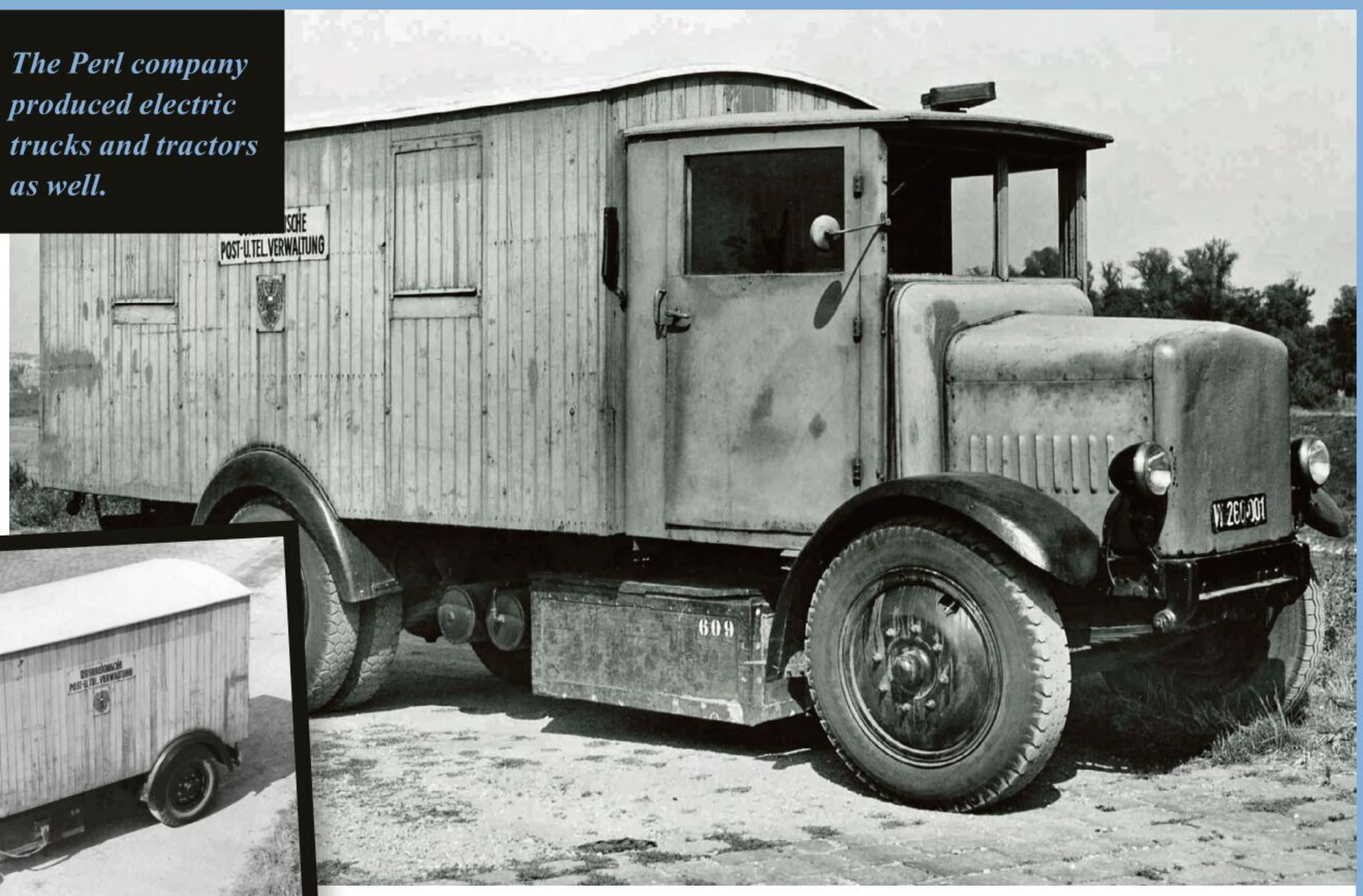
“On the 15th of the month, 29 electric vehicles – including six in reserve – were drafted in the Vienna postal service. They will take care of the transport service on heavily used postal routes. These must cover around 496,000 kilometers a year and thus replace 185,000 two-horse and carriage journeys with horse-drawn carriages. The postal electromobile is an Austro-Daimler car powered by two 15-hp wheel hub motors (Lohner-Porsche system) in the front wheels. The power is supplied by a 42-cell lead-acid battery with a total capacity of 300 Ah, which is suspended below the chassis. The (900 kg) battery enables a range of 45 km, the maximum speed is 18.5 km/h, the payload is limited to 2,500 kg (maximum total weight 6,300 kg)."

Österreichische Daimler-Tudor-Omnibus GmbH was responsible for the production and operation of the vehicles, which is why the parcel vans bore their emblem on the front of the car and were called "Daimler-Tudor-Elektro-Paketwagen." Bodies were supplied by k.u.k. Hofwagen- & Automobilfabrik Jacob Lohner & Co.

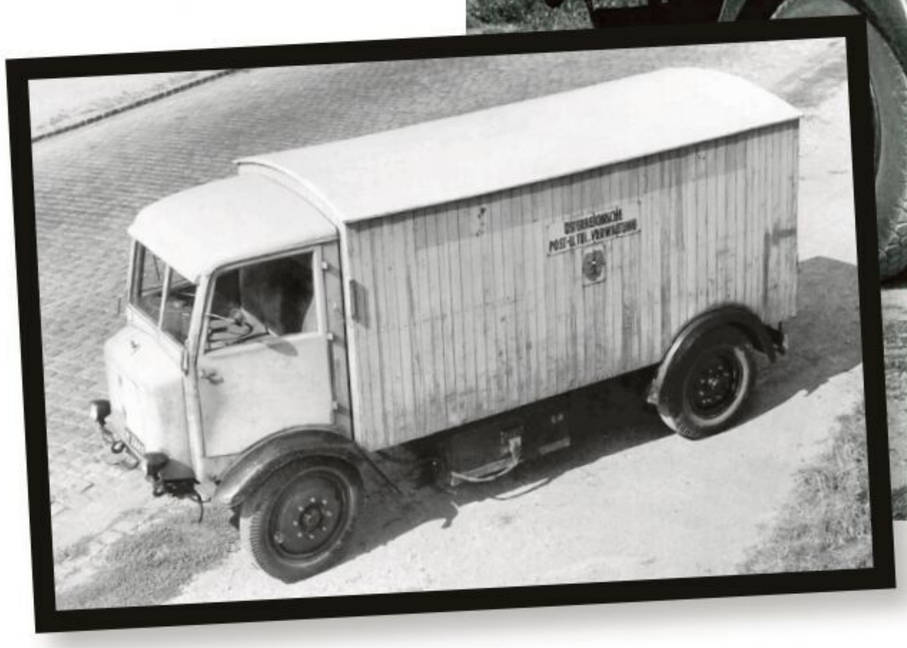
To ensure the smooth operation of the vehicles, a new building with 42 parking spots for them was erected for the Electric Postbus Garage in the third district of Vienna. In addition to the parking spaces, the 1,257-square-meter facility included a repair workshop and offices for management and staff. Battery charging stations and a transformer and rectifier room were located in the basement.

“Since the daily performance of the vehicles is greater than the range of the battery, a battery change must be carried out in the garage, where the batteries are lifted and inserted directly under the vehicle with underground elevators. Up to 56 batteries can be charged at the same time in the

The Perl company produced electric trucks and tractors as well.



This forward-control Austro-Daimler LEA II electric parcel truck was made in 1923.



loading space of the garage, whereby the charging stations are provided with rails for small trolleys," added the report. Remarkably, a battery swap took only 90 seconds! The garage was also problem-free in the tightest of spaces: the parcel wagons drove on a "wagon sliding platform," which moved on a track in the axis of the garage and transported the vehicle to the free parking space.

Hans-Ludwig Stoll, a Dresden-born engineer, was entrusted with managing the garage. He was also responsible for the operation and maintenance of the Vienna Stephansplatz-Volksoper bus line. In addition to parcel vans, there were public buses built on the same chassis. These were equipped with five standing places and 13 seats and ran between 6 a.m. and 11 p.m. The batteries had to be replaced after five or six trips. Unfortunately, the outbreak of the First World War in 1914 brought further development of electrification in the municipal transport sector to a standstill.

AUSTRIAN POST'S ELECTRIC PARCEL VANS BETWEEN THE TWO WORLD WARS

After World War I and the breakup of the Austro-Hungarian Monarchy, the postal service resumed service with refurbished prewar vehicles. It was not until 1923 that the post office had sufficient funds to procure new vehicles. It took over the electric parcel van business from Österreichische Daimler-Tudor-Omnibus GmbH and set up its own workshops and garages with charging stations on the site of the former K. u. K. Officer Riding School in Vienna 3.

At the same time, 27 new Austro-Daimler LEA 2 parcel vans were procured, which were similar to the previous Daimler-Tudor models with a payload of 2.5 tons and a range of 45 kilometers. However, the drive was no longer via the wheel hubs in the front wheels, but by means of a chain drive to the rear wheels. The two 8-hp electric motors enabled an average speed of 16 km/h when fully loaded. When empty, the LEA 2 managed a dizzying speed of 25 km/h! The average energy consumption was 50 kWh per 100 km. The annual mileage per car varied between 8,000 and 23,000 km, depending on the assigned route.

With the further procurement of 43 Perl parcel vans between 1925 and 1930, the Elektro-Post fleet was significantly increased. The Perl Post 30, manufactured in Vienna-Liesing, was based on a Peugeot chassis and had a payload of 2.4 tons. Two 14-hp motors drew their energy from an 80-cell, 150-volt lead-acid battery. The rear wheels were driven via a driveshaft and worm gear differential. The Vehicle Division of the Post was extremely impressed by the quality of the Perl vehicles, as proven by a letter in 1926: "We are informing you that the electric vehicle you delivered . . . has been in use since July 10, 1925, is in service in Vienna as a postal parcel van and has covered 11,128 kilometers by February 10 of the current year. During this seven-month period, the car was in use for 207 days and was on repair for eight days. The repairs necessary in the period above were . . . of a minor nature (change of brake pads). The relatively low level of wear on the tires should also be noted." The Perl wagons were already

IMPERIAL ELECTRICS

Alternative Power

A Daimler-Tudor being tested in Hungary, 1913.

A one-off body built in the postal depot on an old electric truck chassis, 1934.

The battery pack made the Barkas very slow and unreliable.

HUNGARY

The Hungarian Royal Post was one of the first organizations to use motor vehicles in the world. Experiments began in 1897, and a fleet of 21 three-wheelers and a four-wheeler was enrolled into service in 1900. From 1905, trucks aided parcel delivery all over the country. Even before World War I, the Post did trial runs with an Austrian Daimler-Tudor, but it was not until 1927 that electric trucks were seriously considered. By 1929 there were 35 electric trucks in use – mostly supplied by Rába, the Hungarian Wagon and Machine Factory, in Győr with electric equipment sourced from the Ganz company. A mini powerplant was set up at the Vehicle Depot. In the second half of the 1930s Rába bought the license of Bleichert, a German company specializing in electric delivery vehicles. These Rába-Bleichert trucks survived the war as neither the Wehrmacht nor the Red Army found them useful. The last example was decommissioned in 1963. In the 1970s, the Post tested a Barkas that had been converted to electric use by the Villamosipari Kutatóintézet (Research Institute for the Electric Industry). It proved to be too heavy and cumbersome.

SOURCE: POSTAL MUSEUM

By 1929 there were 35 electric trucks in use by the Hungarian Post.

These trucks were made in Győr under licence from Bleichert and were even used after WW2.

The Hungarian Post did not like the electric Barkas.

Only nine Dostal vans were built in 1949.

Prewar German postal vehicles, such as this Bergmann BEL 1000, were used right after the war.

fitted with modern pneumatic tires, while the vehicles with solid rubber tires were retrofitted little by little. Payment for the pneumatic tires was based on the kilometers driven in a loan agreement with the post office.

The global economic crisis of 1929 made it almost impossible for the Post to make additional investments in electromobility, even though this would have been particularly useful in those difficult times. After all, electric parcel vans did not require extraordinarily expensive imported fuel and could be recharged with cheap off-peak electricity. At the end of 1930, the Austrian Post had 71 electric parcel vans. The 27 LEA 2 and 20 Perl Post 30 were joined by 18 Perl 3-ton EP 2 trucks and five Perl EL 6 with one-ton payload, as well as a Bergmann electric vehicle in 1925 for test purposes.

THE TURMOIL OF WORLD WAR II

The independence of the Austrian Post ended in 1938 when Austria was annexed by the German Reich. It was folded into the Deutsche Reichspost, which already had more than 2500 electric Bergmann parcel vans in operation.

During one of the last Allied bombing raids over Vienna, the post office garage in Ungargasse, which housed the electric parcel vans, was almost completely destroyed. To function in the difficult postwar period, they began by processing leftover material from the prewar period.

RECONSTRUCTION AFTER WORLD WAR II

In 1946, the Zeitschrift für Post und Teleographie reported that 11 electric parcel vans, provisionally converted and nailed together with wooden boxes, were already in use again. Some were from Austrian prewar production and some were the Reich's German Bergmann electric parcel vans that remained in Austria.

Among the Bergmanns, the big 10-hp model could boast a payload of 2,150 kg and had a range of 35 km. The average energy consumption was 37 kWh per 100 kilometers. The 1000-kilo battery was replaceable. Total weight of the car was 6,450 kg. These vehicles proved to be extremely robust and durable. They were in operation in the Vienna parcel delivery service well into the second half of the 1970s. The smaller Bergmann models, called the BEL 750 and BEL 1000, with the 4-hp motor and the batteries under the front hood had been taken out of service earlier.

In 1949, 42 electric vehicles were already on the road for the Austrian Post. Some of them had more than 400,000 kilometers under their belts and still met economic and reliability requirements. This was impressive enough for the Post to launch its largest procurement campaign for e-vehicles in 1950. A total of 160 new electric parcel vans were put into service by 1955. Some of these remained in service until June 15, 1982.

A NEW BEGINNING IN 1950

Starting in 1949, the Österreichische Automobil-Fabrik AG in Vienna-Floridsdorf built 25 cab-over delivery vans with electric drive called ÖAF 5 ENO, which were to help shape the streets of Vienna for over three decades. The Brown-Boveri direct-current motor transmitted its power to the

The ÖAF 5ENO trucks were usually equipped with trailers. These operated between Vienna's main post offices and train stations.

One of the unsuccesful vehicles from the 1970s was this Saviem SG-based ÖAF electric truck.

Left: The ÖAF 2ENO in 1951 featured unitary design.

double-tired rear wheels by means of a cardan shaft and differential. The vehicle technology was installed by the Viennese vehicle construction company Knittl. The mighty body of the 7.0-meter-long, 2.3-meter wide, and 2.9-meter-high monster consisted of a wooden frame with sheet steel planking. These vehicles featured a shiny new postal yellow instead of the dreary mouse-gray hue used previously. The wagons mainly ran between the large station post offices with trailers. Depending on the power requirement and load status, the drivers could decide to connect the two battery packs, each weighing 900 kilos, in parallel (50 hp) or use them individually (25 hp). The curb weight including batteries was 7,100 kilograms. The vehicle was designed for a total payload of five tons: three tons of packages in the towing vehicle and two tons in the package trailer. With its top speed of 28 km/h, the 5 ENO often became a traffic obstacle, and the batteries were empty after driving a distance of 60 km.

The other model, called 2 ENO, was quite different from its big brother – despite sharing its name and electric drive. While the 5 ENO was built on a steel chassis, the 2 ENO was of unitary construction.

Its 18-hp DC motor was positioned at the front above the differential and distributed power to the two front wheels via half-shafts. The 80-cell lead-acid exchange package, which weighed "only" 1,200 kg, provided enough "juice" for a distance of 35 km. With a top speed of 35 km/h, the "yellow snails" were already known to be moving traffic obstacles, but if battery power ran low, the giants dragged themselves at a 5-km/h walking speed to the urgently needed charging station, much to the annoyance of other road users. If the charging current ran out completely, the unloaded four-ton giants could hardly be moved without towing equipment.

160 pieces of the type 2 ENO were built. "There was actually nothing to be repaired with the 2 ENO. Only the brakes caused problems from time to time," said the foreman of the Salzburg electric garage. The ENOs were in operation for over 30 years.

In addition to the ENO family, there were nine Dostal parcel vans. The Dostal company had already produced an electric parcel van, the C 147, in a typical truck design in 1947. The 1949 EL 3000 featured a more modern look. With a payload of three tons, it placed itself in the middle between the ÖAF 2 ENO and 5 ENO. Two 80-cell battery packs with 250 Ah and 150V supplied energy to the 17-hp direct-current motor. Propulsion was controlled with four forward and two reverse switches. After a maximum of 60 kilometers, the Dostal parcel van had to be recharged in the post office garage on Ungargasse, which had been rebuilt after the war.

