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"DEVELOPMENT OF SPORTS CAR DESIGN : 1910 - 1950"

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INTRODUCTION

Any discourse on sports car design must begin with a definition of sports cars. This is not easy to do: sports cars come in a variety of different shapes and configurations. For instance, in the 1920s and 1930s, most sports cars could be recognized, apart from their performance, by their open bodywork. Nowadays however, virtually all high performance sports cars are enclosed. Also, with the advent of the luxurious high speed coupe, a high top speed and acceleration are no longer the exclusive properties of the sports car. Today the situation is even more confusing; sports cars may have their engine at the front, in the rear, or in the middle; they may be open or closed, and may seat two, three, or four people. The format of the sports car has undergone many changes in its long and varied development.

However, perhaps one quality has remained consistent - the sports car's character. Sports cars offer a more immediate, exciting, and pleasurable experience of motoring than ordinary cars. The saloon provides basic mobility; the sports car lies closer to our dreams. Perhaps the best definition is a car that, in comparison to a saloon of similar price, offers superior performance and more adventurous styling, sometimes at the expense of practicality and comfort.

In looking at the history of sports car styling and design, the advent of the Cisitalia coupe of 1947 may be taken as a convenient point of reference. Until then, sports car development had been primarily concerned with first principles, with establishing optimum solutions in the areas of aerodynamics, lightness of construction, and of providing the maximum interior room with the minimum exterior volume. The Cisitalia could be said to sum up the achievements of this development; it signaled the arrrival of the modern sports car. As its body was styled by the then up-and-coming Pinin Farina, it was also to show the way forward in styling. Hence forward, sports car design would largely consist of refinement of an established concept with sculpture playing a major role in body design.

This thesis deals with the first intensive phase of the sports car's development, from its inception as a derivative of the touring car at the end of the first decade in the century, to its maturity as a highly refined gran-turismo sports car of the late 1940s.

CHAPTER 1 THE ORIGIN OF THE SPORTS CAR

DEVELOPMENT OF THE TOURING BODY

In order to examine the evolution of sports car design, it is necessary to trace the sports car's origins and emergence as a type of automobile distinct from four seater saloon and touring cars. The sports car as we know it today, that is, a relatively fast, open 2 seater, had an antecedent in spirit in the horse drawn spider phaeton or curricle of the 19th century. A light two-wheeled vehicle, it combined glamour and performance, and was very much favoured by the young men of Regency days. Today, the name 'spider' survives as a model name for many open roadsters, for example the Fiat 124 Spider, introduced in 1966.

It was not long after the first successful petrol engined vehicles were developed by Karl Benz and Gottlieb Daimlier in Germany, in 1886, that the competitive and sporting aspects of the new 'horseless' carriages began to be appreciated. Friendly contests were held between the early De Dion Bouton and Serpollet steam cars in the streets of Paris in 1888, and the first official road race took place between Paris and Rouen in 1895. It was won by 3 hp Panhard, driven by Emile Levassor. It could be said to be the world's first conclusively successful racing car.

France, with its excellent network of roads and passion for mechanical novelty, (the bicycle gained wide acceptance there) was the centre of intense development in automotive design at the turn of the century. It was also a leader in establishing the foundations of the motor racing industry, for many important early races were held there, for example, the Gordon Bennet Cup of 1900, between Paris and Lyons. The cars of these early races were high unsteady; petrol, electric, or steampowered, and relatively slow. Evolved by Daimlier in Germany and Panhard et Levassor, Peugeot, Sepollet and De Dion in France, they could be said to be of the first generation of horseless carriages.

Competition quickly showed up the disadvantages of a high centre of gravity, a short wheelbase and a narrow track distance between the wheels, and many valuable lessons about chassis and engine design were learned from racing. Consequently, racing cars very much at the forefront

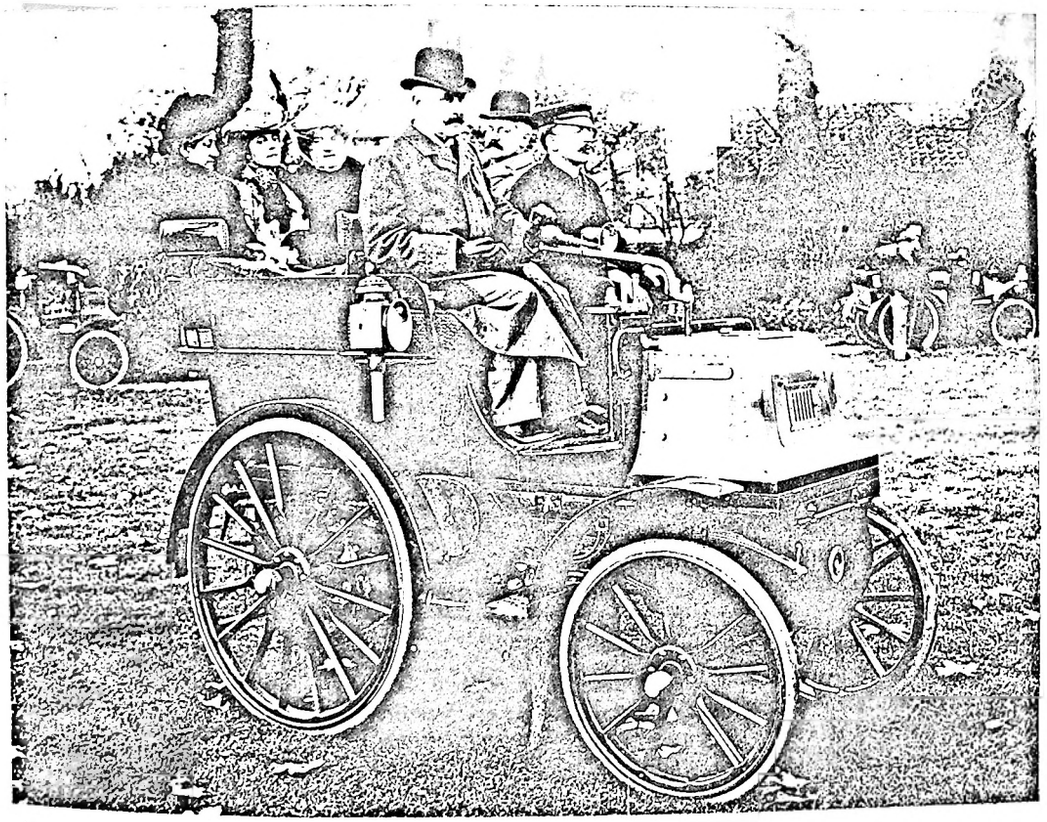


FIG. 1

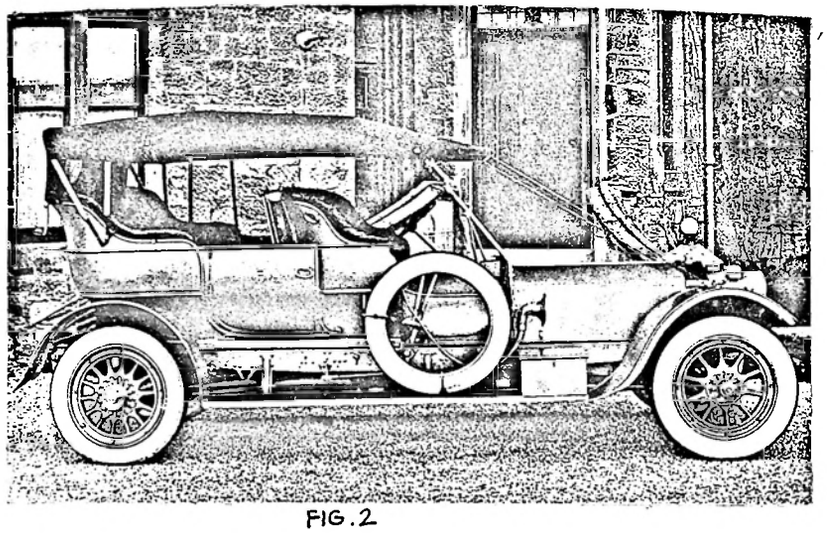
of technological development. Racing also added prestige value; success in competitive events conferred status on a car and its makers, and founded the success of many companies.