THE PAST 50 YEARS

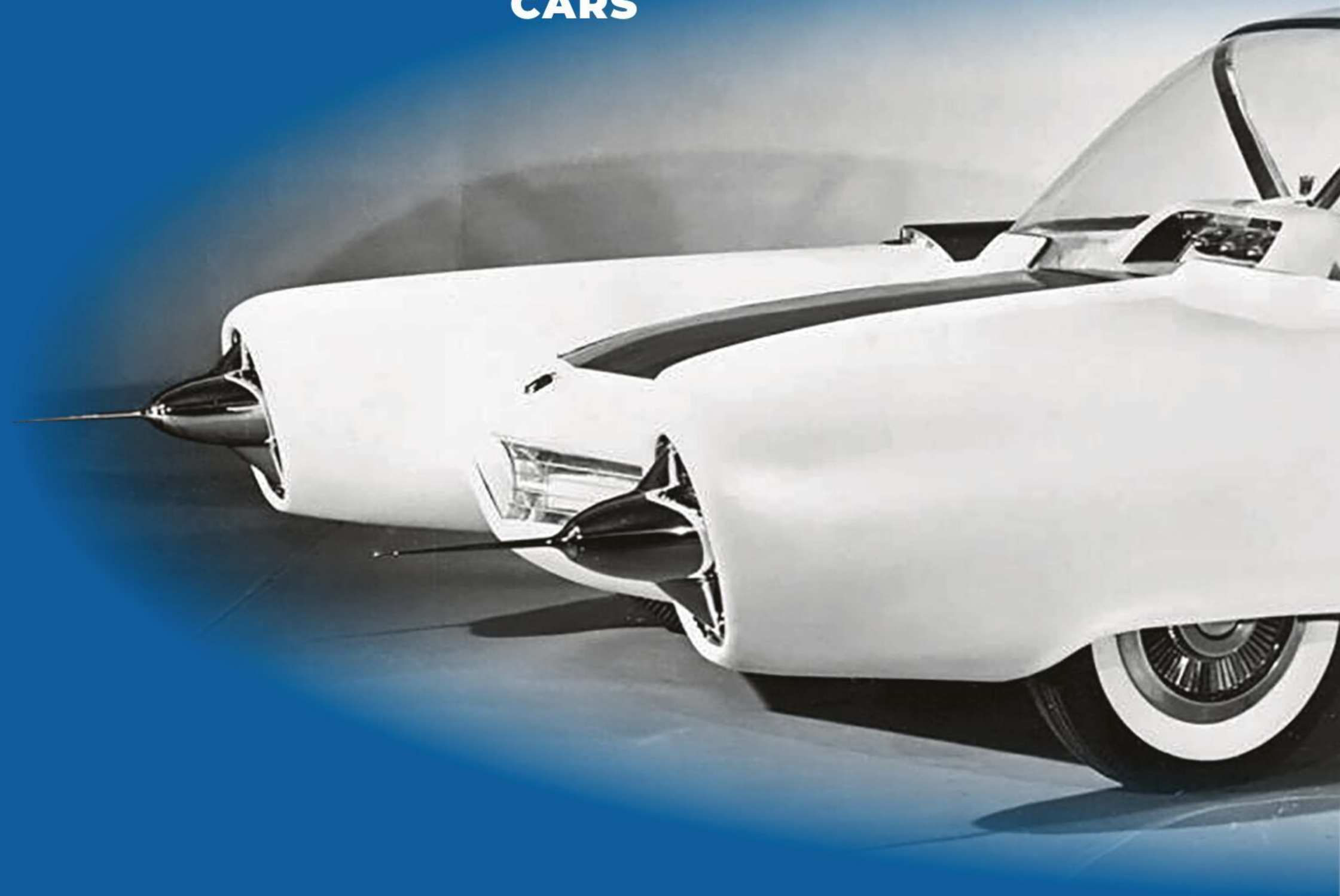
The ENOs were followed by a long post-electric-car lull. While tests were carried out with numerous vehicles, none were deemed service-ready. Today, the Austrian Post has been enjoying the benefits of the global renaissance of electromobility and uses a modern fleet of electric vehicles ranging from electric bicycles to trucks in its delivery service. ♦

ATOMIC VISION

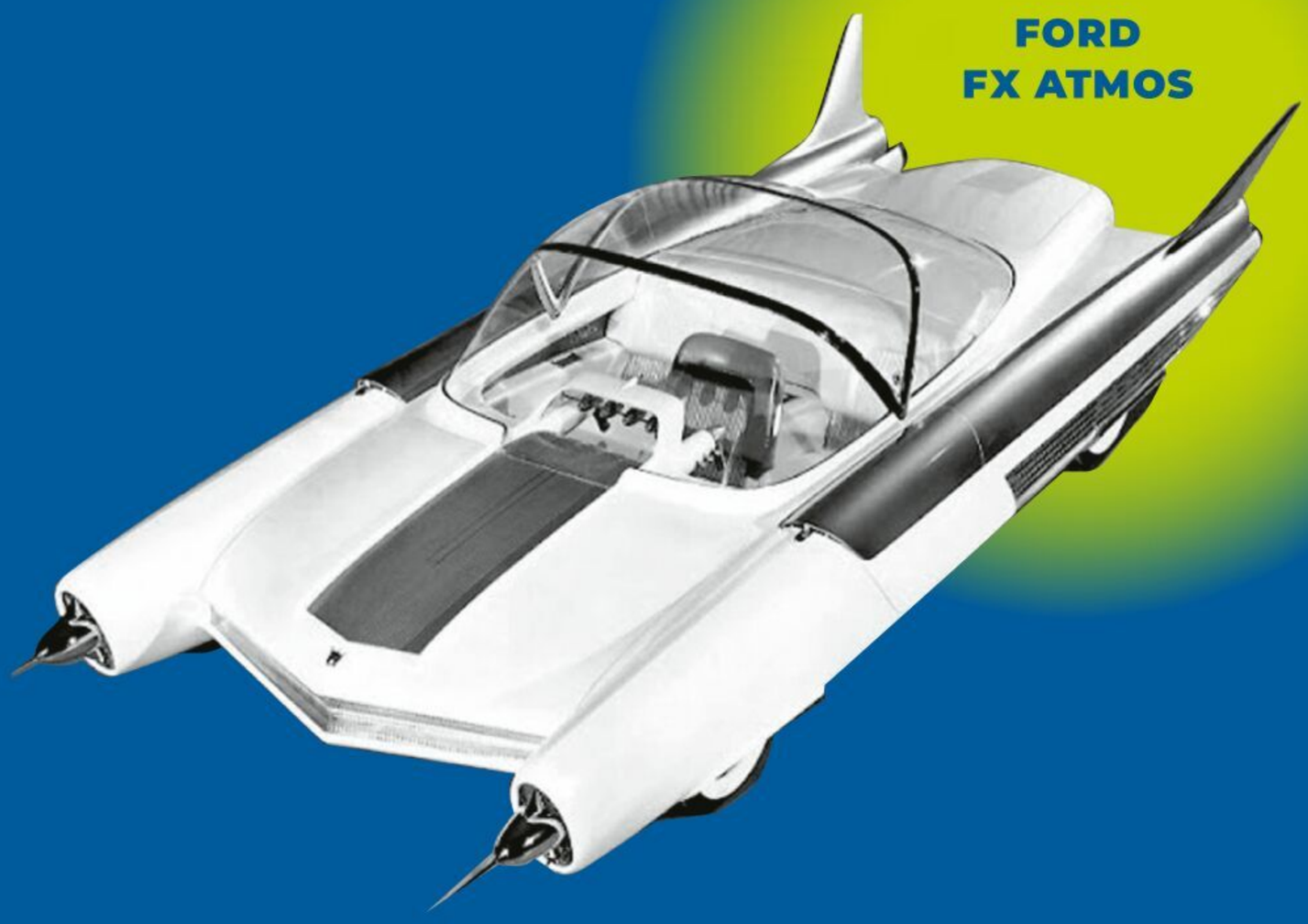
The period between 1940-1963, popularly known as the Atomic Age, has filtered down to vehicle technology as well. **Alexander W. Trimmel** takes stock of the few cars which were propelled by atomic energy.

Nuclear propulsion for the FX Atmos?
Ford's Vice President Lewis Crusoe denied these rumours.

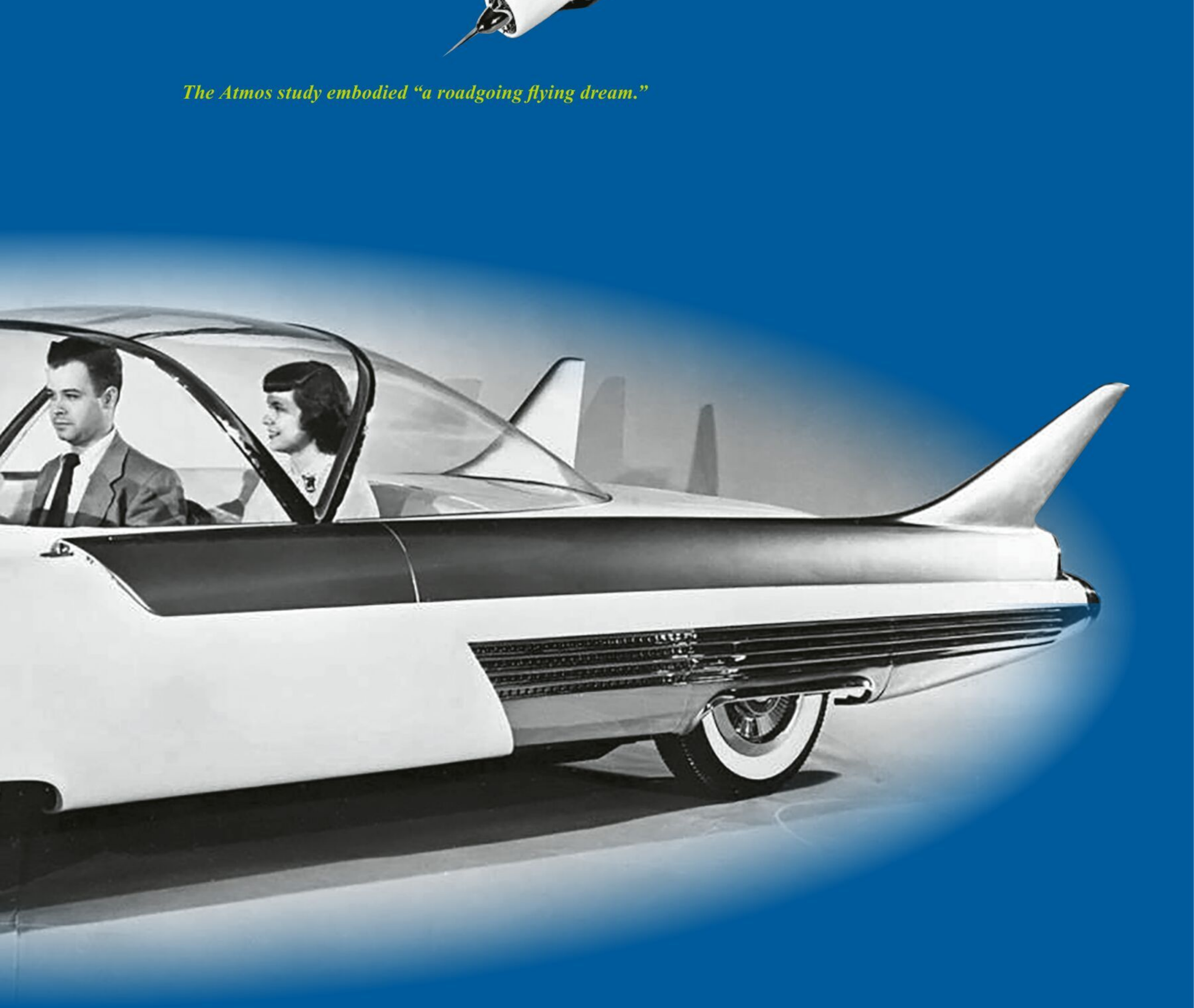
NUCLEAR-POWERED CARS



FORD FX ATMOS

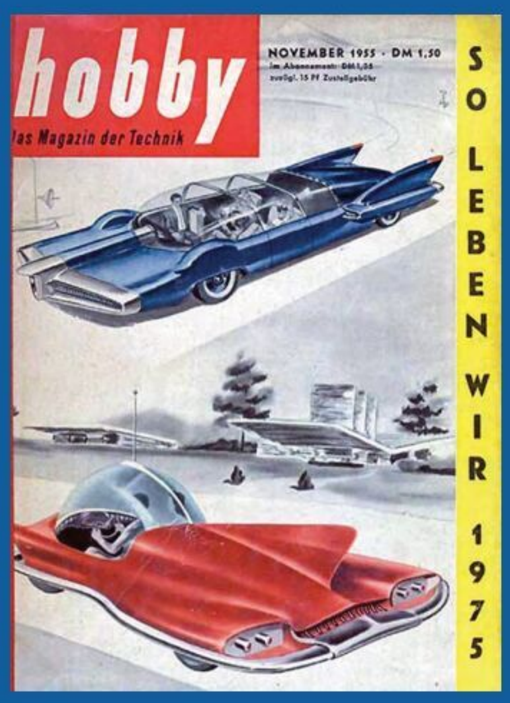


The Atmos study embodied "a roadgoing flying dream."



ATOM TOY

Radioactivity in the kid's room: the Gilbert Atomic Energy Lab.

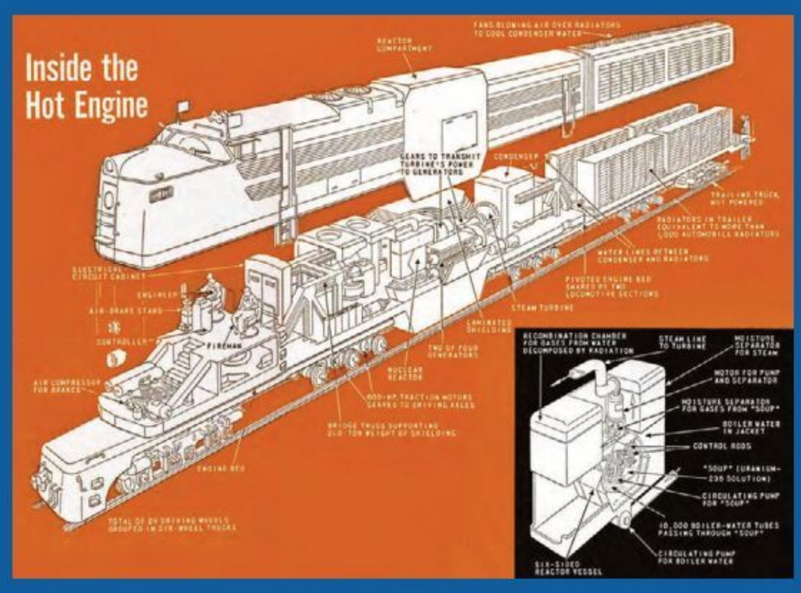


ATOMIC VISION

How life was imagined to be twenty years on.

X-12

In 1954 the 58 meters long X-12 nuclear locomotive study weighed 360 tons.



The two bombs, known as "Little Boy" and "Fat Man," should have given the mighty of the world plenty to think about when the atomic explosion clouds reached 18,000 meters above Hiroshima and Nagasaki, Japan. However, East and West continued to strong-arm each other into a nuclear arms race. It was possible for the world powers to wipe out the world population umpteen times within a few hours with their atomic bomb arsenal. The posthumously crowned winner, however, who was the first to press the buzzer button, would probably not have been able to be determined by anyone afterward. In order to give nuclear power, a weapon of mass destruction, a little cutesy charm, Dwight D. Eisenhower called for the peaceful use of atomic energy at the UN conference in Geneva in August 1955. Thanks to one-sided reporting, the population, who were very interested in science at the time, could be convinced that nuclear energy should find its way into all areas of life.

ATOM TOY

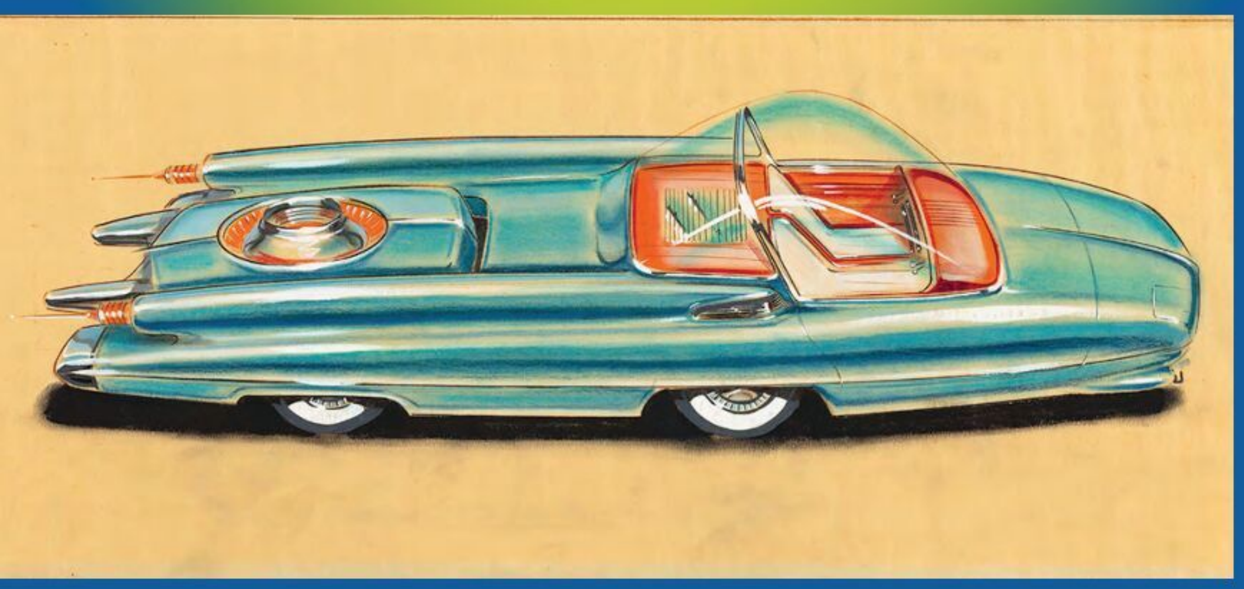
In order to take away the inappropriate fear of radioactivity from children and to get to know how to deal with it in a playful way as early as possible, Alfred Carlton Gilbert, an American magician and inventor, developed the Atomic Energy Lab as a toy, which progressive parents bought for their little ones for U.S. $50 starting in 1950. Contents included a Geiger counter, an electroscope, a Spinthariscope, and a Wilson cloud chamber, and – quite shockingly, one might say – four uranium-containing, radioactive ore samples that children were allowed to handle openly at home. It was also thought that the new technology, which was touted as almost harmless, was set to replace conventional powertrains in vehicles used in the air, on the water, on rails, and on roads as well.

ATOMIC VISION

Visionaries and dreamers saw the terrestrial world freed from all energy supply and space problems thanks to nuclear power, as illustrated by Ernst Behrendt's prognosis in a 1955 cover story for the German magazine "Hobby," a local version of Popular Mechanics. Titled "So Leben wir 1975" ("How We Will Live in 1975"), it read:
"For many people, dreams of the future are the sober present. In the morning they go to their office or workshop; in the evening they return to their apartment; they spend the hours between morning and evening on platforms in space, in nuclear-powered cars … on rolling pavement many meters underground … Today's designers seem to agree on how the means of future transport will be powered. As far as can be seen, the petrol piston engine has almost disappeared. Surely there are still a few diesel engines somewhere in a sleepy province, but in the big world the turbine drive has long been the established norm. However, its reign will probably be short-lived. Since nuclear power has long been harnessed to generate electricity, it may well be possible to use it to power cars … All the problems that still stand in the way

FORD NUCLEON

The 1957 Ford Nucleon concept aimed for a range of 10,000 miles (16,000 km) between refueling.



FORD NUCLEON

In order to provide enough space for the engine, the passenger cell was moved in front of the front axle.

of using nuclear power for smaller vehicles today are hoped to be overcome by 1975. First, it will be possible to build a small, compact nuclear facility that can be installed under the car, rather than in the car, as one might think. Secondly, it will hopefully be possible to shield the nuclear facility in such a way that people are not endangered and to make the necessary protective cover relatively light. The conversion of nuclear energy into electrical energy may take place directly, and no longer via the energy-economically costly and cumbersome detour of heat-water-steam-turbine electricity. Rather, the electrical energy generated from nuclear energy will be used directly to power the various electrical motors attached to each axle."

X-12, 1954

In 1954, Lyle B. Borst, a professor in the Physics Department of the University of Utah, presented the feasibility study for a nuclear-powered locomotive called the X-12. It was set to be powered by a 30,000-kW light water reactor, which would use Uranium-235 as fuel. The reactor was to be encased in a 200-ton protective wall to prevent radioactivity from escaping. The total weight of the almost 58-meter-long locomotive was calculated at 360 tons; the production costs were estimated at an astronomical U.S. $1.2 million. Although the X-12 would have cost twice as much as four diesels coupled together to produce the same 7,000 horsepower, five rail operators showed great interest in the project. However, the high cost of uranium prevented the X-12 from becoming reality.

FORD FX-ATMOS, 1954

The same year, the Ford Motor Company presented its stunning FX-Atmos prototype at the Chicago auto show. It was labeled a study of an "experimental future atmosphere" – which could lead to a new "world." It was reminiscent of a double-fuselage space glider, with powerful stabilizing fins at the rear and wheels hidden under the plastic body. The pilot obtained all the latest traffic information via the "Roadarscope" radar screen mounted on the dashboard in order to be guided safely and quickly through heavy traffic. The spaceship was steered with two handles, sitting in the middle, while the two passengers of the three-seater – enthroned under a huge glass canopy – were allowed to enjoy the free view of the starry sky. However, the real revolution was supposed to take place under the bonnet, according to speculation in the U.S. press. It was rumored that a nuclear power source was intended to power the aircraft-like road cruiser. Ford Vice President Lewis Crusoe vehemently countered these rumors. "This vehicle is not proposed as a future production vehicle. For this reason, no technical considerations were made during development!" Editors of Auto Motor und Sport in Germany claimed that "a flat or boxer engine" under the cooling fins was really providing the necessary traction.

FORD NUCLEON, 1957–1958

Just three years later, Ford strategists painted a whole new picture of the automotive future with the launch of the Jim Powers–designed Nucleon, in which designers assumed

STUDEBAKER PACKARD ASTRAL

A styling study was made in 1957 to gain experience in working with glass-reinforced plastic. Publicity material mentioned nuclear power.

FORD SEATTLE-ITE XXI

The four-wheeled front end together with the drivetrain was interchangeable.

that one day the bulkiness and weight of nuclear reactors and the associated shielding could be significantly reduced. They envisioned an easily replaceable nuclear power module in the loading area of the futuristic pickup model, which was realized on a 3/8 scale. Consisting of a nuclear reactor, a steam turbine, and gearboxes with electronic torque converters, it resembled the powertrain of a nuclear submarine. The steam generated by uranium fission propelled the turbine. The position of the powertrain between the front and rear axles was due to the incredible heaviness of the reactor's lead casing, which was responsible for the astronomical weight. The developers calculated a range of 8,000 emission-free kilometers before the reactors would have been replaced at an exchange point that was to replace conventional petrol stations.

FORD SEATTLE-ITE XXI, 1962

Ford's atomic-car research program came in very handy for Eisenhower's government, which did not want to arouse fears of catastrophes about the peaceful and military use of nuclear power in the first place. In the course of the semi-official Seattle World's Fair in 1962, Alex Tremulis's model of the 'Seattle-ite XXI, a six-wheeled future study created quite the buzz. The designer considered four front wheels necessary, not only to ensure more driving stability, but also to be able to carry the very heavy atomic front-wheel powertrain, which was easily replaceable. The front part of the car up to the windshield were to be separated from the rest of the vehicle in "plug and play" fashion, so the Seattle-ite should have been easily converted from an economical city car to a 400-hp sports car when required. The computer-aided control at the touch of a finger, as well as a screen that was supposed to inform the driver about the weather and traffic situation, are regarded as harbingers of the systems used today. Automobil Revue, a respected Swiss magazine, wrote the following about the Ford Seattle-ite: "There should be no more talk of gas-polluted air, since in a few decades vehicles will only be powered by atomic power or solar energy. So it seems visions of flying carpets and suitcases mentioned in the 1001 Nights fairy tale will come true after all …"

STUDEBAKER PACKARD ASTRAL, 1957

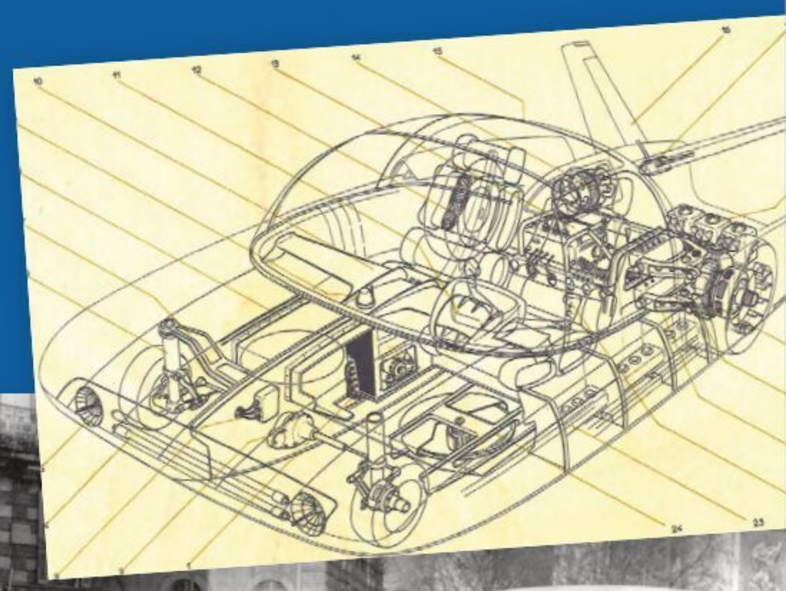
In 1957, the Art Center of South Bend asked Studebaker if it would be possible in the course of an exhibition to present "a futuristic automobile that meets the needs of commuter traffic in 25 years." The styling team led by Ed Herrmann took on the challenge and placed the fiberglass-reinforced plastic-bodied Astral on a single gyroscopically balanced wheel, which was actively stabilized in a control circuit using a gyroscopic instrument that provided the necessary balance. Thanks to the atomic ion drivetrain, excursions into space should have been possible with the Astral, so traffic problems and roads would be things of the past, as one could hover unhindered over land and water. The utopian-looking, immobile idea carrier with a dummy engine was also presented to the public at the Geneva Motor Show in 1958, where at the same time another vehicle with a possible nuclear drive was to provide plenty of material for discussion.

ARBEL SYMÉTRIC

In the 1951 prototype (right), a Simca engine generated the electricity for the electric motors. The '58 model (above) was intended to be propelled by a nuclear power source.

SIMCA FULGUR

Robert Opron's study was very well thought out down to the last detail.



ARBEL SYMÉTRIC, 1958

The aforementioned car was the Arbel Symétric by the Loubière brothers. Casimir Loubières, an energetic and resourceful car salesman and amateur engineer, was building avant-grade prototypes since 1950 thanks to the deep pockets of his brother, Maurice. The Symétric got its name from the simple fact that it was symmetrical. The body was made of plastic panels (whether on steel, alloy, or timber frames is unclear), sitting on a relatively high "backbone" tube chassis. The windscreens and windows were all curved plexiglass. The doors opened in a very peculiar, clamshell-like way: the glass would slide into the domed roof, while the plastic door panel slid under the floor. The four doors were made of identical panels, as were the boot and hood and the front and rear windscreens. The car's suspension was entirely made from rubber blocks, eliminating the need for shock absorbers. The original Symétric in 1951 was a hybrid utilizing a 1.1-liter Simca petrol engine as a generator, providing electricity to motors in all four wheels. Indeed, the electric motors were situated within the wheel hubs themselves. After a few years of relative silence, the Symétric returned to the scene in an updated form at the 1958 Paris Motor Show. Launched in cooperation with François Arbel, the new Arbel Symétric featured updated styling and four different powertrain choices. The fourth, called Genestatom, was – according to the official blurb – a "40-kW hybrid nuclear dual turbine mounted at the rear of the car, which would use nuclear waste material stored in a special cartridge, providing electric power for five years." The brochure also mentioned that the availability of this engine depended on government approval. Though a few deposits were collected, the Arbel project quickly vanished.

SIMCA FULGUR, 1958

In 1958 Robert Opron, a young designer at Simca, accepted a challenge to produce a concept for the 1959 Geneva Motor Show to illustrate his vision on what cars in the year 2000 would look like. The Fulgur ("Flash" in Latin) was shown at the Geneva show. According to its official description, "On secondary roads, the Fulgur is powered by six monatomic free energy storage accumulators, which are fully accessible at the rear: in this case, the range is 5,000 km. The driver has a radar device for orientation. He gives instructions to an 'electronic brain' that takes care of the car's steering. On freeways, a control tower takes the Fulgur under its wing; the steering is fully automatic; the power supply is provided by electromagnetic induction. If the radar device detects an obstacle, the car is brought to a standstill immediately. The suspension of the Fulgur is electromagnetic, with a control device automatically adapting it to road conditions." The Fulgur was also shown at the 1959 New York Auto Show and also at Chicago 1961 before disappearing into oblivion.

Today, more than 60 years later, much of what Opron and other visionaries anticipated back then would be reality today is still regarded as pure pie in the sky. ♦

ON THE PATH OF GODS

GUTBROD ATLAS

Gutbrod is a largely forgotten German car brand, though its Superior was the first car in serial production with a direct-fuel-injection engine. **Otfried Jaus**, an expert on of the brand takes a look at the post-war development of the postwar commercial vehicle range as we are preparing a book with Sammlung K on the company.

The Gutbrod brand name was only used after WW2.

An early blurb featuring the Vischer-built cab touted the frugality of the 16-hp two-stroke engine, which consumed just 7-9 liters of fuel/100 km.

Colour photos by Máté Boér

A 24-page brochure in 1951 listed all variants.

SMALL COMMERCIAL VEHICLES IN GERMANY BETWEEN 1945 AND 1953

The immediate postwar years saw Germany divided into four different zones, controlled by the American, French, British, and Soviet forces. Industrial production collapsed, the Reichsmark lost its value, and people were exchanging goods for food.

In these circumstances, small, cheap light transporters were essential. In the period 1945–1947 there were just a few companies in Germany that were able to supply this market segment: Vidal & Sohn in Hamburg and Standard Fahrzeugfabrik Wilhelm Gutbrod (renamed to Motorenwerk Wilhelm Gutbrod) in Plochingen. These companies already offered such vehicles before the war, and their factory survived the war's activities with little damage. Mercedes joined them with a makeshift pickup version of the 170V, which was the second-most popular model in the ¾-ton truck segment for a while.

By the time Gutbrod came up with its new model, the Atlas, in 1950, the market exploded. DKW came up with the Schnellaster in 1949, Vidal & Sohn moved away from tricycles with its Volkswagen-powered Matador, and Volkswagen itself introduced its first Transporter in 1950. Smaller competitors included Manderbach in Wissenbach, which produced a small van with a Ford engine; the Willy Ostner Fahrzeugwerke in Sulzbach-Rosenberg; and Autowerke Salzgitter, which followed the European trend of converting Jeeps into small delivery trucks. Later on Ford, Borgward, and Lloyd also came up with their own vans.

Discovered in 2008, this truck was almost scrapped.

GUTBROD ATLAS

The story of Gutbrod commercial vehicles goes back to the early 1930s. Wilhelm Gutbrod (1890–1948) was always interested in mechanical things, and though he studied to become an engineer, the First World War put an end to such plans. In 1926 he set up his own company, Standard Fahrzeugfabrik GmbH in Ludwigsburg, where he produced motorcycles. In 1932 he bought a license from Josef Ganz and subsequently launched production of the Standard Superior small car (see Rare & Unique Vehicles No. 2). At the same time the company introduced a three-wheeler goods carrier, the Progress 200. Eventually four-wheeled small Superior-based trucks followed, the bigger Merkur and its smaller companion, named the Hermes.

By the second half of the 1930s, the range was standardized as the P 203, P 503, H 204, H 504, and HV 504 – denominating the number of wheels, engine sizes, and loading capacities. With the outbreak of the Second World War, the authorities only allowed the production of one standardized three-wheeler freight truck by various companies in Germany. Vidal & Sohn's Tempo A400 was the template – and Standard was ordered to follow it; thus the E1 three-wheeler was born. Though Wilhem Gutbrod considered the Tempo to be inferior, he knew better than to argue with Nazi Party officials. The E1 remained in production until the end of 1941, when Vidal & Sohn intervened.

After the war, Gutbrod first resumed production of agricultural machinery. In the second half of 1946, company managers contemplated using their existing stock of parts for the H-series as a basis that would enable them to put

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1 A Gutbrod demonstration somewhere in Germany.

2 A celebration of the 1000th Gutbrod H504 at the Plochingen factory, 1948.

3 Promotional photo of the Binz-bodied Atlas flatbed.

together a series of small trucks. However, there were two major problems: the prewar engine supplier disappeared, and the American authorities were reluctant to issue a manufacturing license for such products.

Wilhelm Gutbrod solved the first problem by employing Will Krauter, who previously worked at the Institute for Motor Vehicles in Stuttgart. During the war he designed an air-cooled four-cylinder, two-stroke engine, which was intended as an auxiliary drive for military gliders but probably was never used for that purpose.

Gutbrod's efforts to convince the Americans to change their minds were fruitless at first. But he persevered, arguing that the planned delivery van was actually not an automobile but merely a simple means of transport, which was a basic necessity for the population. Besides, he said, the 500cc, 12-14-hp engine was more like a toy than a serious power source, so any chance of using it for a military vehicle was quickly dispelled. Thus Motorenwerk Wilhelm Gutbrod was the first company to receive a production license for small delivery vans in the American zone.

For a while sales were okay, but it was apparent that the Heck 504 was way past its sell-by date. In 1948, Vidal & Sohn sold 3,769 units of its Tempo, followed by Gutbrod with 759 units and Mercedes with 616 units.

Walter Gutbrod, the eldest son of Wilhelm, joined the company in 1945. Following the untimely death of his father in August 1948, he took the helm of the Gutbrod companies – there were two at this time. Previously he had argued with

1 The meticulous restoration was done by a workshop specialising in Porsche.

2 On some export markets the MotoStandard brand name was used. This speedometer was installed during restoration.

3 The brand new two-cylinder, two-stroke engine.

4 Only a few Atlas were built with a Vischer cab.

his father about the direction the company was taking as he wanted to focus more on agricultural machinery.

As the head of Gutbrod, Walter decided to plow ahead with development of a new small commercial vehicle. Krauter left the company and engine development work was farmed out to Dr. Ing Schnürle, a two-stroke expert who set up his own engineering company in Stuttgart after the war. It was Schnürle who employed Dr. Hans Scherenberg, a former Daimler-Benz test engineer, while he was waiting for his denazification process to end. Scherenberg became the linchpin of Gutbrod's engine development program. It was his work that led to the fuel injection engine in the Superior small car. Dr. Schnürle's engineering office also developed a small air-cooled two-cylinder, two-stroke engine for a new range of small commercial vehicles. By 1949, the platform of the new small van was completed. Its cab was designed by Karl Hannemann, the former head of the bodybuilding division at Horch within AutoUnion AG. Hannemann worked with a lesser-known Stuttgart-based coachbuilder, Vischer, on the prototypes.

At this time Walter Gutbrod looked at the possibility of bringing cab production in-house but then decided to use a trusted partner, Binz, instead.

By the end of 1949 the new model, code-named "Heck 04," was production ready. All it needed was a catchy name. Continuing the Greek-Roman mythology theme, the name Atlas was chosen. Apparently Goliath and Hansa-Lloyd, both members of the Borgward Group, already offered an Atlas in

the 1930s, but in postwar times the name was free to be used. Production of the Gutbrod Atlas 800 (the name indicating its payload in kg) commenced in 1950, first at Plochingen, then at a new facility in Calw. By the end of the year, Gutbrod offered a full range of bodies from a simple Fahrgestell mit Fahrerhaus (cab-on-chassis) to an eight-seater Omnibus, with prices ranging from DM 4850 to DM 6950.

While Gutbrod achieved a new production record of 4,360 units, competition heated up. Volkswagen sold 5,765 units of its new Transporter, and market leader Tempo had sales of 8820 tricycles. Other well-established players also surpassed Gutbrod: Goliath sold 8,468 three-wheelers, while sales of the DKW Schnellaster amounted to 5,434 units.

Pricing became a key issue with increasing raw-material prices. The Atlas 800 became more expensive and more obsolete as its two-stroke engine was no match for Volkswagen's four-cylinder, four-stroke unit. A new, higher-payload variant called the Atlas 1000 was unveiled in 1951. In the same year, assembly of the Gutbrod commercial vehicles also commenced in South Africa. By the end of 1952, the financial situation at Gutbrod became dire.

Sales of the Atlas dwindled. Payment from the company's partner in South Africa came irregularly. In the fall of 1953, Gutbrod went into receivership. Altogether, around 11,000 Atlas models were produced in Germany and from 1000 to 1300 vans were made in South Africa. The reorganized Gutbrod was set to return as a producer of agricultural devices, but that was an altogether different company.