The cars of the 1890's as exemplified by the 1898 Daimlier (Fig. 1) were tall and short. Underneath the crude, heavy chassis were the mechanicals and the engine, (which sometimes lived under the seat, as in a Benz). Steering was a tiller system, and suspension was by leaf springs. The large rear wheels impeded access from the side to the rear seat; rear passengers had to climb in through a door at the back. This car also had no roof; being so high, a closed body would almost cause the whole car to be blown over in a strong wind.

It was not until chassis design became sufficiently lower and longer that civilized features like a proper side entrance and a closed body could be realised. These were built by coachbuilders who had been building such features in carriages for centuries. A major problem facing coachbuilders in making the transition from the horsedrawn carriage to the horseless carriage was one of proportion. The subtle curves of a carriage were well balanced by its large spindly wheels and the plastically moving mass of the horses out front; a car body, in contrast, had only a short, box-like bonnet in front, and its wheels were smaller and further apart than in a carriage. The proportions of the body panels of many early car bodies, derived as they were from carriages, tended to look a little out of place on early horseless chassis.

The first side entrance cars on a long chassis were evolved in the winter of 1902-1903. They were called side entrance tonneau bodies, and the Paris Salon of the following winter showed the first full scale displays of these designs; this event may be taken as the arrival of designs unique to the automobile.

Interestingly, Karl Benz's three wheeled petrol car of 1886 was remarkably advanced in comparison. Its layout was the result of long and careful thought, and easily allowed side access, although it only held two people. It was unique also in that its construction owed nothing to horse carriage construction - rather move, in fact, to the new cycle technology - and is widely considered as being the first purpose designed car.



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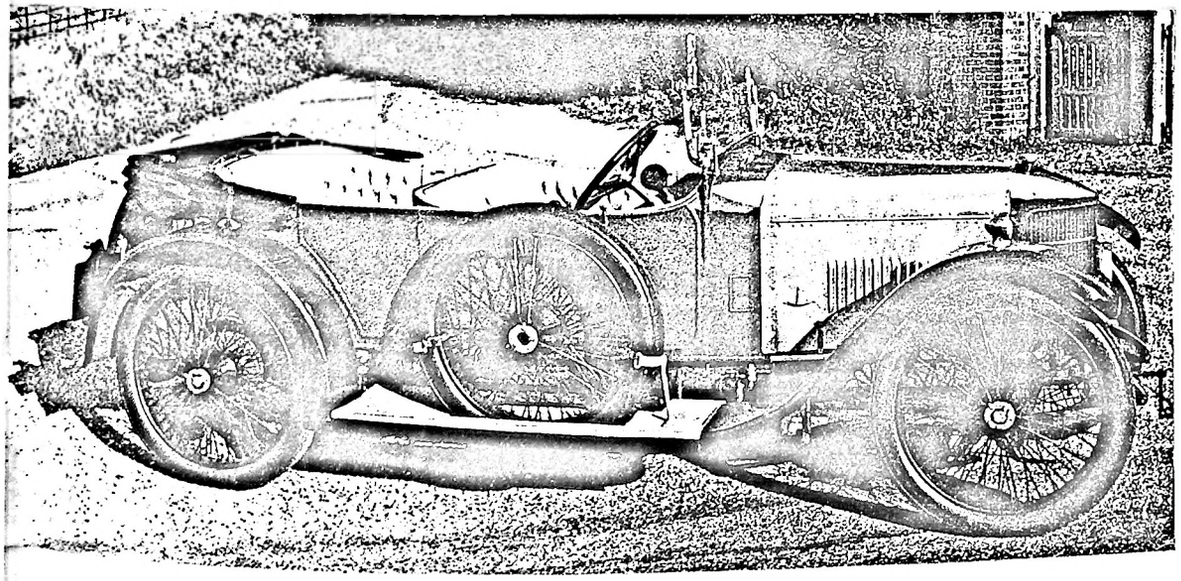


FIG. 3

By 1901, the first purpose built racing cars emerged as a type distinct from the touring car. These were heavy lumbering cars, the French firm of Darraq had a 50hp racer, while in England, Napier was construction 70hp racers for the Gordon Bennet Cup. In addition, the epochal Mercedes 35PS, designed by Wilhelm Maybach of the Daimlier company, made its debut in 1901 also, in the Grand Prix de Pau. This car showed the way forward technically; it had a throttle to control engine speed, and a gate pattern for its gear lever.

By 1904 the side entrance touring car had evolved into the Roi De Belges style, developed by a Parisian coachbuilder, Rothschild et Fils and their gifted designer, Mr Charles Ferrand. This was the first style of body work exclusive to the car, coming nearly twenty years after its invention. It was a handsome four seater touring body, built to the order of King Leopold of Belgium, its rear seats being said to be modelled after the Queen's boudoir chairs. A low, square bonnet led to a large, amply curved body shell. Its very curvaceous body panelling owed much to the curvilinear elements of Art Nouveau, some of them even being of compound curvature, a particular innovation of this style, intended to reduce joint lines and simplify appearance. They were significant also in that they were made of metal, not of wood, which was the order of the day.

Overall the Roi de Belges Style (Fig.2) could look very impressive, particularly when its proportions were accentuated by a very long chassis, and it quickly became popular. However, there was still an uneasy juxtaposition between the low bonnet and high body; the car still looked vaguely incomplete without a horse in front.

INFLUENCE OF RACING

In the wake of the disastrous Paris-Madrid race in 1903, where many bystanders were killed by cars veering uncontrollably off the course, racing began to change in character. Henceforward, it would be held in cordoned off circuits or race tracks for the safety of the spectators. It also began to gradually proliferate into a number of different types of event. Two of these were the 'grand prix' for out and out racing cars, and circuit trials for touring cars - high performance production cars that could be brought by the public - such as the Tourist Trophy on

the Isle of Man, the Taga Florio in the mountains of Sicily, and the Prince Henry Trials of Prussia. The touring cars developed in these trials were the ancestors of the authentic sports car.

The Prince Henry Trials, as they came to be known, were a series of gruelling reliability trials sponsored by Prince Heinrich of Prussia from 1908 onwards. They involved repeated hill climbs and speed trials, in the most arduous conditions. Cars developed quickly in such demanding circumstances, and so fierce was the competition for Prince Henry's cup that the event may be singled out as the greatest impetus in the development of the sports car.