1 The story of Standard and Gutbrod commercial vehicles told by Sammlung K.

SAMMLUNG K AND THE GUTBROD ATLAS

Gutbrod has a special place in the Sammlung K collection which features more than a dozen vehicles from the Standard, MotoStandard and Gutbrod brands including two Atlas light trucks. One of the highlights is an ultra-rare Atlas with a Vischer cab of which there are only two known survivors! This particular vehicle was literally excavated in 2008 as it was parked outdoors for decades. The wreck was not only overgrown, but also partially sunk into the ground. A restoration company which specializes in Porsche cars (!) was so fascinated by the vehicle that they took it on, though economically restoration did not make sense. But the rarity of the car prevented it from being scapped. After a lot of efforts a pristine, "better than new" vehicle was built from the few remaining original parts which has won awards at classic car shows in Germany. The blue Atlas flatbed rolled off the Calw assembly line in 1951. It is a typical representative of the model with a Binz-made cab. Around 4000 units were produced in that model year, including over 2,200 Atlas 800s with the 576 cc two-cylinder engine (16 hp). Unfortunately the original papers of this car have been lost, so its background is not known. It has never been completely restored, just repaired and upgraded to comply with newer requirements, such as turn signals. ♦

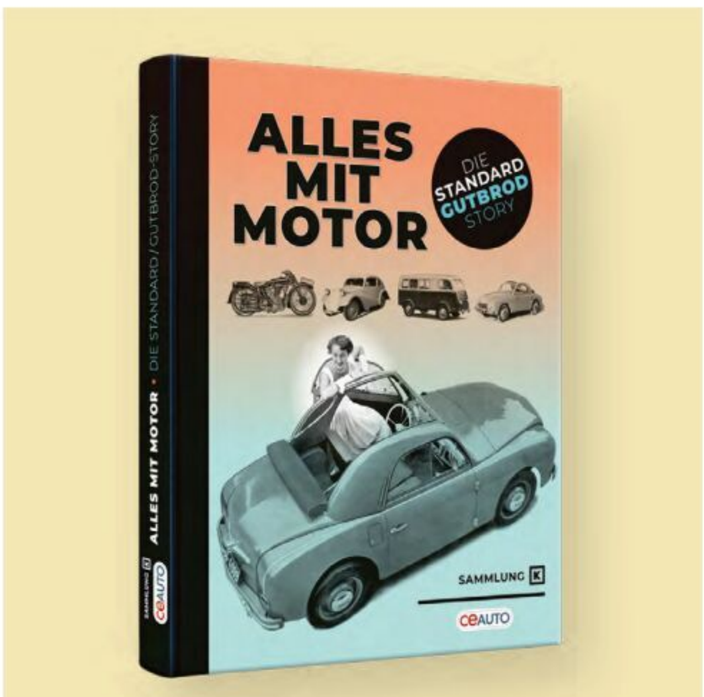
SAMMLUNG K

2

2 The large flatbed of the Atlas was ideal for craftsmen.

3

3 A typical Binz-bodied Atlas, of which 4000 were produced in 1951.



ALLES MIT MOTOR

We will proudly present our new book, Alles Mit Motor – Die Standard/Gutbrod Story at the 2022 Retro Classics in Stuttgart in April. This 272-page book charts the story of Walter Gutbrod and his company from 1926 to 1954. Paul Schilperoord whose research on Josef Ganz has been featured in Rare & Unique Vehicles No2, noted motorcycle historian Andy Schwietzer and Otfried Jaus put together a very compre-hensive overview, which is accompanied by a photo gal-lery of surviving vehicles. More details are on https://rareandunique.media/gutbrod

Do you want to know more about the book **ALLES MIT MOTOR**? Look at:

Alles mit Motor,
full coloured book,
272 pages,
CEAUTO-Verlag

ISBN 978-3-200-08284-7
Preis 48,90 Euro

4 The success of the Atlas was short lived.

5 The instrument panel was redesigned for 1951.

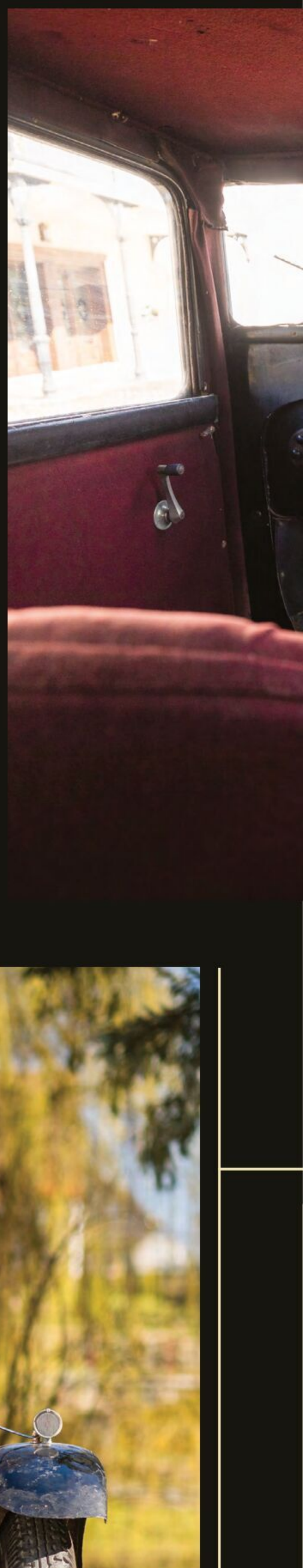
4

5

AVIONS VOISIN TYPE C23/ C24 CHARQUATRE, 1932

CUBIST CHARISMA

Gabriel Voisin was a visionary, and his automobiles were highly unconventional. One of his personal cars, a prototype between the C23 and C24, is today part of a Czech private collection and it was sourced by the Auto Veteran Company in Prague.



1 Bernard Voisin standing next to the C23/24 at Voisin's family villa in Ville-franche-sur-Mer.

2

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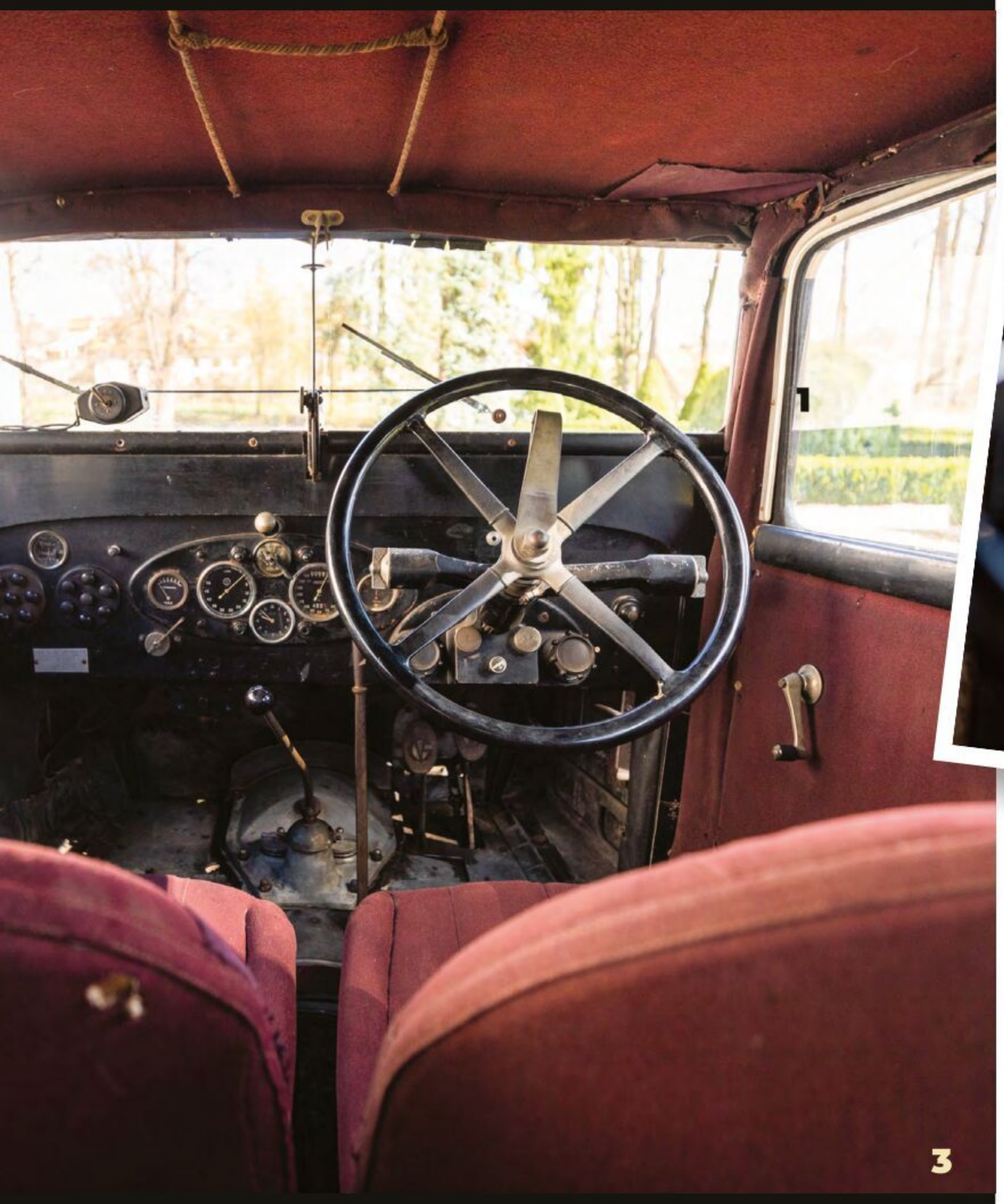


3

The controls of the adjustable suspension.

2 Voisin has a distinctive appearance.

3 Completely original interior.

4 The famous "cocotte" bird was made from alloy.

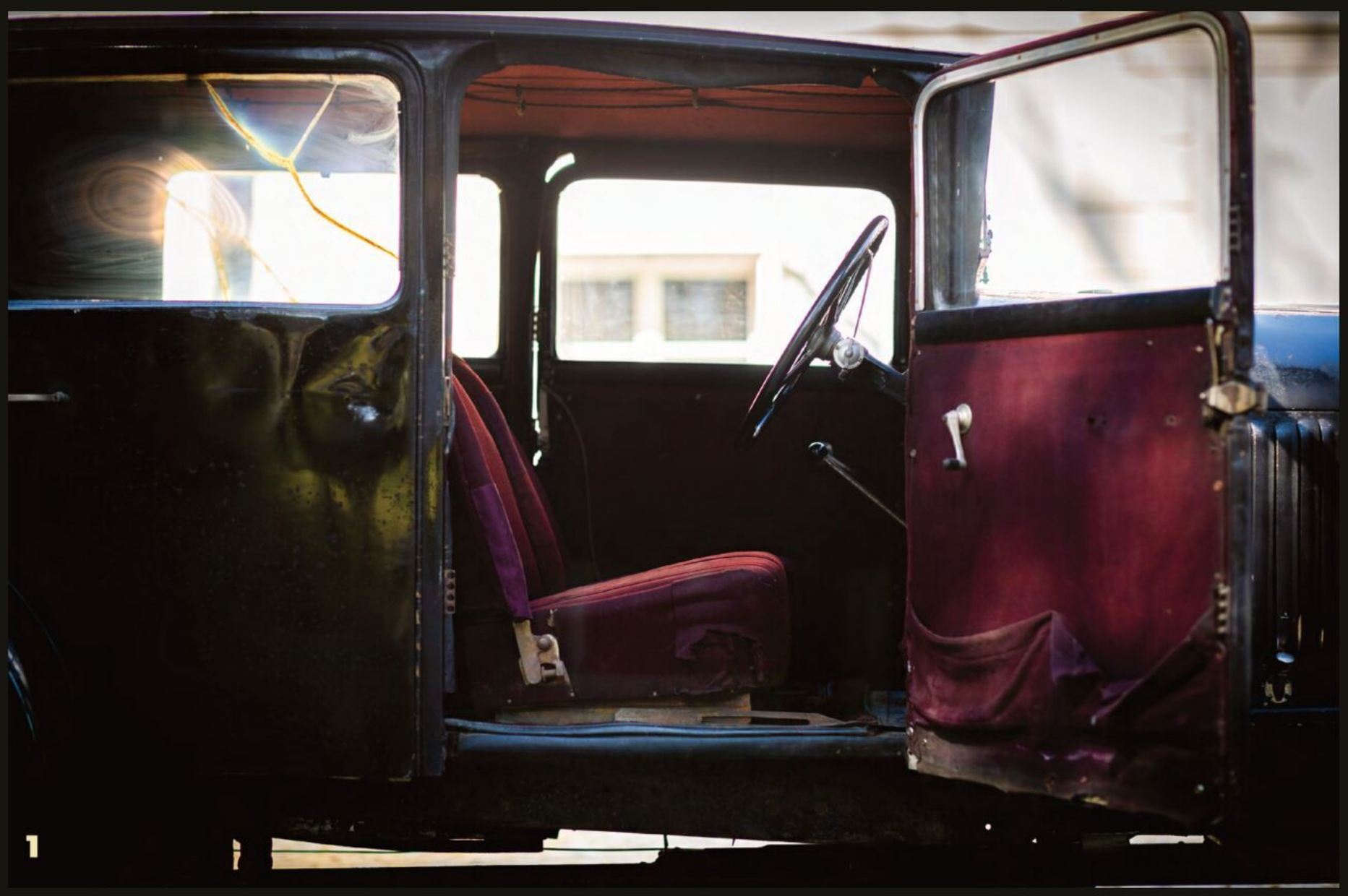
4

Gabriel Voisin has been described variously as a mechanic, engineer, architect, aerodynamicist, inventor, and industrialist. He was also a painter, musician, poet, and philosopher. He was truly a renaissance man. Born in 1880, he studied architecture, but at the 1900 World Expo he became mesmerized by "flying machines," and his attention turned to the nascent discipline of aviation. In April 1904, after completing compulsory military service, he teamed up with his brother to open a factory. Among other remarkable planes, they developed the Voisin-Farman I with Henry Farman, which was the first European airplane capable of handling a kilometer stretch not only in a straight direction, but also swirling.

In 1909, at just 29 years old, Gabriel Voisin became the youngest Knight of the Legion of Honor. In 1911, he took the dramatic step of building all-metal airplanes, leading to the production of more than 10,000 airframes during World War I. At the war's end, he turned his attention to automobiles. Voisin worked together with André Lefebvre, who went on to design the Citroën Traction Avant, to develop his new lineup. Voisin cars were light and advanced, but they were not cheap. Customers included aristocrats, royalty, and celebrities. A close friend was renowned French architect Le Corbusier, who inspired many different bodies. Unlike many of his contemporaries Voisin offered more than a chassis that then had to be "dressed" by a specialist. He had a deep mistrust of coachbuilders, thinking that they were incapable

ART DECO TREASURE

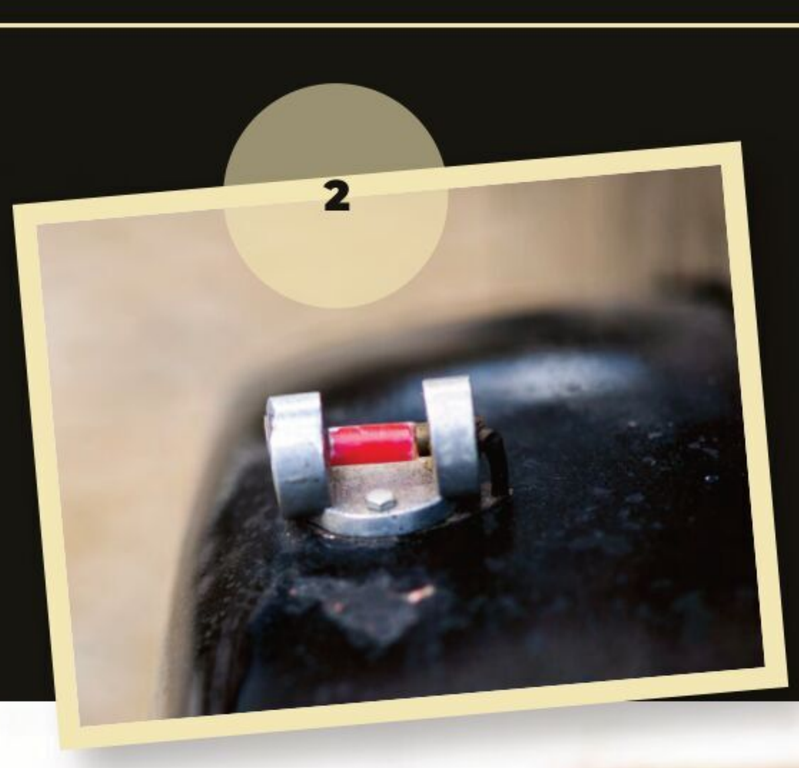
Collectors Corner



1 The aluminum door revealed a comfortable interior.

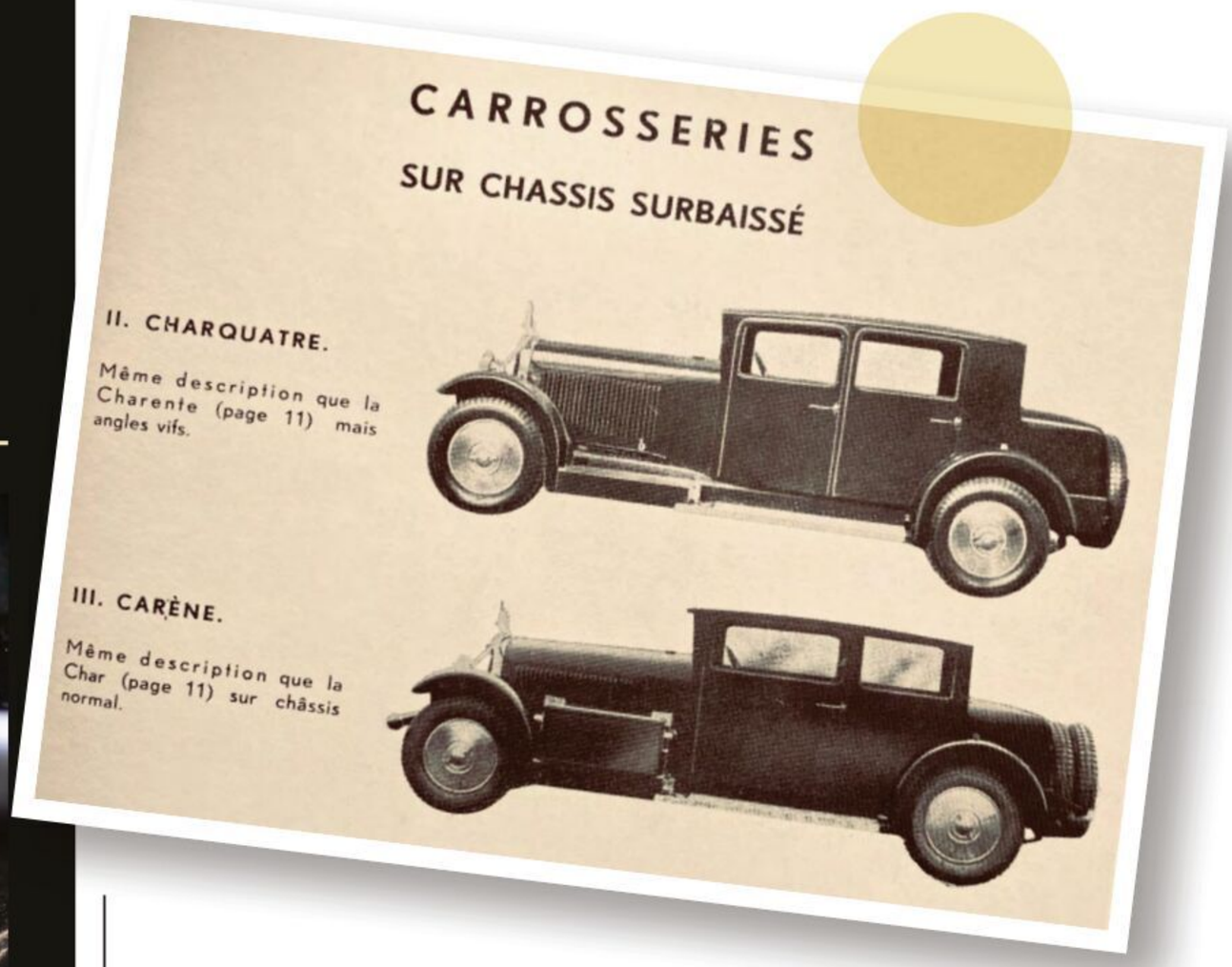
2 Unique Art-Deco position light designed by Gabriel Voisin.