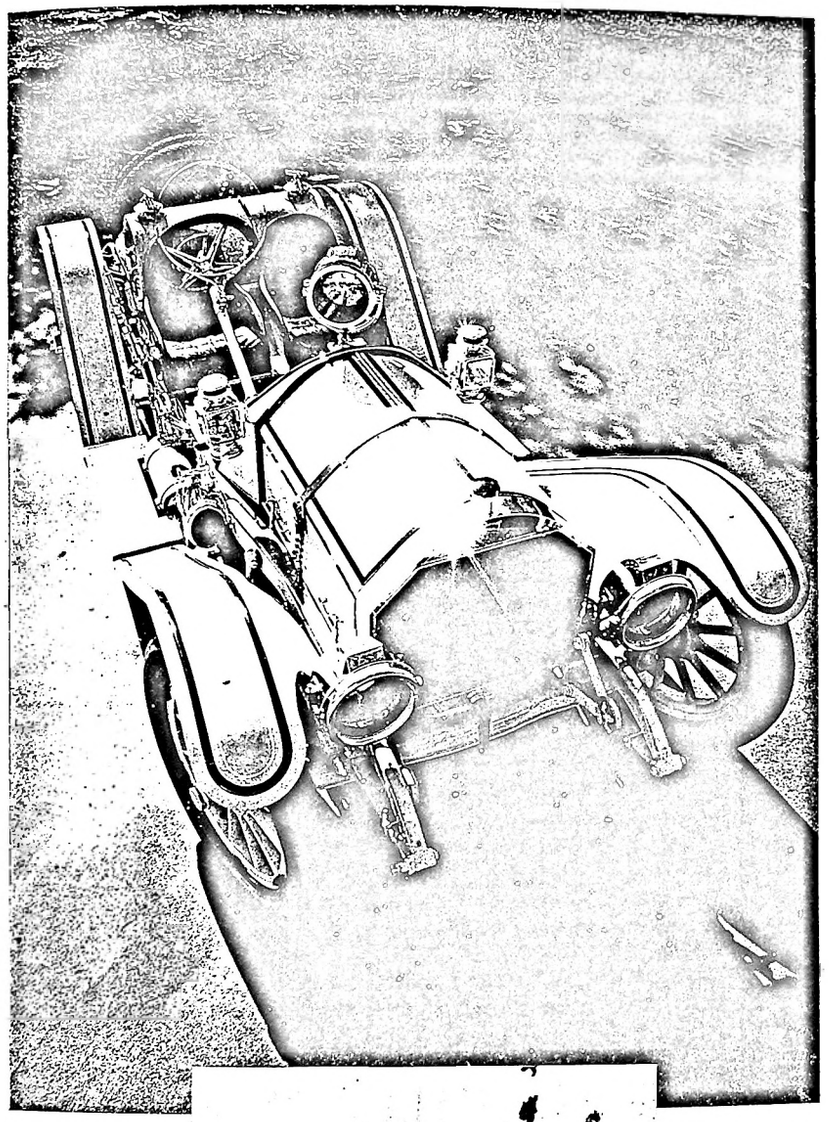
In 1910 it illustrated the way things were going, for Ferdinand Porsche of Austria arrived with a team of Austro Daimlers 22/80ps, very advanced cars with overhead camshafts and 5 inclined valves per cylinder. They also had a body that was tulip shaped in cross section; both to cut down on frontal area, and acknowledging the fact that a driver needed more room around his elbows and chest than around his hips.

Cutting down on frontal area was relatively new, and indicative of the early application of aerodynamics to car body design. These Austro Daimlers may well have owed something to the background of advanced aerodynamic knowledge in Germany, developed from working with the Zeppelins.

It was as a result of the Prince Henry Trials that the tourer body emerged in its classic form. The rear passengers, once perched high in Roi de Belges fashion, now came down to the same level as those of the front, lowering the centre of gravity. Thus for the first time passengers could be said to be in, rather than on, the car. This was first seen on a twin cowl Horch of 1908.

Also the forms of the bonnet and body were beginning to merge, progressing toward a smooth, more unified torpedo shape. The scuttle became smaller and sloped upwards only gently. The large wire wheels with narrow tyres were partially concealed by single curvature flared wings. As a direct consequence of the Trials, the whole car became lower and more purposeful looking. A good example was the Vauxhall Prince Henry of 1912, with a vee-shaped radiator (Fig.3). The integration of bonnet and body were of major importance. In 1911, "the

FIG.5



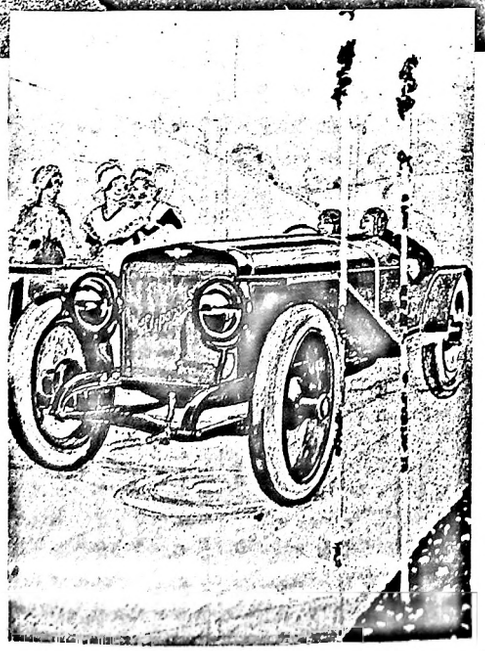


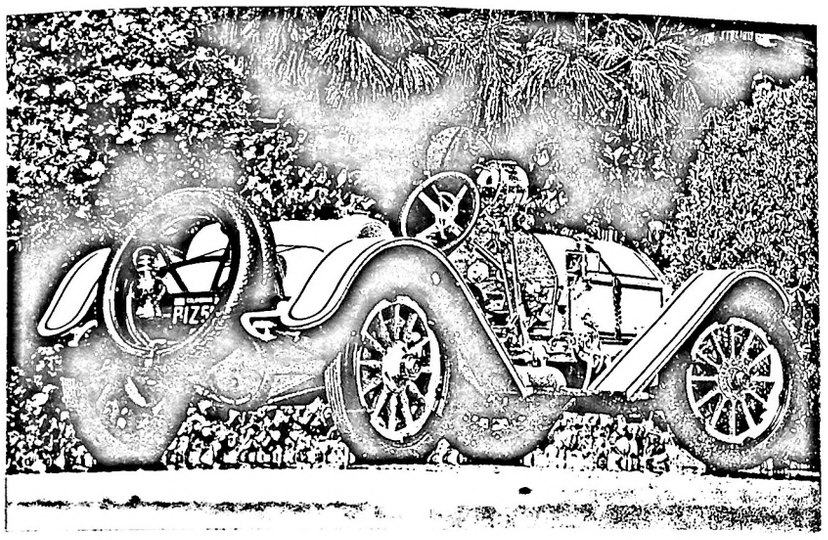
FIG.4

Autocar" correctly prophesied: "the up sloping bonnet is a decidedly striking design which we shall see in England ere long".[1]

In contrast, racing cars were heavy, lumbering monsters unsuitable for ordinary road use. Some touring chassis were stripped down and dressed up in a two seater roadster body, in an effort to bring some of the excitement of track racing to the road; these were, however, unsatisfactory, as their chassis were too long. It was not long before a short chassis car was developed, to fill the gap between the racing car and the tourer; this was the emergence of the true sports car, and it happened almost simultaneously on both side of the Atlantic. In Europe, the Hispano Suiza (Fig 4) appeared in 1911 in Spain, while in America the Mercer Raceabout predated it by a year (Fig.5)

The Mercer Type 35 Raceabout came from Mercer Country in New Jersey. Born into an era when Woodrow Wilson was President of America, and Mary Pickfod was the most wanted star in Hollywood, it struck an immediate chord in the hearts of aspiring young men. With its low-line bonnet, aggressive sweep and curvature of the fenders, and its supercilious monocle windshield, it was irresistible to the well heeled playboy. The steeply raked steering wheel column and angled dash, made a clean break from the vertical dash inherited from the horse drawn buggy. The spatial relationship between the functional parts, the angles of the brake and gear levers, the relation of the seats to the rear wheels, was determined not by styling, but by the fact that they simply worked best that way. When asked how the appearance of the Raceabout was arrived at, the car's creator and engineer, Finley Robertson Porter replied; "Why, we just built it that way!"[1] The car was a direct, honest expression of its function.

There was very little evidence of actual body work on this car; one was very much at one with the elements when careering about on dirtroads on the outskirts of the city. The scuttle faired out from the bonnet to support the dash, the fenders accentuated the wheels, linked the whole car together visually and gave it an aggressive stance. Otherwise the car was a joyous assembly of disparate elements, from the twin bucket seats to the gleaming brass acetylene lamps and spare tyres strapped to the back, with no attempt being made to integrate their forms. In this respect the Mercer was a little behind the torpedo bodied Prince Henry tourers of Europe.



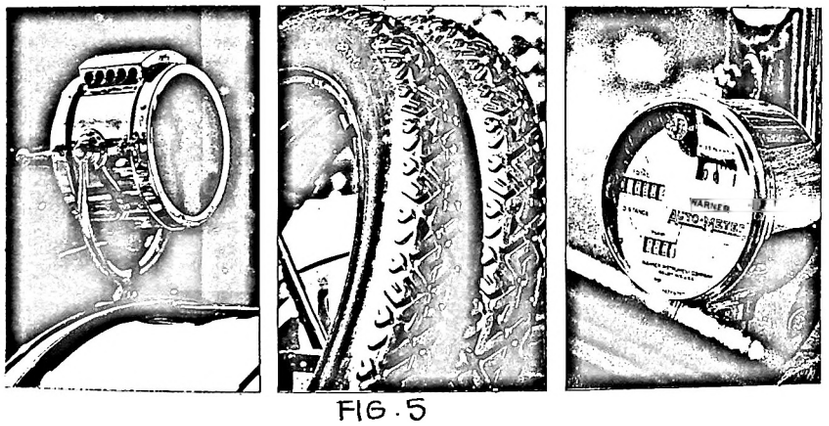
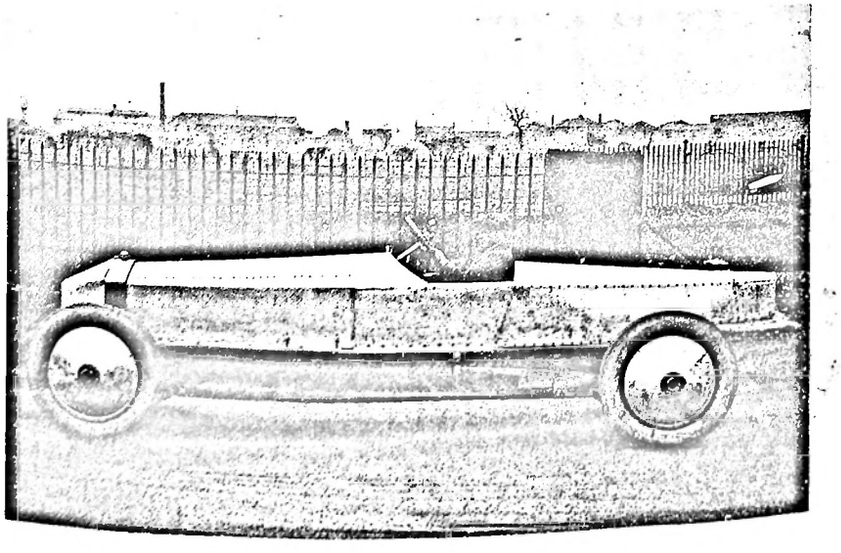


FIG. 5

FIG. 6



The function of each element of the Mercer was articulated beautifully; the convoluted spirals of the horn, the large bass drum of the spotlight perched on top of the bonnet. Each element expressed its function independently of the others.

In Europe, meanwhile, the Hispano Suiza Alfonso, named after the King of Spain, was making similar inroads. Its category illustrations (Fig.4) were done by a French artist prominent in the contemporary motoring and social scene, Rene Vincent. The atmosphere of the 1912-14 period is perfectly captured, with the young ladies' attention attracted by two motorists in their dashing new Hispano.

The Alfonso is a progression of the Mercer in that its bonnet and body are more integrated or more torpedo-like in the Prince Henry idiom, although its mudguards, being of wooden planks, were not as refined. This was Europe's first sports car, and justifiably proclaimed itself in its catalogue 'La Reine de la Route'.

The role of the artist or stylist in automobile designs was as yet a very small one. The first motor car bodies generally resulted from an interplay of ideas between the coachbuilder and the customer, the coachbuilder using well established craft methods, derived from a long tradition of coachbuilding. In 1912, the 'Automobile and Carriage builders Journal' quoted an American visitor to Europe as saying: "Within the past year, we are told many European makers have employed artists of reputation to work in conjunction with their body designers". The 'Journal's comment was: "That may be so but we doubt it".[2] The problem was that to the English, 'artist' meant the great academics like Millais, and it was difficult for them to see how an artist's ideas could be related to body design. coachbuilders, moreover, were craftsmen, who had little formal training in aesthetics. The superb proportions of carriage design were slowly and gradually evolved over centuries of practice.

Nevertheless, early progenitors of the modern car stylist did exist before the Great War. Mr Charles Ferrand of Rothschild et Fils in Paris, was responsible for the Roi de Belges style with its characteristic Art Nouveau curves. Later, Ernst Neumann, a Berlin artist and poster designer, designed the Vee-shaped radiator for the Prince Henry touring cars, which achieved a fashionable following, particularly in the Paris

and London motor shows of 1913-1914, with its accompanying raised bonnet line. Neumann was responsible for many clean, advanced bodies designed in Germany, notably a 1914 saloon for NAG, which had subtle razor-edge styling.

The shape of the car had now arrived at the torpedo body, with its integration of bonnet and bodywork. This form, the first automotive one to make a clean break from the horse drawn carriage, was to carry the automobile through World War One and beyond to the 1920s. In sports car design, both before and after the war, a major influence were the French grand prix cars. The Peugeot Grand prix car of 1912, with a twin overhead camshaft engine inspired by that of the Alfonso, established a new trend for lightweight, more efficient sports cars, while the 1911 Rolland-Pilain, with its narrow bonnet and smoothly upswept scuttle leading to its cigar shaped tail, was to be the archetype of the modern two seater sports car, benefitting from much aerodynamic development in pre-war France.

CHAPTER 2

THE COACHBUILDING ERA

If the Edwardian era can be regarded as one of definition, the 1920s can be regarded as being a period of consolidation. The first real advances in light weight construction came about as a response to the dilemma facing coachbuilders; how to provide ever more elaborate coachwork as demanded by the customers without imposing too much weight on the chassis.

In Europe, two main types of sports car prevailed: the light efficient roadsters of France, typified by America, Darraq and Peugeot, and the larger, heavier sports cars found in Britain and Germany, typified by the Bentley and Mercedes. Sports cars were abundant; it was the practice of almost every manufacturer to offer a roadster-bodied derivative of their standard saloons, the most successful example being Morris in England, with the M6 Midget of 1928.

The French Motor industry recovered quickly after the war, and had a full display of new models for the Paris Salon of 1919. Star of the show was another Hispano Suiza - this time the H6, which was the world's most technologically advanced car at the time, having overhead camshafts and servo assisted brakes. Hispano Suiza's Flying Stork was one of the world's two most famous radiator mascots, the other being Rolls Royce's Spirit of Ecstasy. SPAD fighter planes were powered by Hispano engines, and the tall, imposing radiator and huge bonnet of the H6 identified with the S.E.5. and SPAD single seater fighters which had car-type radiators, and were some of the most exciting and powerful machines that the public were familiar with. The high bonnet entailed high sides and therefore a clear line ran from the radiator, along the bonnet line, and to the rear. The HG had an immediate fashionable following.