3 Ultra angular details with adjustable windscreen.



4 A unique design resulting in very good proportions.

5 Top-of-the-line Jaeger instruments.


CARROSSERIES

SUR CHASSIS SURBAISSÉ

II. CHARQUATRE.

Même description que la Charente (page 11) mais angles vifs.

III. CARÈNE.

Même description que la Char (page 11) sur châssis normal.

A period brochure showing the Charquatre and Caréne body styles.

of meeting his exacting engineering standards or achieving the demanding quality of his proprietary construction techniques – never mind living up to his perfectionist aesthetic demands – so he built the bodies in-house.

Each car had a radiator mascot, patterned after La Cocotte (the chick) devised for the C5 out of scrap aluminum and riveted together. Voisin's name was a household word because of his aviation exploits, so the vehicle found success in the marketplace.

The mid-range Voisin C23 was introduced in 1930, positioned between entry and top-level models. It was equipped with a 2994-cc sleeve valve six-cylinder engine, built under license from Charles Knight. Two years later came the C24 with the same engine – tuned for an extra 10 hp but featuring a lightened and lowered chassis. The interior was carried over, as was the adjustable suspension.

This car, which now resides in a Czech private collection in original condition, was built in 1932 and is a prototype of the C24 – some people call it a C23 and others a C24. It features an angular, Art Deco-styled four-door body called the Charquatre (sometimes referred to as Myra), which is claimed to have been partly designed by Le Corbusier.

Among surviving Voisins, Charquatre-bodied versions are few and far between. The Louwman Museum in the Netherlands and Peter Mullin's museum in the United States are known to possess one each.

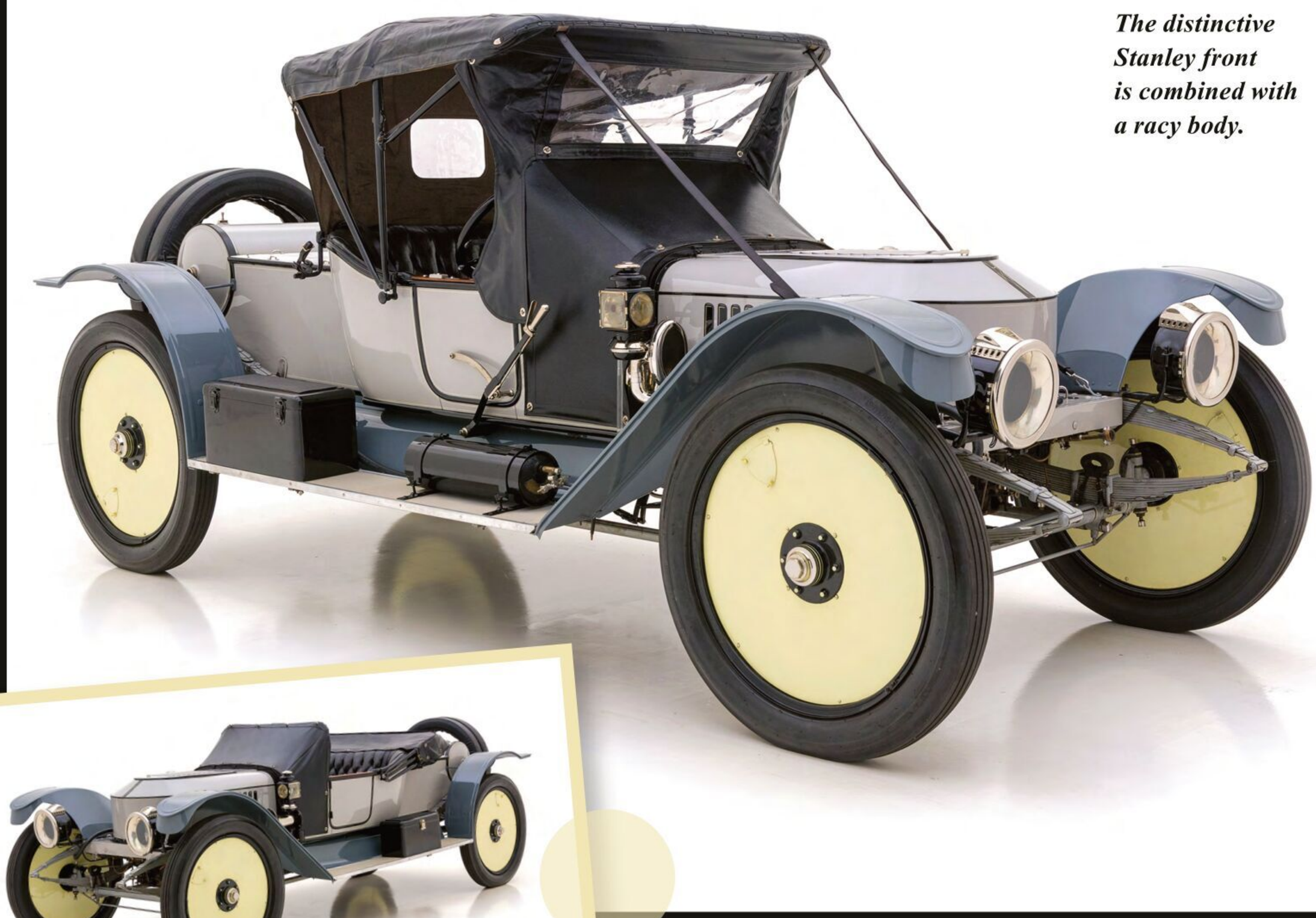
However, this car is even more exceptional, because it was owned by Gabriel Voisin himself until his death in 1973. It was bought from his son, Bernard Voisin, at their family villa in Villefranche-sur-Mer in 1991. ♦

1912 STANLEY SPECIAL 30-HP ROADSTER TRIBUTE

SPORTS PUFFING

Brent Campbell, a lifelong Stanley Steamer enthusiast, collector, and restorer, spent 15 years building a tribute to a very special Stanley.


2



The distinctive Stanley front is combined with a racy body.

1

1 The suspension was lowered by 8 inches (20 cm).

2 Instead of a standard windshield Raymond Stanley preferred a canvas covering, known as the "Cambridge Windshield".

3

SOURCE: STEAM CAR NETWORK

4

3 The original car as used by the Stanley family.

4 Brent Campbell spent 15 years building his tribute.

While roadgoing steam locomotives and early steam cars derived from these contraptions were produced in large numbers starting in the 1880s, things changed with the rise of the internal-combustion engine. The Ford Model T spelled the end of these reliable, safe, but hard-to-operate vehicles. Stanley, one of the best-known and best-selling of the steam car manufacturers, was launched by the Stanley twins, Francis Edgar and Freelan O., in the late 1890s in Massachusetts. For a short time Stanley outsold every gasoline car in the United States, but eventually technological advances in petrol cars, such as more efficient engines and the appearance of the electric starter, made steam cars obsolete. After World War I, Stanley went into a steep decline, and the company folded in 1927.

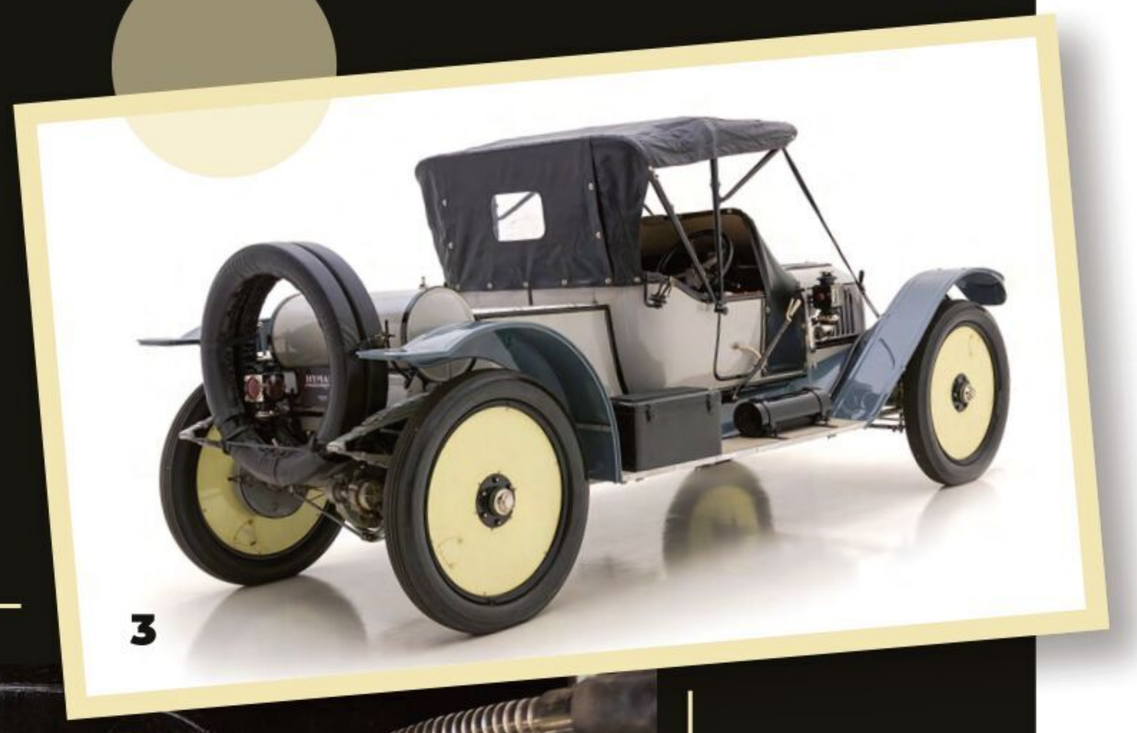
THE RAYMOND STANLEY SPECIALS

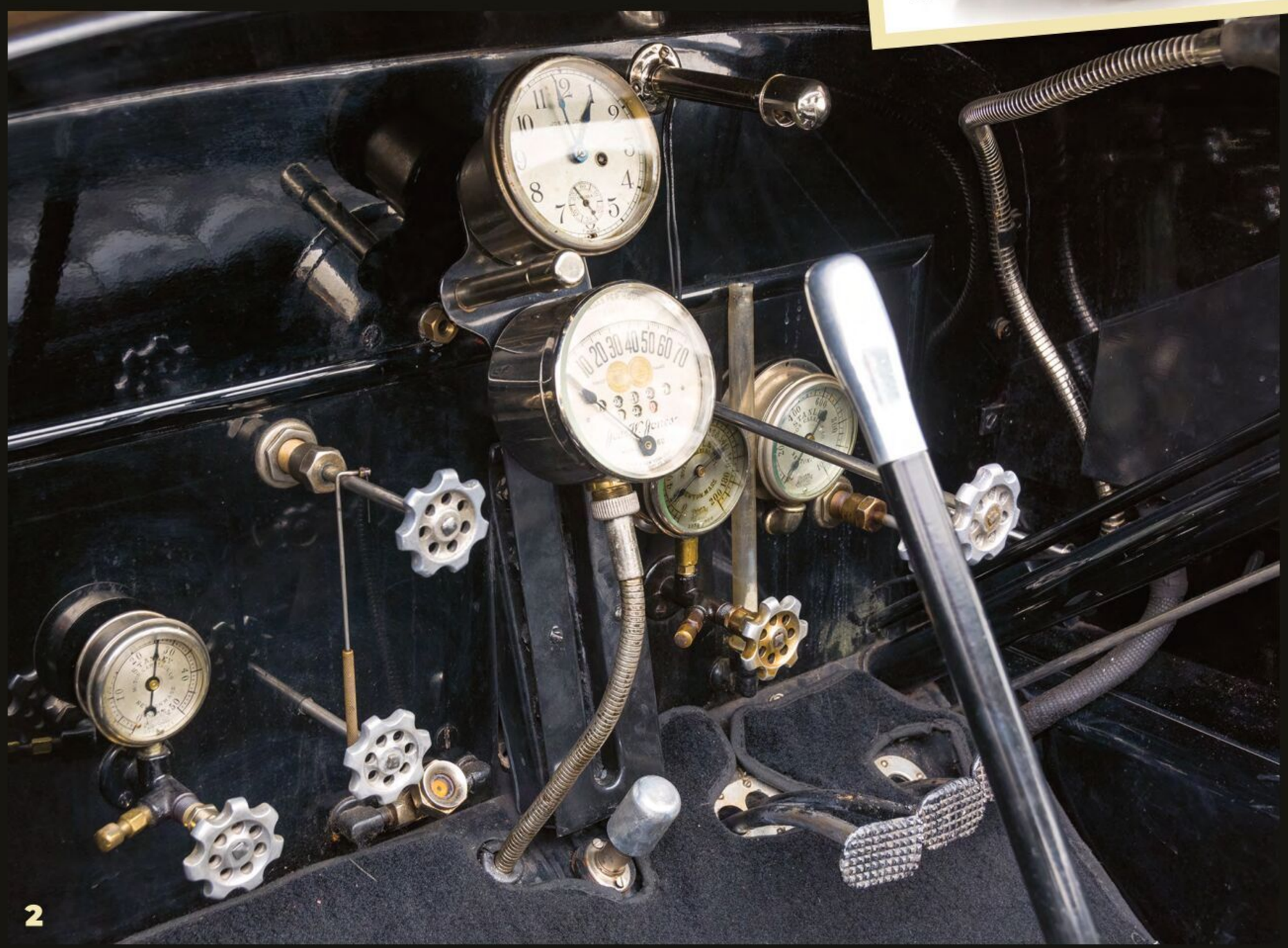
Between 1908 and 1916, the Stanley Motor Carriage Company built no fewer than three special cars for Raymond Stanley, the only son of F.E. Stanley. Raymond attended Harvard University and earned his degree in Automotive Design, an area in which he had a great interest stemming from growing up in the business. This allowed him the opportunity to have his father supervise his designs. Raymond's first car was a non-production-looking version of the famous Model H Gentleman's Speedy Roadster, completed when he was just 14. On a short wheelbase and powered by a 10-hp engine (the full-size H made 20 horsepower), it took Raymond to school and back, and he drove it to Maine the first summer after building it.

While Raymond designed his next car specifically for himself, the factory pulled out all the stops. Choosing a 30-hp engine as used in the Model K Semi-Racer and the Model Z nine-passenger Mountain Wagon, he started with a 118-inch wheelbase as used by the Mountain Wagon and designed a sleek, low two-seat roadster body. It was completed in 1911, but Raymond did not keep it long, selling it to Thomas Plant, a wealthy businessman, on April 25, 1912. It was rediscovered by Brent Campbell (1945–2021), who had been around Stanleys since the early 1950s, when he rode in his grandfather George Monreau's 1913 Model 65. George Monreau had once worked at the Stanley factory and regaled his eager listeners with many tales.

Campbell restored Raymond's former roadster, which he nicknamed Effie, because "F.E. surely had to oversee the [building] of the car at the factory."

Over the years Campbell owned and restored many Stanleys, but he was best known in steam-car circles for his multi-year painstaking re-creation of the third Raymond special, a 1912 30-hp roadster.





1 As with other Stanleys, the boiler fills the whole front of the car.

2 As a steamer there are lots of knobs and instruments as required.

3 Brent Campbell's car was driven by Jay Leno in 2017 to Mount Washington, the highest peak in New England.

THE STANLEY 30-HP ROADSTER SPECIAL

This car was based on his 1911 roadster, but Raymond made some changes resulting in an even lower and longer shape. It had a non-standard 130-inch wheelbase and, of course, a 30-hp engine. There was no glass windscreen, just a Cambridge Windshield (known also as canvas cowl) to direct airflow upward. By 1913, Raymond had changed the lighting to the newest style and raised the windshield, eventually fitting two "portholes" for better visibility. A luggage deck was fitted behind the cockpit, finished off with a round tank at the rear. The road ahead was well lit with novel combination kerosene-and-electric side lamps, as well as electrically ignited E&J gas headlamps that necessitated a battery box on the running board. Production cars would not get these until a year later. The wheels were standard 28-inch artillery wood-spoke types, fitted with disc covers on both sides.