THE BUGATTI TYPE 35 - INFLUENCE OF AERODYNAMICS

Progress in the shape of racing cars went forward only slowly between 1904 and 1909, although technical progress was fast. Chassis design, steering and roadholding improvements took precedence over body design and aerodynamics. However, this was to change in 1909. Since the

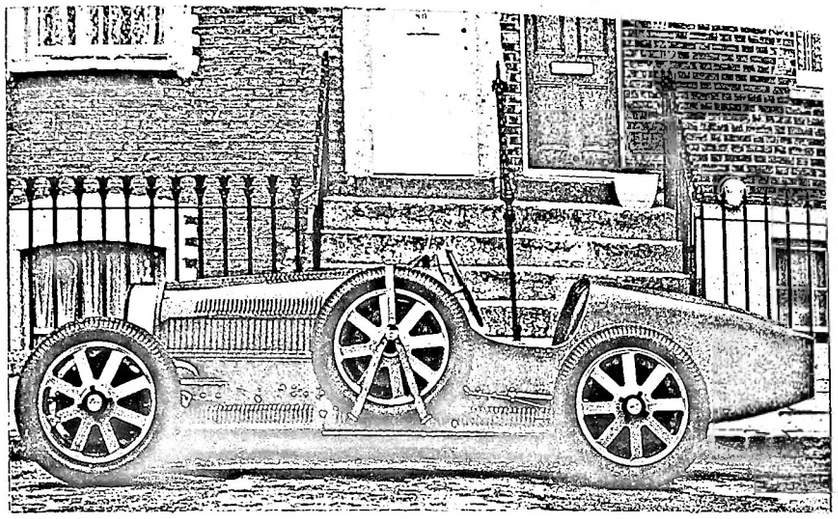
Wright Brothers flight, progress in aerodynamic theory had been rapid, and there had been time to re-interpret the subject for the automobile, while Brooklands had been open since 1907, to provide an arena in which high speeds could be held as long as the driver and his car could cope. On the great banked circuit Newton's Napier set the lap record for the 1908 season at 114.9 mph, a speed far above the figure at which a streamlined, windcheating profile became helpful.

Brooklands consequently developed a new generation of high speed cars with rapidly evolved windcheating bodies made of aluminium, for example the narrow Vauxhall single seater KN, or the 1911 Rolls Royce (Fig 6)

A narrow, streamlined, cigar shaped body became the norm for racing cars. Smooth undertrays enclosing the chassis and engine appeared, with ducted radiator cowlings, in which air passing through the matrix was expelled through louvres directly along the bonnet sides. Brookland's counterpart in America was Indianapolis, which generated narrow two seater bodies as opposed to Brookland's single seater. A racing event which had a strong impact on the application of aerodynamics to French sports touring cars was the Grand Prix de Tourisme, held for a few years until 1925. The 1922 event was won by an 18cv Voisin, designed by Gabriel Voisin, a handsome cigar shape with long curved bulges running along the body sides. The winner in 1925 was a Bugatti, modelled closely on the lines of the fabled Bugatti type 35 sports car.

Ettore Bugatti closely followed contemporary trends in aerodynamic progress. The slender outlines of the Bugattis built for the 1923 Indianapolis 500 race owed much to the work of SPAD aircraft aerodynamicists, working under the aircraft designer Bechereau. An alternative convention in the immediate post war period was the racing shell of entirely circular cross section, and such bodies were fitted to the Bugattis entered for the 1922 grand-prix at Strasbourg or Salmson chassis.

Although the Germans were engaged in the most fundamental research into wind resistance in the early twenties, the Italians designed the car which was to have the greatest immediate impact on the design of racing cars of the same period. In 1922 the Fiat grand prix models appeared with new bodies built after much experimentation by the company's aviation engineers. They featured bullet-nosed body shells



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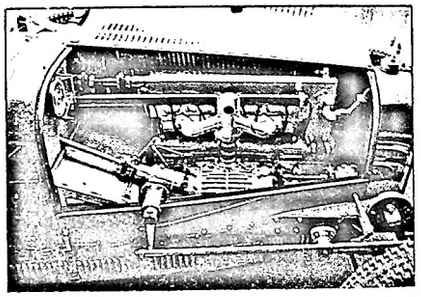

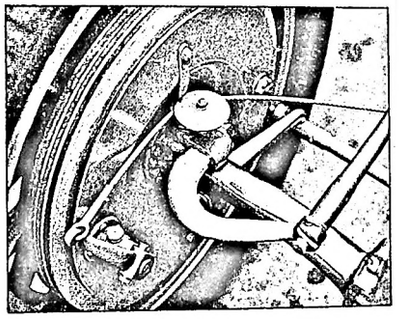

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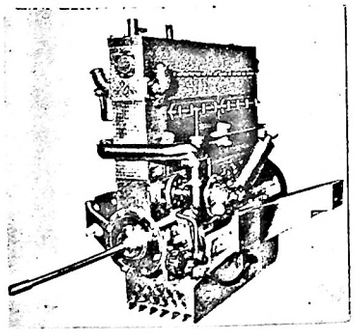
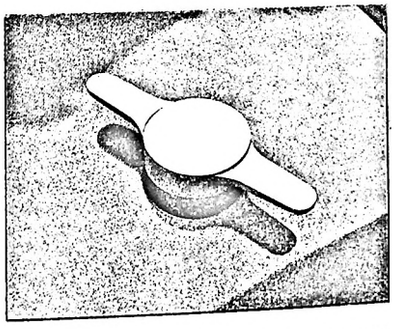
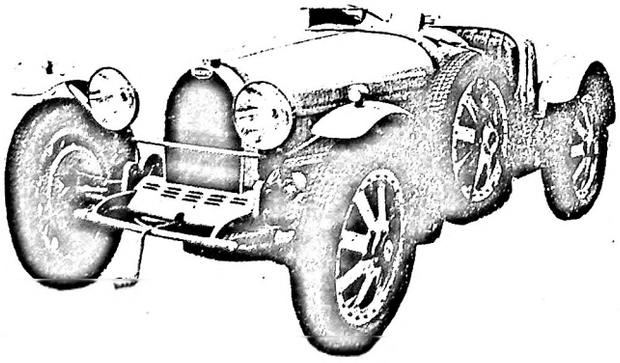
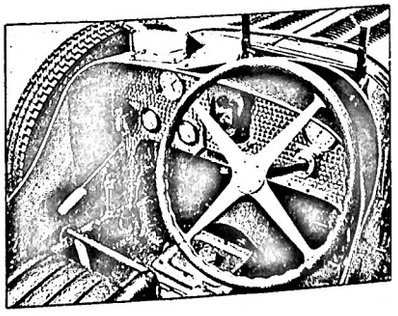








which curved gently out to accommodate the two occupants demanded by the regulations, and tapered smoothly to a short flat sided tail. They also had an undertray which gradually increased its distance from the ground as the tail narrowed, while a horizontal streak beside the cockpit controlled airflow along the body sides.

Bugatti adopted several elements of this in his classic Type 35 (Fig 1) which made its debut at Lyons, in the French Grand Prix in August 1924. The Type 35 soon emerged as one of the finest of 1920 sports cars, combining aesthetic and mechanical excellence. It was a classic race bed torpedo shape, from its horseshoe radiator to its knife edge tail, and it closely followed the Fiat in outline, especially in the chassis layout at the rear, where the chassis frame swept in to follow the contours of the body.