The steering was the weak point in the design. As Campbell recalled: *"This car was not sold since it was still in use by Raymond in 1914 when the steering broke the second time. F.E. decided to dismantle the car after the second steering breakage, which happened while Raymond and two of his Harvard classmates were on*

their way from Harvard to Raeburn Country Club in Brookline, Massachusetts, on a Friday afternoon for a game of golf. Each week the boys would try to best the previous week's time, as Raymond told several steam enthusiasts in an interview in the early 1980s before his death in 1984. He said they were on track for a record time when the steering broke the second time and the steering wheel just went around and around in his hands with no connection to the front wheels. Luckily, he and his two passengers survived the crash. Ray walked away to the nearest house to call his father. It was after this last incident that F.E. decided to dismantle the car. I used the word 'dismantle' since those who have studied the Stanley twins know that Maine Yankees didn't throw anything away that could be used. I have no doubt that any usable parts were recycled at the factory!"

Working from photographs of the original car, Campbell spent years collecting appropriate 30-hp Stanley parts from the 1912 era. Choosing to replicate the car's initial configuration as it was before Raymond updated the fenders and lighting, he obtained a set of 1912 fenders from a batch made up for several restorers then at work. Reproduction of the unique chassis as well as a body "skeleton" was undertaken by Mark Herman, a cabinetmaker renowned for woodwork on early Stanleys. The skeleton was skinned in aluminium by Don Irvine in Michigan.

Completed in 2016, the car toured for a week that summer in Rhode Island. It celebrated Independence Day 2017 by passing the ultimate test: driving up New Hampshire's Mount Washington, the highest peak in New England, with Jay Leno at the wheel. The current owner has asked Mark Hyman to offer the car for sale. ♦

SOURCES

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THE KNIGHT OF THE PAINTER

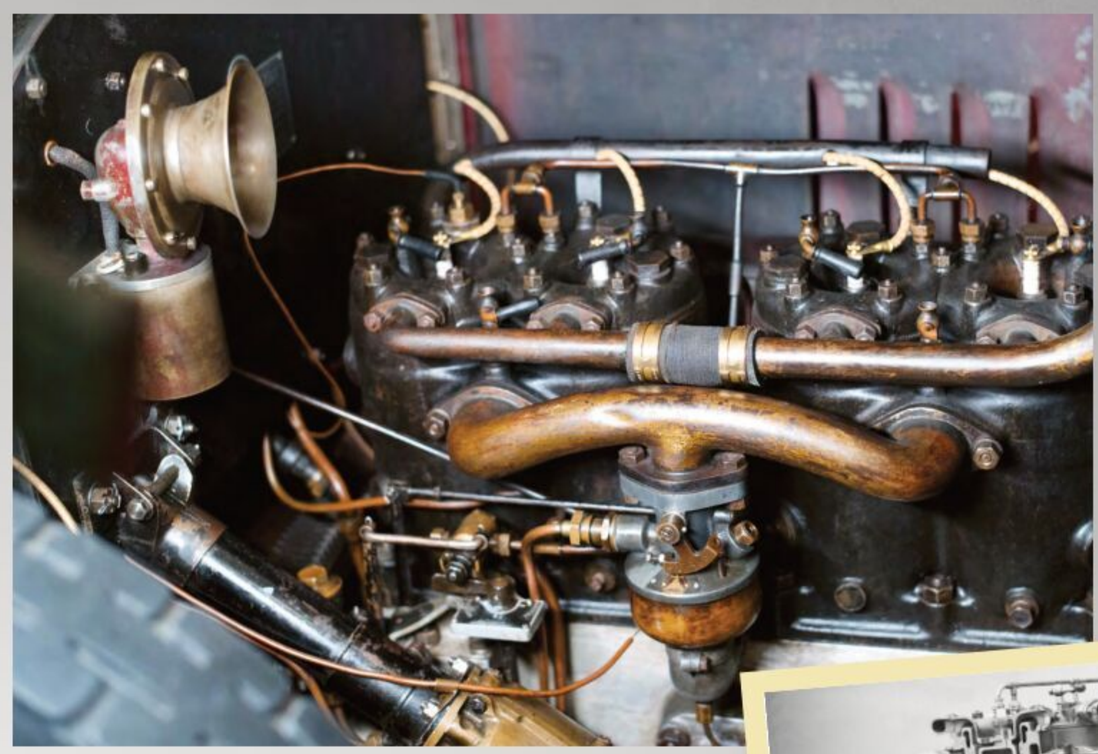
MERCEDES 16/45 PS

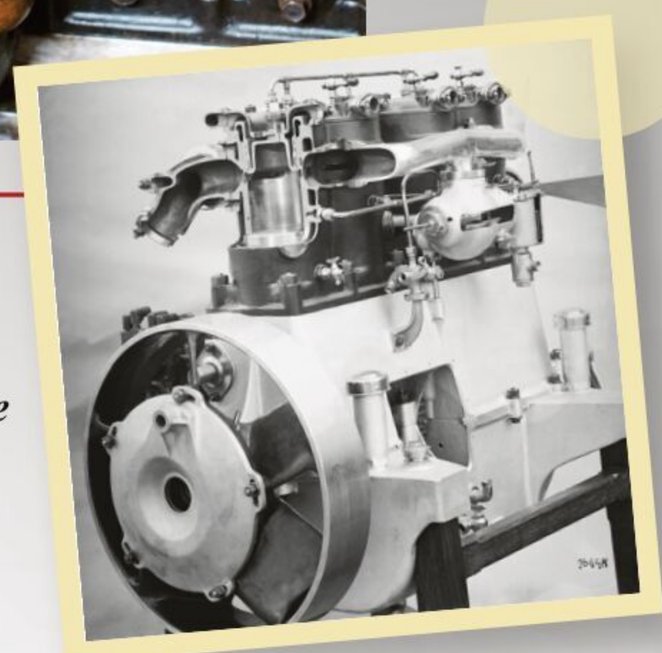
Peter Helck was a renowned illustrator of racing cars who also owned several exquisite automobiles. His Mercedes 16/45 PS is part of the Central Garage Collection today.

TEXT: DR HARRY NIEMANN · **PHOTO:** RENE STAUD STUDIOS

The 16/45 PS was the most popular Mercedes with a Knight engine.

Peter Helck with his Mercedes in the 1920s.





From the outside bigger intake and exhaust ports are the telling signs.

A sectioned view shows the intricacies of the sleeve valve engine.

There was no luggage compartment, just big travel cases strapped at the back.

In this narrow cockpit everything is placed carefully, such as speedometer, oil pressure, etc.

There was an electric starter, but the car could be cranked as well. Just in case…

Before World War I, Mercedes was among the best-known luxury-car makers. The cars with the three-pointed star appeared in the fleet of the Russian tsar, the Japanese emperor, and obviously the German emperor as well. Their crafts-manship and elegance also attracted the wealthy bourgeois. In 1907 Paul Daimler, the eldest child of Gottlieb Daimler, took over from Wilhelm Maybach as Chief Engineer at Daimler-Motoren-Gessellschaft. His task was to keep the lineup fresh, exciting, and special. To that end, Paul Daimler decided to look closely at Charles Knight's sleeve-valve engines.

THE KNIGHT ENGINE

Charles J. Knight (1868–1940), an American newspaper publisher, took upon himself the task of perfecting the gasoline engine when his early Knox car proved to be too noisy. By 1903 he built an experimental sleeve valve motor which differed from the poppet-valve-type motor in that it did away with the valve springs, push rods, cam, etc. The sleeve valve slid back and forth in the cylinder, opening and closing ports for the gas and exhaust. While the idea of sleeve valves goes back to steam engines, Knight's innovative approach had two sliding sleeves, one for the intake and one for the exhaust. This allowed hemispherical combustion chambers, and it was more efficient and quieter than competitive poppet-valve engines at the time. Knight continued development until 1905, when he had a working prototype. A touring car with the "Silent Knight" engine was introduced at the 1906 Chicago Auto Show. As innovative as it was, the Knight initially did not find a market in America. One challenge was that Knight's sleeve-valve engine was expensive to produce because it required high-precision ground surfaces between the piston, the sleeves, and the cylinder walls. Knight, reasoning that Europe's luxury-car builders might be receptive, packed his bags and headed overseas. He settled in Coventry, where the British Daimler company soon bought the rights from Knight "for England and the colonies" and shared ownership of the European rights. Soon Minerva from Belgium and Panhard & Levassor in France also signed on.

MERCEDES AND THE KNIGHT ENGINE

Daimler-Motoren-Gesellschaft was intrigued enough to order a program of testing and additional development that lasted through 1909. When the engine passed all the tests, the Stuttgart firm decided to buy a 10-year license to manufacture it.

In December 1910 at the Paris Motor Show, the 16/40 hp was presented as the first passenger-car model with the new engine. It was a sensation. Series production of the 16/40 hp with a 4.0-liter four-cylinder engine started at the beginning of 1910. Two further four-cylinder models, the 10/30 hp and the 25/65 hp, went into production in 1913. At that time, the advantages and disadvantages of the Knight design were discussed in great detail by motorists and engineers. Undisputed advantages were the new system's smoothness, quiet operation, and refinement, which were exceptional for that time. Moreover, Knight engines performed clearly better in speed ranges from about 500 to 1,500 rpm than conventional units of the same size.

On the other hand, slide-valve engines tended to smoke if the valves did not seal well. It was critical to ensure sufficient lubrication of the cylinder and slide-valve running surfaces, which was even more difficult with the lubricants of that time. The dual sliding sleeves themselves trapped heat, which became a problem when driving under heavy loads or over steep gradients. These issues became even more problematic in the higher speed ranges over 1,600 rpm, where the slide-valve engine's advantages were no longer superior to the poppet-valve type.

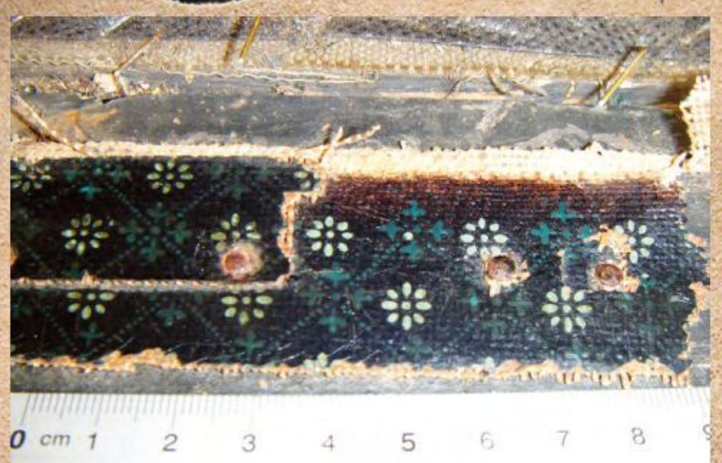
Because the dual sliding valve mechanism was heavy, maximum engine speed was limited to 1,750 rpm. This in turn limited the top speed to about 80 km/h, which meant, at least at that time, that the potential use of the Knight engine was limited without further development. However, Mercedes customers loved the Knight engine: in the course of 14 years, more than 5,800 cars were produced that were equipped with this powertrain.

MERCEDES 16/45 PS

The first Mercedes model with a Knight engine was unveiled at the 1910 Paris Motor Show and went into production in early 1911. The 16/40 PS was offered in various guises, with wheelbases ranging from 2320 to 3240 mm. It came equipped with a four-cylinder 4080-cc engine with Mercedes's double ignition (magnet and battery), and it had a side-mounted, spur gear-driven control camshaft, which actuated the sleeve valves via short connecting rods. This engine was upgraded in 1913 to become the 16/45 PS model. It remained in production until 1924, when it became the 16/50 PS.

The engine timing on the Knight engine was more aggressive than a poppet engine to take advantage of the improved flow characteristics of the sleeve-valve design. This timing was

A previous owner tried its hand on restoring the interior, but failed.



The original floor covering as discovered by Dr Gundula Tutt.

The hand painted leather was carefully upholstered.

HANDMADE

A previous owner replaced the original leather with inadequate material and improper upholstery. Dr. Gundula Tutt, proprietor of Omnia Restoration, worked very carefully on the leather, which she hand painted. She also unearthed the original floor covering, a kind of coated and printed fabric, which was also used in suitcases in the 1920s.

Helck designed some adverts in black and white in which he featured his "Knight" or some fairly similar cars.

An example of Helck's stunning graphics, showing a scene from a 24-hour race, ca. 1908.

"Willie K's Tour of Inspection" shows William Kissam Vanderbilt in his 90-hp Mercedes at speed trying the track in 1906 shortly before the race to see whether the spectators are safe.

Another ad for Kelly-Springfield tires.

described in great detail in the factory-published manual "Der Mercedes-Knight-Cardanwagen der Daimler-Motoren-Gesellschaft Stuttgart-Untertürkheim," by Edwin Stroschein, Chairman of the Technical Commission of the Royal Saxon Automobile Club:

"The four-stroke sequence in one cylinder takes place while the crankshaft completes two rotations. In this case, the intake and exhaust slots only have each other to press once. This explains ... that the camshaft rotates only one and a half times as fast as the crankshaft ... It is very reasonable to assume that the slots open or close, when the piston is at its bottom or top dead center. In fact, they open at the top only at the intake, on the other hand, do not close at the bottom, but only when the piston has already started to rise again. The slits in the exhaust do not open either at bottom dead center, but already when the piston has a little over three-quarters of its descent covered, and do not close as soon as it is at top dead center, but only after it has already gone down a bit."

The 16/40 PS and its descendants were the most popular Mercedes-Knight models, with a production run of around 5,500 units. There were other, smaller models, but these were produced only for a short time. In France, Knight engines continued to be offered by Peugeot, Mors, Avions Voisin, and Panhard et Levassor until 1940.

THE HELCK MERCEDES

The car is thought to have been originally acquired in 1924 by Peter Helck (1893–1988), a New York–born American artist. His oeuvre, mainly dedicated to the depiction of racing scenes, includes around 600 drawings and paintings. He also published two illustrated books, The Checkered Flag (1961) and Great Auto Races (1975). He was a real car enthusiast and, in addition to the Mercedes Knight, owned other rare vehicles including the Locomobile Old 16 racing car. This was the first American racing car to win the Vanderbilt Cup in Long Island in 1906 against international competition. Helck worked for various well-known automobile magazines; his clientele included Automobile Quarterly in the United States and The Autocar in Great Britain. In 1944 he painted a series of eight pictures for Esquire magazine, showing the development of racing from its beginnings to the present day. One of his paintings, A Motor Race on the Continent in the Early Days, sold for more than $100,000, a record price for an automobile painting at that time. From Louis Wagner to Mario Andretti, he knew most of the drivers personally and in many cases was friends with them.

The special thing about the car is not only its prominent first owner, but also the fact that it has remained largely in original condition. When a refurbishment was deemed necessary, the old leather and paint were carefully preserved. This car is not just a testimonial to a very special engine, but also to contemporary materials and manufacturing techniques. ♦

THE BRIEF, BIZARRE SAGA OF THE DAVIS DIVAN

Petersen Museum in Los Angeles owns one of the few survivors.

TED7 PHOTOGRAPHY

The graphics were a bit optimistic about the interior room.

In our previous issue we featured a sporty roadster, which was designed by Frank Kurtis. In the latest installment of Undiscovered Classics **Ken Gross** talks about another Kurtis creation, the Davis Divan.

Davis

TRIPLE TROUBLE

Spin the Globe

The shape of the three-wheeler was partly inspired by airplanes.

THE START OF World War II essentially rescued America's struggling automobile companies from the ravages of the Great Depression. Detroit's "Arsenal of Democracy" roared into action when war was declared. Civilian automobile production eased in February 1942 and remarkably soon, military tanks, halftracks, 6x6 trucks, and even giant aircraft, like four-engine B-24 Liberator bombers, began rolling off hastily repurposed assembly lines. When the war ended in 1945, civilian cars were in short supply. The domestic automakers simply refreshed their '42 models as a quick way to resume production. Demand was high – from car-starved civilians who'd had to make do for the duration, as well as from returning vets with saved-up combat pay.

Predictably, car-starved Americans would buy anything on wheels in the first few years after the war ended. Flamboyant entrepreneur Tucker's radical, rear-engine Tucker 48 quickly caught the public's attention, then died when Preston Tucker himself was indicted for stock manipulation. He was later acquitted, but the Tucker name was ruined, and the futuristic car couldn't be produced. Tucker tried again to market a car in South America before dying of cancer and, some say, a broken heart.

Several more would-be carmakers sprang up. Out in Van Nuys, California, a fast-talking used-car salesman named Glenn Gordon "Gary" Davis would share a similar fate. His lozenge-shaped Davis three-wheeler received a great deal of publicity and several million dollars from would-be dealers, but that proved to be short-lived. Indicted and subsequently convicted of sales fraud, Davis served time in jail for conning these same dealers into thinking he could supply them with production copies of his odd $995 tri-car. Later in life, Davis claimed to have invented the safety airbag. He designed an improved dodge-'em car for amusement rides and even promoted a CO2-powered inflatable bumper.

But that's just the overview; the story itself is even more fascinating.

The Davis Motorcar Company began with "The Californian," a futuristic three-wheeled custom-built roadster designed by racing-car builder Frank Kurtis for madcap Southern California trust fund millionaire, playboy, and racer Joel Thorne. Kurtis (who went on to a successful career building midget racers and Indy 500 roadsters) used a single front wheel setup with a yoke and coil springs reminiscent of a Lockheed P-38 fighter plane's tripod landing gear, with a Ford V-8/60 engine and rear axle. Thorne drove the car in Los Angeles for a while before he sold it to Davis, reportedly for the astonishingly low sum of just $50. "The Californian" had sustained minor damage in an accident (some say staged by Davis), which accounted for its low selling price.

Sensing an opportunity, Davis – an industrial designer – repaired "The Californian" and advertised that an improved version would be going on sale for $995. He garnered extensive publicity after the car's appearance in Life magazine and subsequently in many newspapers. The acclaim spurred dozens of inquiries from people who wanted to be Davis dealers, or who simply wanted to buy an exciting new car. Respected authority Businessweek ran an article and a photo that showed Universal Studios actress Maria Montez at the wheel and claimed that the Davis car would be in production by 1946. Davis claimed a top speed of 80 mph; he insisted his three-wheeled oddity was stable and economical, and he touted a distribution plan with a series of drive-in repair shops where an engine could be changed in as little as 14 minutes and a rental engine would be installed – to be replaced after the original engine was rebuilt.

OFF LIKE A SHOT

The Davis Motorcar Company had an auspicious start. Gary Davis retained

a group of young aircraft engineers including Peter Westburg, 34, a talented aeronautical specialist and artist who worked at Douglas Aircraft. Davis told the men that if they'd come to work for him part time, he'd double their $3-per-hour salaries if the Davis car was successful (and they'd get nothing if the car venture failed). He wanted to claim that aircraft engineers, not traditional automotive people, brought new ideas to the car industry.

Davis's quest to produce a new vehicle was highlighted by his almost fanatical focus on raising money. Joseph Charipar, a retired U.S. Air Force Major, who'd reportedly worked for Ford Motor Company, became Davis's business partner in 1946. Charipar paid some of Davis's bills and advanced him $200 (about $3,100 in 2022 dollars) for an exploratory business trip to Chicago. When Davis was unable to find sufficient financing for his car venture, he decided to proceed on his own.

The immediate postwar era was ripe for a new auto enterprise. And while the three-wheeled Davis looks odd to us today, its streamlined, rhombus-shaped nose and slender silhouette were reminiscent of an aircraft fuselage. The Davis was considered sleek and modern. Writing years later in Cars & Parts magazine, Peter Westburg recalled his initial impression of the Davis car, saying "It had clean lines; there were no angular projections to spoil the flow of air. At rest, the car looked like it wanted to go somewhere, to be where the action was."

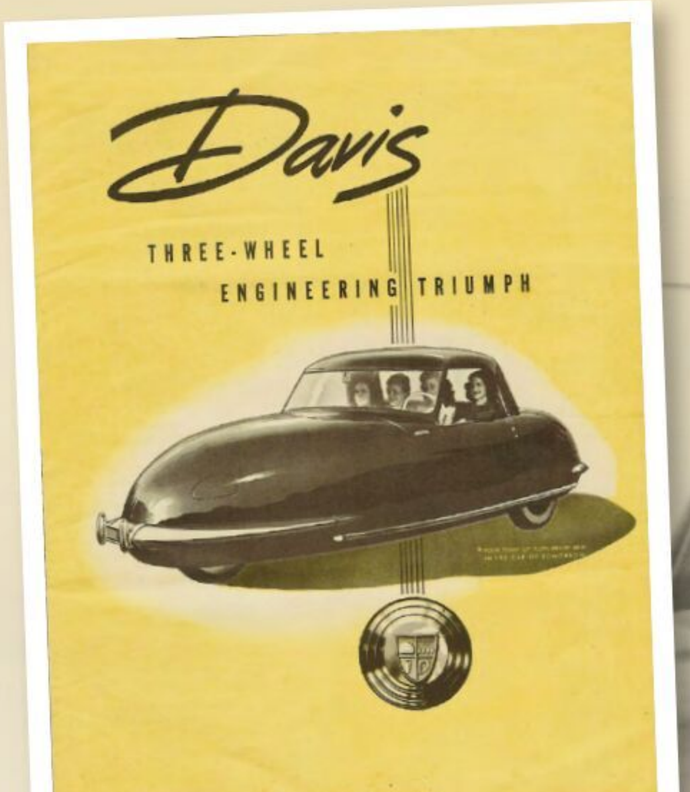
Westburg had more design experience than the other recruits, so he was named chief engineer. He initially admired Davis, saying, "He was a quick talker with a ready grin that made you feel at ease. Only later did I learn that he was a bona fide flim-flam man. He could borrow the shirt off your back and sell it back to you, and you would swear you had gotten a bargain … At the same time, he gave you the impression that he was absolutely sincere …" Westburg recalled Davis liked to be called "Gary" because he'd been told he resembled Hollywood film star Gary Cooper.

A storefront office was established, and the impromptu design team went to work. Tom Lucero, reportedly "a genius with clay," developed a one-quarter-scale green clay model. The bumpers and rub strips were hand-formed from polished aluminum. The completed model was photographed, after which the photos were retouched by artist Rex Burnett (famous for his cutaways in Hot Rod magazine), to include a windshield, the steering wheel, the back of the front seat, and the wheels. Stamped steel panels would have been cheaper, but there would have been a weight penalty.

HEADLINES EVERYWHERE

The first published photo of the "new" Davis three-wheeler appeared in the Hollywood Citizen News on July 22, 1947. An accompanying article boldly proclaimed that "the car was designed for the $1,000 price field by 156 [sic] engineers and specialists." The text said Davis planned to manufacture 50 cars per day initially and

The four women in the car are budding actresses Beth McKee, Antoinette Guhike, Fran Watson, and Dollye Brown. The caption reads: "Four stars of tomorrow ride in the car of tomorrow." Sadly, the quartet were no more successful than the hapless Davis.



Gary Davis with the scale model of the Davis prototype.

NATIONAL AUTOMOTIVE HISTORY COLLECTION, DETROIT PUBLIC LIBRARY

PHOTO: PETERSEN MUSEUM

There were just 17 cars built.

The Davis was as futuristic as the Tucker and both cars were embroiled in scandals.

then production would be ramped up. In that era, new car news was hot stuff. Dozens of newspapers nationwide ran the story. That began the hyperbole that would eventually bring Davis down.

Ambitious and irrepressible, Gary Davis somehow managed to borrow Raymond Loewy's sumptuous office (located nearby) to entertain the first prospective franchise buyer. Reportedly, the suitor was from the Bendix family, and he paid $2,500 (about $35,000 today) for the privilege. That was all Davis needed. He rented an office in the Timm Aircraft Co. Building on Woodley Avenue in Van Nuys, California, with space sufficient to build a prototype. Convinced this was an opportunity, Peter Westburg bravely took a three-month leave of absence from Douglas Aircraft and set about designing a chassis of three-inch steel tubing with channels for cross-bracing.

Davis bought a proprietary Hercules 60-hp, four-cylinder industrial engine. Joe Charipar completed the driveline with a Ford clutch and bell housing mated to a Studebaker three-speed transmission. The wheels were Studebaker, as were the rear axle and the brakes. Davis convinced several newly added shop personnel to work for the same "no pay now/double pay later" deal, and a running chassis quickly took shape. The car was enlarged from a three-seater to a configuration that seated four people abreast. As soon as the prototype was completed, Davis named it "Baby" (after his daughter) and began demonstrating the car to potential franchisees. The rolling chassis had a tight 13-foot turning radius. Davis claimed it had remarkable stability. Westburg recalled, "It could be steered with one finger as one would dial a telephone."

The car's 6-ISO aluminum body panels were made by Zeke King, who worked at Hughes Aircraft. King was called "a magician with metal." To form the panels, he used an air-driven planishing hammer. He hand-formed the bumpers from 1/8-inch-thick low-carbon steel and welded the left- and right-hand sides together. Afterward, the bumpers were ground smooth and chromed. There was no grille. The engine air intake was under the front bumper. A removable metal hard top with a curved rear window ensured the Davis could be a convertible or a snug coupe.

A FLAIR FOR PUBLICITY

To help promote his new project, Davis hired Jack Adams, a former Los Angeles Express reporter, who became the fledgling automaker's PR man. He in turn lined up Cleo Moore, a curvaceous Hollywood starlet. Adams's efforts not only attracted franchisees and many deposit checks, but his irresistible pitch lured in dozens of car salesmen, whom Davis put on commission. Just seven weeks from the start of the engineering process (!), in November 1947, "Baby" debuted at the Ambassador Hotel in Los Angeles. Crowds flocked to the display; four comely American Airlines flight attendants were photographed sitting side by side in the car's 64-inch-wide front seat. Moore posed with anyone who wanted a shot. Davis plied serious punters with cocktails.

Still more franchise deposits rolled in, allowing Davis to fly his new car east to Pennsylvania. Two weeks before Christmas, at Gimbels department store in Philadelphia, "Baby" attracted huge crowds, and that effect continued when it was shown in New York, Chicago, Portland, and other cities, culminating in an appearance at the New Year's Day 1948 Rose Parade. Davis drove the Rose Parade route himself, steering the prototype enthusiastically from side to side and spinning it in circles. In car-starved America the Davis, like the Tucker, was the talk of the town.

To give the impression that there were more cars, "Baby" was painted in Rockledge Gray (a pale green) for the Ambassador Hotel preview. It was repainted in cream for the Rose Parade appearance, and later that January, it was maroon. Before the prototype was flown to Portland, Oregon, for a demonstration, it had been repainted yet again – this time in robin's-egg blue. Sales brochures were printed touting the Davis as "the Sensation of the Nation" and "The Car with the Airborne Ride." He named the car Divan –after a long, low couch with no back.

Promotional films and photo stills showed the Davis capitalizing on its three-wheel configuration and making tight 360-degree turns, even plowing through snow on mountain roads. Gary Davis was shown getting out of the car, locking the steering, and the car circled merrily without a driver. Davis brochures called it a "three-wheel engineering triumph." "Distinctive styling, years ahead!" was another headline. The company claimed that "… It is an engineering fact that a tipping force meets greater resistance from a triangular object than from a rectangular one, if the former has a lower center of gravity." "Turns on a dime" and "painless parking" were added incentives, along with claims of up to 50 miles per gallon and a top speed that "nudged 100 miles per hour." Little wonder people were intrigued when they learned they could get all this and more for under $1,000.

A LACK OF PROGRESS

Meanwhile, serious development work continued at the Van Nuys factory. The production chassis design took shape, using a channel steel chassis and cross members. The lines of the body were finalized using a full-size plaster mold. Under pressure, the men worked long hours, often interrupted by prospective dealers who wanted to track the project's progress and learn when their orders would be ready. Gary Davis's enthusiasm had led prospective dealers to believe that the cars would be manufactured at a rate of 50 cars per day and that within 90 days, 100 cars daily would be rolling off assembly lines at a former aircraft assembly plant in Fort Worth, Texas. Davis told anyone who would listen that many small companies that had been defense contractors (and were looking for work) would be tooling up to make subassemblies for his cars. For their deposits, aspiring franchisees received boxes of brochures, signage, and the right to call themselves Davis dealers.

A tireless promoter, Davis looked at proprietary Kinmont disc brakes (made by a company in Los Angeles, to replace Ford brakes on police cars and taxicabs), and they were installed on "Baby." But as Preston Tucker had learned earlier, these clutch-like brakes were expensive, and they were not subsequently used on the Davis production prototypes. Gary Davis insisted on built-in hydraulic jacks on the prototype, against Peter Westburg's objections. The jacks were a hit at many of the car showings. Later, Peter Westburg said that Davis "proved I was wrong about people. He knew people. I knew engineering. There is a difference."

Photos of the new Davis appeared everywhere. The irrepressible Tom McCahill, America's first popular road tester, wrote about the Davis in Mechanix Illustrated. "If your girlfriend happens to have two heads," McCahill said, "you'll probably appreciate the public's reaction to the Davis three-wheel car. It's regarded as a complete curiosity – a modern-age freak." "… but it's in a class by itself," he said, "for agility and ease of handling plus good looks." The portly McCahill was a respected authority, so it's likely many people read his report and wanted to buy a Davis.

To further legitimize his efforts, Gary Davis addressed the prestigious Society of Automotive Engineers (SAE) in Detroit on November 3, 1948, and presented a seven-page treatise on the engineering of his car, touting the rationale of three wheels.

Peter Westburg and Bob "Pinky" Howells, who'd been hired to manage production, planned to make short-lived Kirksite dies from the plaster mold to form the first body panels. A drop hammer press was reportedly on order. Experienced tool-and-die men from Lockheed were hired to develop conventional dies using quantities of lead and two gas-fired furnaces. It looked as though full-scale Davis production would soon ensue.

Then things began to change.

According to Westburg, Gary Davis returned from a dealer recruiting trip and became enraged that $45,000 of company funds had been spent on production. Howells was subsequently fired. From August 1947 to January 1949, Davis had sold 350 franchises for $1,200,000, with commitments for $1,000,000 more when deliveries began. Peter Westburg recalled one dealer who'd mailed a

Technical Data

DAVIS DIVAN

ENGINE:

Front-engine • 4 cylinder
Bore: 87.4 mm • Stroke: 111 m • Capacity: 2664 cc
Maximum power: 63 hp @ 3200 rpm
Maximum torque: 170 Nm @ 1750 rpm

DIMENSIONS:

Length: 4661 mm • Width: 1829 mm • Height: 1524 mm
Wheelbase: 2781 mm • Weight: 1111 kg

signed contract to Davis without even filling it in. A note accompanying the application read, "Dear Gary, fill this in the way you and I talked." Davis himself apparently found that amusing.

But full production still wasn't beginning.

Dismayed at the lack of progress and unable to afford working for no income, Peter Westburg resigned in May 1948 after Westburg threatened to sue Davis to receive his promised earnings. Davis settled because dealers had begun threatening to take him to court and he didn't need more adverse publicity. But that didn't matter.

As 1949 began, a group of 17 disgruntled dealers complained to the Los Angeles District Attorney, alleging they had been defrauded. In May, the plant closed. By November of that year, in a move reminiscent of the Tucker company's unraveling, the Davis Motorcar Company's books were seized, along with Gary Davis's personal records, at his lavish Benedict Canyon home in Beverly Hills.

Things were about to get much worse.

In May 1950, Peter Westburg was subpoenaed in a case called The State of California v. Glenn Gordon Davis. He testified that Davis had repeatedly asked him, between January and May 1948, when he would get more cars. Westburg further testified that Davis told him "… that if I gave him 10 cars, he would make them look like 100." Westburg was never in charge of production, but Gary Davis apparently thought he should be. With creditors and dealers swarming, the assets of the Davis Motor Car Company, including the cars, were sold at auction to settle tax claims. One of the stranger twists to this story is that the August 1950 cover of Motor Trend headlined: "Davis – How far from production?" Inside, a four-page article by writer Eugene A. Jaderquist inexplicably stated, "And your chances of owning a Davis are still good!"

"The three-wheel Davis is too healthy to die," Jaderquist wrote, "… it's a good car, slanted toward a growing market." The article said that Gary Davis had signed a contract with a new corporation, composed of Davis investors, to manufacture and sell the Davis Divan. The corporation was seeking an actual Davis – they were all now in private hands – so consulting engineers Thomas J. W. Woolard and Edwin Jacobsen "could begin the preliminary surveys so that production could begin." They still believed in the car, despite the fact that there were no cars left and lawsuits were pending.

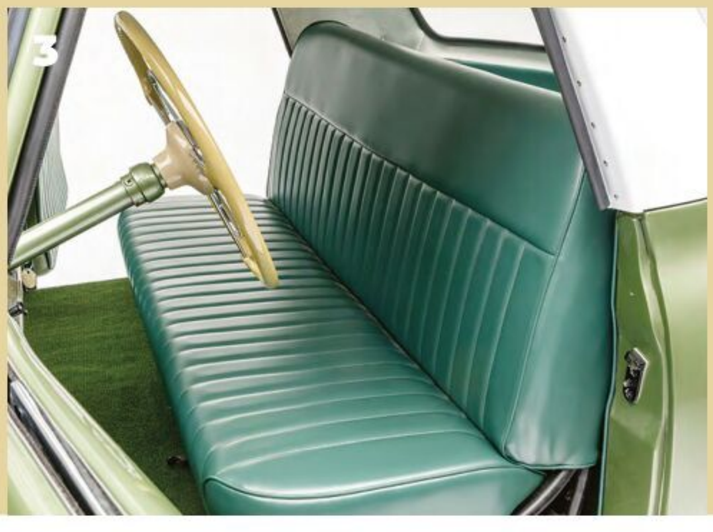
In reality, the end was near. In January 1951, after 90 witnesses had testified and 5,200 pages of testimony had been recorded, much of it from would-be Davis dealers, a jury of 10 men and two women found Gary Davis guilty of 24 out of 28 counts of fraud. He'd spent lavishly, using $65,000 of company money to buy a house; he'd bought a fur coat for his wife, and some funds were used for medical expenses for his second child.

Most important was that, despite his promises, only a few cars had been built, and there were no plans to ramp up production the way he'd claimed. Davis was initially put on probation, but when he was unable to make restitution to the angry dealers, he was sentenced to two years on a minimum security "honor farm" in Castaic, California, in lieu of state prison. Davis lost an appeal in 1952 after a judge upheld the earlier conviction.

1 A switch on the dashboard operated built-in hydraulic jacks.

2 Most cars featured a Continental engine.

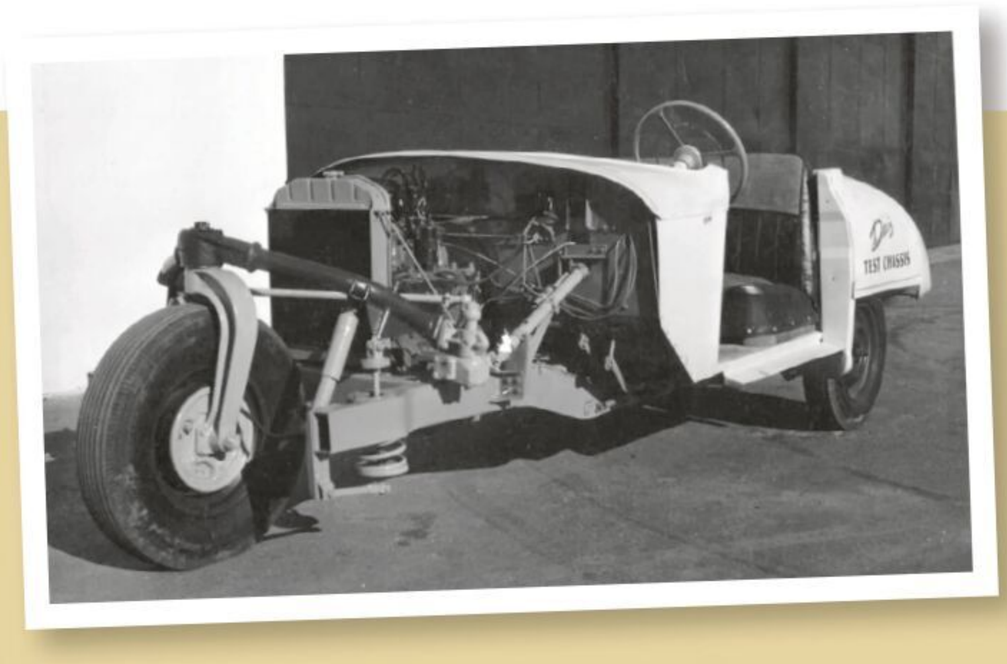
3 The car was named Divan as a reference to its long couch-like bench.