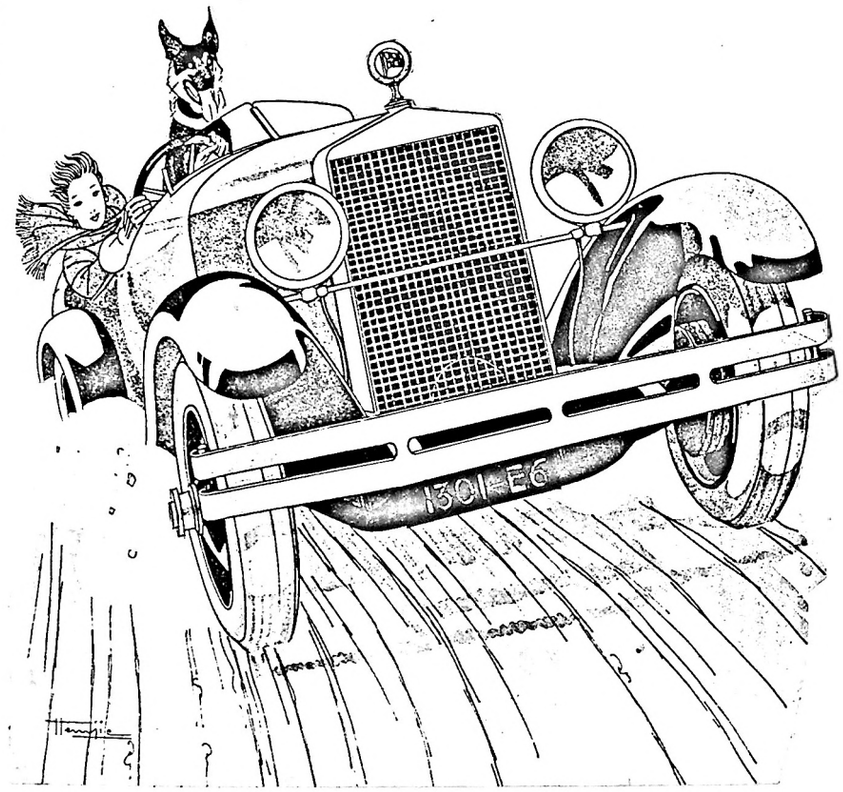
For aerodynamic reasons the visual mass of the car was disposed towards the rear, which, together with the front wheels positioned forward of the radiator gave the car a dynamic look. The many ducts and curves along the side also pointed to the streamlined heritage of this car, as did the angled spokes of the wheels, which in theory were meant to act as vanes, and thus pass air over the brakes. The wheels themselves were of cast alloy, at a time when wire ones were "de riguer",and their starfish shape beautifully set off the large solid mass of the body.

The torpedo body was to live on for some time on the Amilcar and Salmson in France, and later in a modified from in England, on the Austin seven sports and MG.

THE JAZZ AGE

For the first half of the twenties and or a few seasons afterwards motoring was to move up in the world, and the car was to become both an object of high fashion and of artistic expression. As wealthy customers emerged from wartime restraint, they demanded ever more chic and fashionable coachwork.

Paris was the centre of fashion and the luxury trades, and French coachbuilders were to excel in levels of craftsmanship and style. the receptive and ebulliant atmosphere of post war France also made it the artistic centre of the world, with Paris gripped with enthusiasm for all



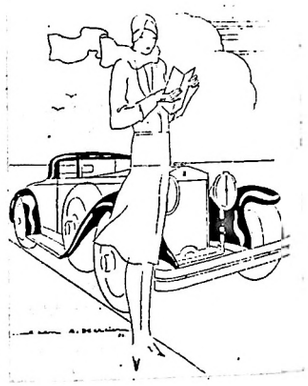


FIG. 9

things new and modern in the world of art: cubism, expressionism, futurism and the Bauhaus of Germany. Contemporary motor advertisements and catalogues began to illustrate cars from a new viewpoint; they seemed longer, lower, their wheels were spread wider, their bonnets were more arrogantly thrusting than they could even be in real life. The customers responded by asking for cars like the ones in the advertisements (Fig.9), and consequently a new vogue for long, low, and sleek bodies quickly evolved. Many completely new body styles were developed, some of them quite witty; a boat tailed 'skiff' body, shaped like a motor launch, complete with mahogany 'decking' between the seats, was developed by the Paris from of Henri Laboudette from 1921 onwards. This 'motor launch' vogue was to become especially popular in France.

In Paris, extravegance and ostentation prevailed everywhere. The Wealthy families spared no expense in ensuring that they had the most fashionable and up-to-date cars. All sorts of exotic finishes and materials were used on the bodywork and on their interior decor. The plain broadcloth of pre-war days was replaced by silk, brocade and hide, especially reptile skin, while the rest of the trimming was of rose wood, tulip wood, ivory or rock crystal. Outside, cars would be dazzlingly bright; red, orange, ivory, gold; and panels were finelined, criss crossed, shamcaned or betartanned. Interiors would be done up like a fashionable flat or a nightclub, according to the owner's taste, and fashion in cars was as frivolous as women's fashions, with the coachbuilding houses bringing out collections each year to make sure the line changed.

These cars were very much cars of the Bright Young Things, of the Eton Crop, of backless dresses and cocktail parties. All-night joyriding was common after the nightclub, and the car makers capitalized on this by emphasising the speed and sportiness of their cars in advertisements, recognising a new element of society who embraced the car as a symbol of their liberation.

It was through the ideas of leading fashion designers; Chanel, Schiaparelli, and others, that the ideas of Picasso, Cocteau, Leger, and others filtered down via haute couture to jewellery, furniture and cars.

It was during the twenties also that a new derivative of the sports car emerged in France - the grand routier. This was a highly roadworthy long distance touring car of less than three litres, high geared,

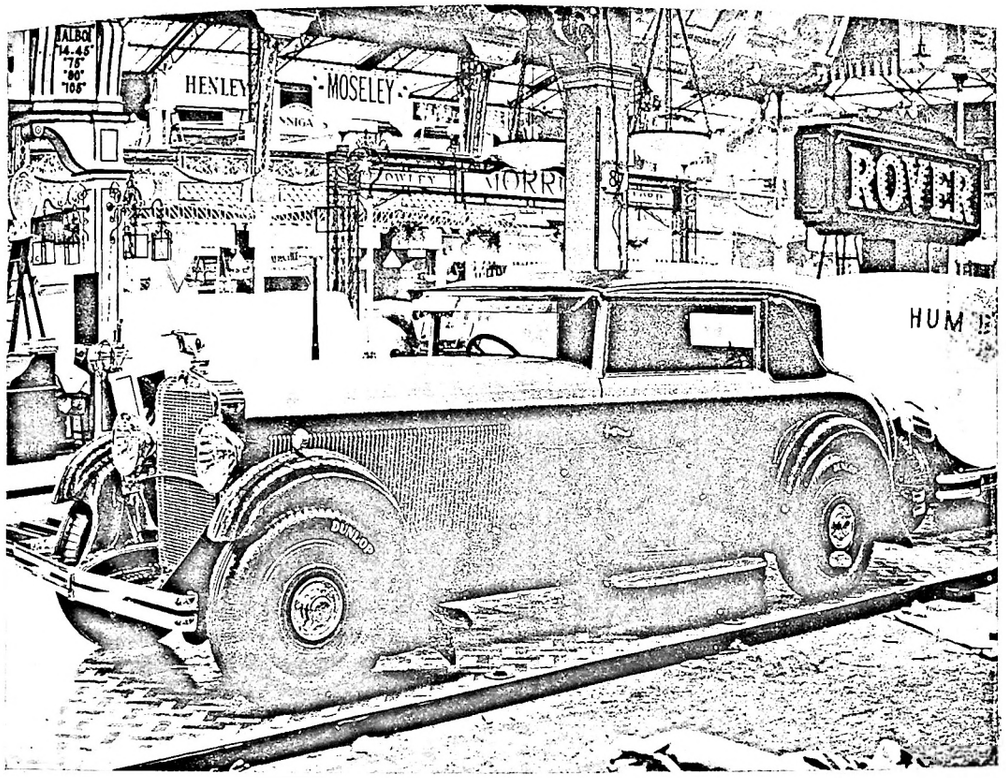


FIG. 10

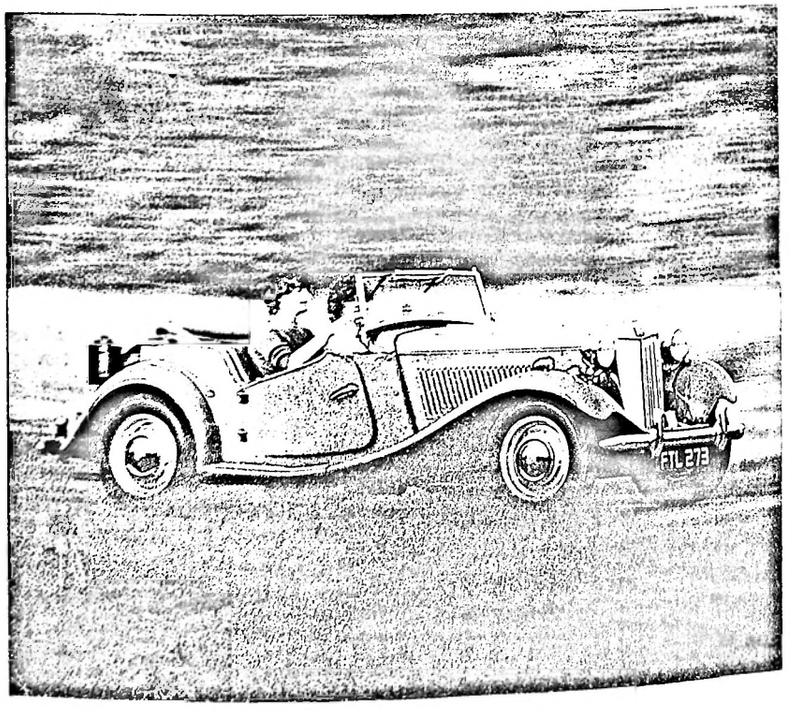


FIG. 11

unrefined and robust. They were developed to travel along France's great routes nationales, with their long perspectives, distant horizons, and indifferent surfaces. The Delage D8 (Fig.10) with body by Figoni of 1931 is typical of the breed. The grand routiers were lower and more compact than saloons, and all day cruising at 60-70 mph soon led to the adoption of closed bodies for comfort; also, to the positioning of the seats within the wheelbase to lower the centre of gravity and increase stability.

COACHBUILT BODIES

In the early twenties the composite body, that is, the classic coachbuilt body consisting of a wooden frame panelled in steel attached to a separate chassis, was still the order of the day. Cars were still quite high, with the chassis still frequently over the axles, the radiator being over the front ones. Leisurely, long stroke engines meant tall bonnets, and this in turn meant a high scuttle to look out over for the driver.

Road racing evolved a much lower chassis with consequent lowering of the body; in line with the hitherto discussed vogue for sleeker bodies, this was quickly adopted as a major new fashion, and cars developed ultra-low bodies with low roofs.But the bonnet remained tall, resulting in a very shallow windscreen to see out of. This was almost like a letter box, and seriously restricted vision in some cases.

The visual form of the automobile had now arrived at a simple and direct statement. The waist line running from the radiator top to the rear unified the car's volumes, and was echoed by the line of the roof and of the running board (if fitted). The falling lines of the mudguards linked the still large shapes of the wheels, and connected to the running boards. Sporting, touring or formal variations were evolved by gifted designers of this basic theme.

The shape of the body was defined by two main factors; the sidesweep - the convex outer contour of the body in plan view, and the turnunder, a shallow curve formed by the side of the body, as one viewed the car from the front. Both these parameters affected the car's basic proportions, the space available for passengers, and the cost of building the body.

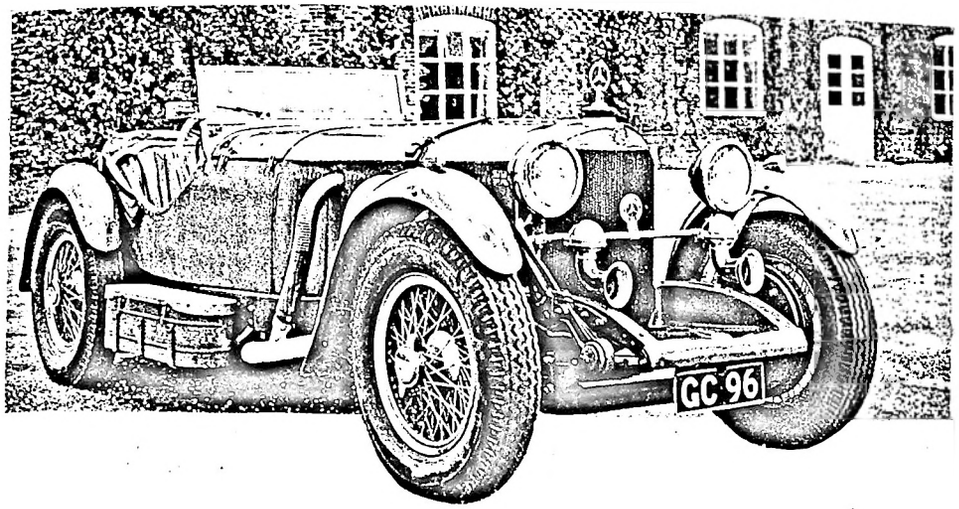
Sports cars has a pronounced horizontal emphasis. Tyres were narrow and beaded edged, to be replaced by fatter ones a few years later. Often, a large spotlight would be mounted on the scuttle for long distance drives far into the night, or more often, just for show. A basic component of coachbuilt bodies was the valence or sill. This was the area between the running boards and the doors; it covered the chassis, supported the body sides, and made good the difference in width between the body and chassis. Together with the running board, it reflected the existence of the chassis as the basic connecting and structural component of the car. The coachbuilt body was costly, heavy, and because of being a rigid structure, creaked and rattled as the chassis transmitted stresses and strains to it in motion. In response to this, Charles T Weymann evolved the Weymann body from 1923 onwards. This was a lightweight, flexible skeleton covered in waterproof fabric stretched tight. Since its joints were padded, it could 'give' under stress, and therefore could be driven fast over bad roads without groaning and creaking. It found wide application on the French grand routier cars, and by 1925 Weymann bodies were to be seen on Peugeot, Berliet, Chenard-Walcker, and many other makes.

The speed and economy with which a Weymann body could be made was also a revelation to the industry. Complex and time-consuming panel beating and painting could be avoided altogether, and the variety of fabrics and textures added a new dimension, enthusiastically taken up by the fashion conscious elite of Paris.