LATER YEARS

Years afterward, Davis still insisted he was innocent of any crime. Mike Lamm interviewed him for Special-Interest Autos in 1970. Bedridden with oxygen tanks and under a plastic tent, Davis claimed he never promised immediate deliveries and that he knew ramping up for production could take 18 months, and he insisted he was railroaded by a zealous district attorney. A heavy smoker, Gary Davis passed away at Desert Hospital on August 16, 1973, after suffering from years from pulmonary emphysema.

Seventeen Davis pilot models were built, including two Jeep-like vehicles that Gary Davis hoped to sell to the U.S. Army. (That venture failed when one of the Davis Jeeps flipped during a test at Aberdeen Proving Grounds.) The pilot passenger cars weighed 2,250 pounds, had a 108-inch wheelbase (later cars had a 109.5-inch wheelbase), and rode on 550/15 tires. After the first four cars were built with Hercules engines, a Continental four-cylinder became standard. A mockup of a seven-passenger sedan on a 130-inch wheelbase was constructed. Sketches survive of a panel delivery van and a wooden station wagon. None were built. In his later years, Davis developed



"The Car with the Airborne Ride" said the promotional brochure, and a look at the test chassis shows why.

designs for a CO2-propelled (carbon dioxide) airbag and released sketches of various padded solutions for car interiors to aid motorists in a crash. He was still convinced that the elliptical shape of the Davis was superior in a collision to conventionally shaped cars. He said it was "40 percent safer than a conventional car," but he was unable to interest investors. For years, an enthusiast named Tom Wilson published a Davis newsletter and gathered everything he could about the remaining Davis cars, enough to write a book – but that never happened.

A few years ago, Jay Leno drove the Petersen Museum's Davis Divan on his "Jay Leno's Garage" TV show and found it fun to drive, if a tad unstable. "I love this period of automotive history," Leno said. "Anybody who thought he had a good idea could go into production. [Driving a Davis] … feels like a Hudson with one of the wheels missing," Jay quipped.

The Amelia Island Concours d'Elegance is hosting seven Davis cars – probably the largest number ever assembled since the Van Nuys factory tried building them. The Lane Motor Museum is bringing the prototype "Baby," and a second example, Wayne Carini. Myron Vernis, the Petersen Automotive Museum, and several others are bringing Davis Divans, and at least one of the two Jeep prototypes is expected. People who've never seen a Davis will see a slew of them.

COULD THE DAVIS HAVE BEEN A SUCCESS?

Notwithstanding its unusual three-wheel configuration, the pilot models required considerably more development; the company was far short of the funds needed for engineering and manufacturing, and the proposed $995 selling price was looking much more like $1,400, or even more, when the Davis plant closed its doors. Arguably doomed from the outset, the Davis remains an interesting footnote in postwar automotive history.

Give Gary Davis credit for trying. ♦

Davis spent two years in prison because of fraud.

CREDITS: MIKE LAMM, GEOFFREY HACKER, JOSEPH HARPER and BRYAN STEVENS from the Petersen Museum

The New ERA Mini could have been a resurrection of Kieft Cars. It inspired Ralph Broad for the Broadspeed GT, while it was also mistaken for a Mini Cooper during that car's launch. **Jeroen Booij** recalls how a very early Mini coupé from Birmingham fell into oblivion.

THE COULD-HAVE-BEEN COUPÉ

NEW ERA MINI

There have been several attempts to market a Mini Coupé – the New ERA was the first by far.

ODE TO NIGHTINGALE

Spin the Globe

Slamming the Mini's roof into a fastback does give a totally different view.

THE MIGHTY British Motor Corporation never made its own coupé version of the Mini, but you can wonder whether that was a chance missed. When the Mini came out in August 1959 as the Austin Se7en and Morris Mini Minor, the market for sporty Specials based on mostly prewar Ford, Austin, and Morris chassis had just reached a peak, and a thriving industry in fiberglass bodies and tuning had mushroomed throughout the U.K.

The launch of the Mini turned much of that upside down. At just under £500, the clever Mini was cheap while it outperformed even many contemporary bigger cars, let alone those aesthetically good-looking but technically speaking outdated Specials. Thanks to its ingenious suspension setup, the Mini had fantastic handling, while its mechanicals and packaging may have been the cleverest thing since the invention of the car itself. It didn't take enthusiasts long to find out that the Mini proved to be the best possible new base for their beloved Specials.

But before sleek rebodied Minis such as the Deep Sanderson 301, Ogle SX1000, and Butterfield Musketeer were unveiled at the motor shows of the early 1960s, there was the New ERA Mini Coupé, dreamed up by a man named Kenneth Nightingale. Back in 1957, Nightingale had set up a tuning and accessory shop in the city of Birmingham named ERA - for Ecurie Rossignol Accessories (rossignol being French for "nightingale"). He was also the secretary and treasurer of the Bugatti Owners Club at the time but a budding car designer above that. His first attempt at (re)designing a car had come when his own Austin A35 became the subject of a thorough revamp. He modified the front of that, which now sported a chrome grille in Bugatti style and an unrecognizable rear end with elongated rear window, boot lid hinged upside down, short bumpers, and a spare at the back. Chrome trim, tripod headlights, wire wheels, a full Webasto roof, and deep gloss metallic paint certainly made it stand out from the crowd.

But then came the Mini. And when Nightingale heard of the upcoming launch of that car he got excited and decided to order one straight away, without even having seen it. It arrived in September 1959, just weeks after the worldwide unveiling on August 26. And thinking he could do better than Alec Issigonis and the BMC design team in Longbridge, he started drawing modifications shortly after taking delivery. Nightingale's idea was to turn the boxy little saloon into a sleek coupé not unlike Abarth's sporting 1000 Bialbero. And with a picture of that car and his own design drawings, he went to the Burns Brothers coachbuilders in Birmingham with the plan to turn the Mini into the car of his dreams. And so it came that the hacksaw was put into the fresh metal of one very early Mini. By the summer of 1960 the front and rear ends had been changed dramatically. The car now sported a more raked windscreen and another chrome grille like that of Nightingale's earlier A35. The Mini's rear got an even more drastic approach. Everything behind its B-pillars and beltlines was cut away to make place for a fastback roof in Abarth fashion. The Burns brothers made a new steeply raked fastback rear with rain gutters now following a rounded line from roof to back and with tiny little side screens. It was all hammered out in steel.

Once repainted and reregistered, the car was fitted with all the gauges, switches, seat adjusters, pedal extenders, and dashboard lights available from Nightingale's New ERA accessory shop. Restall bucket seats were upholstered with light brown leather, and a wooden dash was made. This was a flashy Mini at a time when such a thing was yet unknown to any tuner or accessory shop. But Nightingale wasn't satisfied yet. Before he would market his car as the New ERA Coupé, he decided it would be better to modify the nose even more. Once again he took the car to Burns Brothers, now for another reshape of the nose section, again in steel, to a much more rounded front with recessed headlights and smaller air intake. The Abarth Bialbero likeness was now even more apparent with its oval radiator grille and the ability to cover the headlights with Perspex. Now that the car was ready

1 New ERA stood for New Ecurie Rossignol Accessoiries.

2 Based on a very early Mini but with 997 Cooper engine.

3 Nightingale's A35 (top) and the Mini in its first guise.

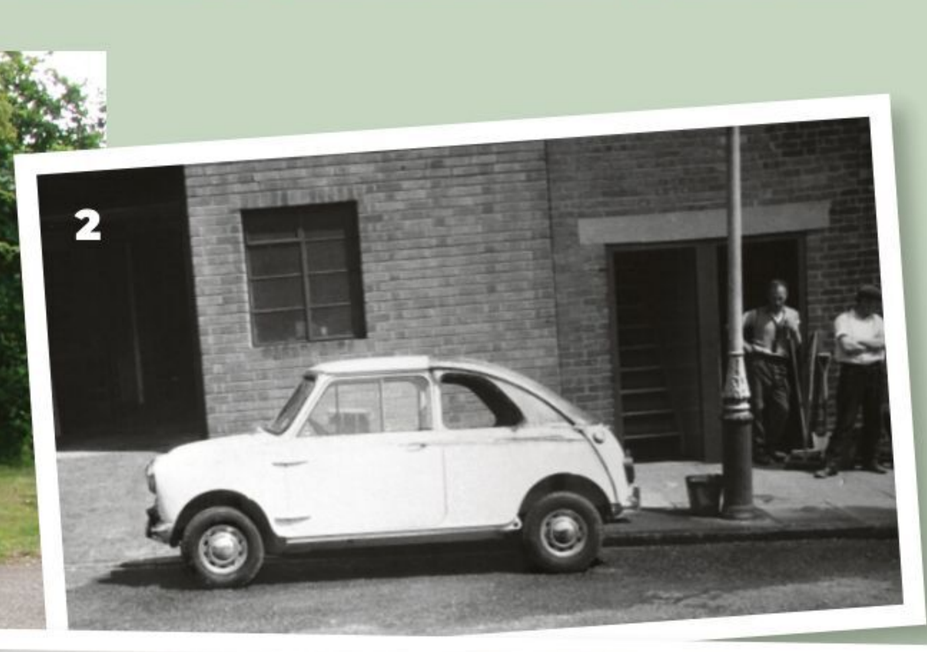
1

2

3

The car's interior is crammed with accessories, among them now highly sought-after Restall seats.

A dashboard like that of an airplane – almost. Interesting choke switch on the far-right.



1 Over the years 'POP 22' has seen several guises.

2 The car in the making at Burns Brothers in Birmingham.

3 Just finished in early 1960, blue in colour.

4 And with Mrs. Nightingale. Note Alfa-style grille.

to be marketed, Nightingale teamed up with Cyril Kieft, who'd moved from Wolverhampton to Birmingham and played with the idea of starting to build cars again. The duo planned to sell the Mini Coupé under the Kieft name, but this never happened. Possibly because the Kieft Cars Company, sold by Cyril Kieft years earlier, had closed its doors for good in 1961?

Whatever the reason was, Nightingale now took on the sales project himself. Unfortunately his marketing efforts were rather poor, probably due to his being fully occupied with running his accessory business on Birmingham's Caroline Street. He did manage to sell two more cars, though, both based on brand-new Minis also, and there is just one picture to prove that. It shows the three in a line. On the left is one in Old English White and registered 3260 JW, then the prototype in a greenish blue with its signature POP 22 registration, and last in line a car that was not fully finished at the time and was unpainted and unregistered yet. What happened to the original "POP" and the white car remains unknown to this day. The POP 22 registration later made it to the third New ERA Coupé, which became Nightingale's personal car. What's more, it is still owned by his son Christopher today and the one seen here. Chris Nightingale sympathetically restored it after it had been in storage between 1981 and 2006. He has some sweet memories of his dad's Mini Coupés. Most appealing may well be the one of his dad taking him in the car to Chobham test circuit near London for the launch of the Mini Cooper in July 1961. Several leading Formula 1 drivers were there to show what the Mini Cooper could do when a skilled man at the wheel was really trying. But when Nightingale junior and senior arrived at the track with their Coup, several members of the international motoring press thought this had to be the new Mini Cooper, showing their delight – no doubt to the displeasure of their host BMC!

Several journalists believed this to be the Mini Cooper when that car was launched in 1961.

Another great yarn came from Tony Stanton: "I saw Ralph Broad taking photos of the New ERA Mini Coupé twelve months before the Broadspeed GT came out," he said, which may prove that Nightingale's original idea led to the pretty Broadspeed also. All in all, it seems a real missed opportunity for a miniature motoring manufacturer or car stylist such as Nightingale not to have been able to make more of his plan of a fastback Mini. His personal car was used in the late 1960s as a demonstration vehicle for New ERA security products such as the Safelock steering-wheel lock.

The car appeared in several exhibitions in the Birmingham area, fitted with a wide variety of products. However, it wasn't advertised in magazines such as Practical Mechanics or Practical Motorist or later tomes such as Cars & Car Conversions, which might well have helped sales. Could it have become a success with Kieft's backing and being marketed as a Kieft? We will never know. The fact is that it didn't take long before others ran off with the idea when more Mini-based coupés followed in the 1960s.

With his son Christopher taking up a different occupation, Kenneth Nightingale's company, Ecurie Rossignol Accessories, was eventually sold in 1974. But how about the other two cars? Could they survive? Chris Nightingale is almost certain that they were scrapped many years ago, but at least he still cherishes the final car. Originally it was painted in lime green, then later British Racing Green, and now finally repainted in a gorgeous Aston Martin metallic green. The restoration was finished just in time to attend the Mini Cooper's 50th-anniversary celebrations at the National Motor Museum 10 years ago now. No one there mistook it for a Mini Cooper, but there's no doubt it was once again a real star of the show. ♦

Technical Data

NEW ERA MINI

ENGINE:

Front-engine • 4-cylinder
Bore: 62.4 mm • Stroke: 81.3 mm • Capacity: 997 cc
Maximum power: 56 hp @ 6000 rpm
Maximum torque: 73 Nm @ 3600 rpm

DIMENSIONS:

Length: 3054 mm • Width: 1410 mm • Height: 1346 cm
Wheelbase: 2035 mm • Weight: 605 kg

BIOGRAPHIES

Authors

OTFRIED JAUS

OTFRIED JAUS grew up in Stuttgart-Untertürkheim, Germany. He first encountered a Gutbrod Atlas at the neighborhood grocery store during his childhood. Motorized vehicles have always been an interest, although he had nothing to do with them professionally. The big star that rotates over the Neckar valley caused him to deal intensively with local small manufacturers from around 1980. He wrote his first book in 1994, about small-scale industrial and manual vehicle construction in Württemberg. Additional publications and TV reports have since emerged, based on his extensive archive and small vehicle collection.

FEDERICO SIGNORELLI

DESIGNER AND COLUMNIST

Federico Signorelli was born in 1987 in Palermo, Italy, where he graduated in Industrial Design specializing in Exhibition Design and Museum Enhancement. During his career he worked on combining transportation and car design with motoring history, cooperating with such luminaries as Pietro Camardella, formerly at Pininfarina, and Benedetto Inzerillo, a leading yacht designer. In 2019, Signorelli worked on the 100th anniversary exhibition of the Targa Florio race. As a member of AISA (the Italian Automotive History Association), Signorelli writes for various magazines dealing with historical issues.

New authors in this issue:

ERIK ECKERMANN

AFTER HAVING TRAINED as an auto mechanic and foreign trade clerk, Erik Eckermann was employed as a manager of a factory-authorized Simca/ Auto Union/Krupp workshop in Ghana, West Africa. In the 1960s he took up studies at Hamburg University of Applied Sciences (Wagenbauschule), followed by a position as curator of the Deutsches Museum, where he was responsible for developing the Land Transport and Petroleum departments. Since 1978 he has been active as an automotive historian with numerous contributions and books, as well as planning and execution of vehicle exhibits such as Auto Hall II at the Deutsches Museum and various special exhibitions for the VDA (Automobile Industry Association). He received an Award of Distinction from the Society of Automotive Historians (USA) in 1987.

RICHARD TRUESDELL

SINCE 1985, Southern California–based contributor Richard Truesdell has traveled the world as a full-time automotive photojournalist, best known for driving special cars over legendary roads. His work has appeared in more than 25 magazines, including Car and Driver, Motor Trend, and Octane. He has also served as editor-in-chief of Car Audio and Electronics and Chevy Enthusiast, appeared on the History Channel, and co-authored with automotive historian Mark Fletcher three automotive books: Hurst Equipped (2012), 1970 Maximum Muscle (2021), and Hemi under Glass: Bob Riggle and His Wheel-Standing Mopars (2021). Check out more of his work at bit.ly/RTPDFS.

ALEXANDER TRIMMEL

WITH A MOTORSPORT-LOVING FATHER, Alexander Trimmel was able to visit Austria's racetracks and he learned to read early thanks to Auto-Revue magazine. In drawing classes, he tried to outperform every Italian design studio, and when he was studying architecture, he always drew big garages as part of buildings. Additional training as a car mechanic enabled him to design his own car. After the end of his racing career, Trimmel utilized his passion by trading model cars. A well-known figure in Austrian motoring circles, Trimmel frequently moderates historic racing events and works as a contributor for various magazines.

1944 Alfa Romeo 6C 2500 Sport 'Turinga Superleggera'

on display at the PreWarCar.com & PostWarClassic.com stand

during **Salon Rétromobile** 16-20 March 2022

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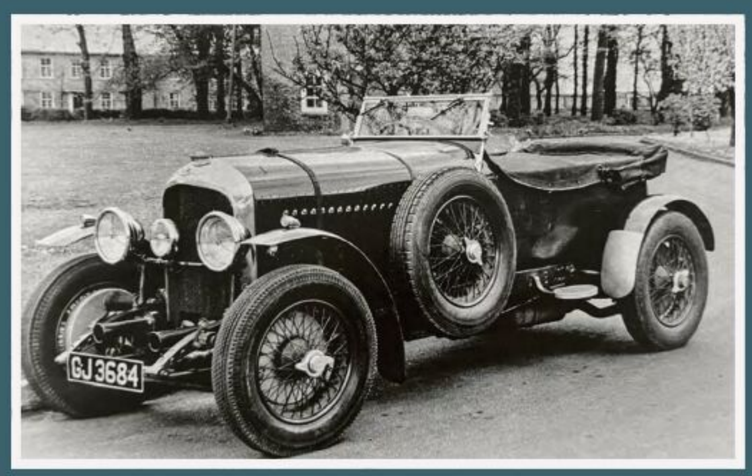
“DROP HEAD COUPÉ“

1938 **MERCEDES-BENZ 320**
CABRIOLET A

1937 **MERCEDES-BENZ 540 K**
SPEZIALROADSTER

1938 **ASTON MARTIN 15/98 2 LTR.**
SHORT CHASSIS

1930 **LAGONDA 2 LTR.**
SUPERCHARGED



1930 **BENTLEY 4 1/2 LTR.**
SHORT CHASSIS OPEN TOURER

1938 **ASTON MARTIN 15/98 2 LTR.**
LONG CHASSIS SALOON

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