EARLY 1930's - PERIOD OF CHANGE

1925 coincided with the Exposition des Art Decoratif, the high point of Art Deco. The nautical, boat-tailed vogue in France was very pronounced, and there were many boat shaped roadsters and tourers, frequently finished in exotic moods with inlay. V-shaped windscreens were common, and luggage boots began to feature increasingly as part of the structure of cars. A contributary factor in this was, interestingly, the fact that luggage could then no longer be sent on ahead with the servants on long journeys, as the servants were becoming fewer and fewer.

FIG.12



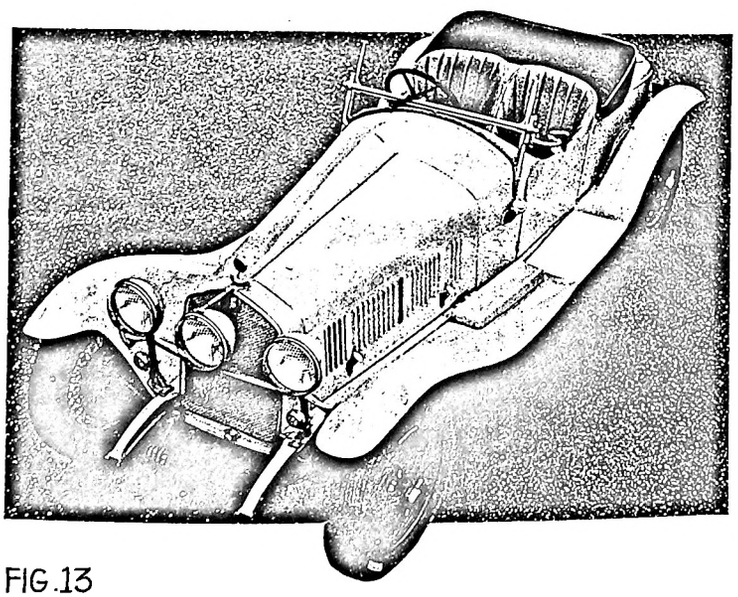


FIG.13

Olympia in 1925 saw some new trends. Cars had more imposing bonnets, flatter roof lines, wider doors, and lower seats, brought about by an increase in steering column rake.

By 1926, seats came down still further, as footwells became part of the chassis. To save weight, glass was reduced to a minimum, with consequently high body sides. Scuttles were beginning to diminish, the bonnet line coming closer to the windscreen.

The extravagance of the first half of the decade was beginning to be replaced by a more austere, banal look. The individual tastes of customers were no longer to take precedence, especially with the Wall Street Crash of 1929, after which much wealthy patronage of coachbuilding disappeared. Mass production was steadily on the increase, and with it, a more banal, mass produced style.

In Britain, the 30's were the heyday of the small inexpensive sports car, such as the MG Midget, (Fig.11) Wolseley Hornet, Singer le Mans, and Riley Sprite, while at the upper end of the market Aston Martin and Bentley continued with heavier, more expensive roadsters. English sports car styling did not in general progress as much on the Continent or in America, although the Riley IMP and MPH models were well balanced and of good proportion.

The large heavy type of car was also to be found in Germany, in the form of the Mercedes 540K (Fig 12), which, with flexible exhaust pipes protruding from the bonnet sides and vee-shaped radiator, was a very masculine, almost arrogant looking car.

The truly classic sports car of the early 1930's came from Alfa Romeo of Italy, with the 1500 and 1750 models, (Fig 13) particularly the latter. Its body was designed by Ugo Zagato, who had his own carrozzeria or coachbuilding works in Milan. Unlike the exotic appearance of the Bugatti Type 35, the Alfa had the slim, uncluttered lines of a thoroughbred. Its masses and proportions were handled with a sense of harmony and symmetry that are hallmarks of the Italian approach to car styling. Like the Bugatti, the Alfa was also almost invincible in major sporting events. Its functional elegance was very typical of Zagato. It has often been said that if one defined the function of an automobile as obtaining the maximum speed possible using a moderately powered engine, and being of light construction and sound aerodynamics, then Zagato's work comes close to expressing that function.

The thirties were a time when composite bodies were being produced at the same time as mass produced pressed steel ones. The American's, though late in adapting the car initially, quickly made up for lost time by pioneering the development of mass production. They had gained in this area on the Europeans by the end of World War I, with the Budd company at the forefront of development. Dodge, Nash, and Ford were all mass producing bodies by 1920.

The coachbuilders were largely sustained by aristocratic patronage, particularly in England, but their costly, outdated, and slow methods of production meant that they could not keep pace with the big corporations, who turned out vast numbers of cars very cheaply, often of sounder construction. The next step in this area was the unitary body which integrated the chassis and body structure into one. This was seen on the American Chrysler Airflow of 1934, and the Lincoln Zepher of 1937.

The 1930's saw a decisive break between sports cars and racing cars. By 1935, the specialized grand-prix Mercedes Benz and Auto Unions, which were soon to develop over 600 mph, were more than a match for the smaller capacity Alfa Romeo and Bugatti racers which had been developed from sports cars. The two have remained apart ever since.

CHAPTER 3

STREAMLINING

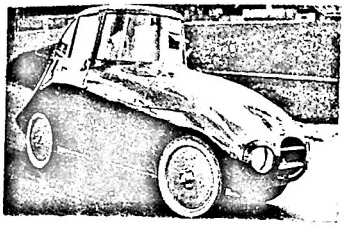
DEVELOPMENT OF AERODYNAMICS

The thirties were the decade in which aerodynamics became important, either spuriously, as in the superficial streamlined efforts of some British coachworks or the streamlined vogue that dominated styling in the latter half of the decade, or genuinely, as in the Chrysler Airflow and Lincoln Zepher of the mid-30's. However, it was in the twenties that the foundation of automobile aerodynamics were laid. With the intervention of World War I, the engineering evolution of motor cars had slowed. The new aeronautive sciences however, had something to offer, and Germany became a powerful force in reshaping the structure and outline of the automobile. This was due in part to the Treaty of Versailles, which deemed that Germany could no longer engage in the development or manufacture of aircraft. Consequently, the Germans turned their talents to automobiles.

The most important contribution was made by Paul Jaray, under whose direction the Zeppelin company had made great strides in applying aerodynamic theory to airships. When he turned his attention to automobiles, Jaray, together with his colleague Wolfgang Klemperer rapidly evolved a series of efficient wind cheating bodies (fig 14) which were of fundamental importance to the development of the automobile. Unlike the aviation designer Rumpler, who developed smooth outlines for rear engined cars, Jaray accepted the conventional long engined chassis of the times, if the cars were to sell in any numbers.

However, Jaray was premature in his ideas, even though he successfully defined the outline of the high efficiency saloon; the public had only just got used to the new torpedo style of body at the end of the war. The only Jaray design to reach mass production was the Czechoslovakian Tatra, (fig 15) a rear engined saloon which made its debut at the Berlin show of 1934.

In France immediately after the war there was also great interest in automobile design on the part of the aviation companies. Voisin, Farman, Bugatti, Salmson, Nieuport and SPAD were names with links in both fields in 1919.



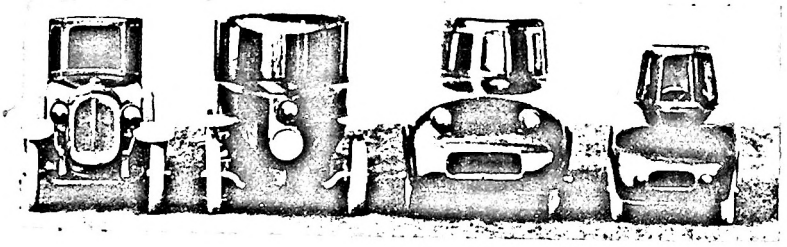


FIG. 14

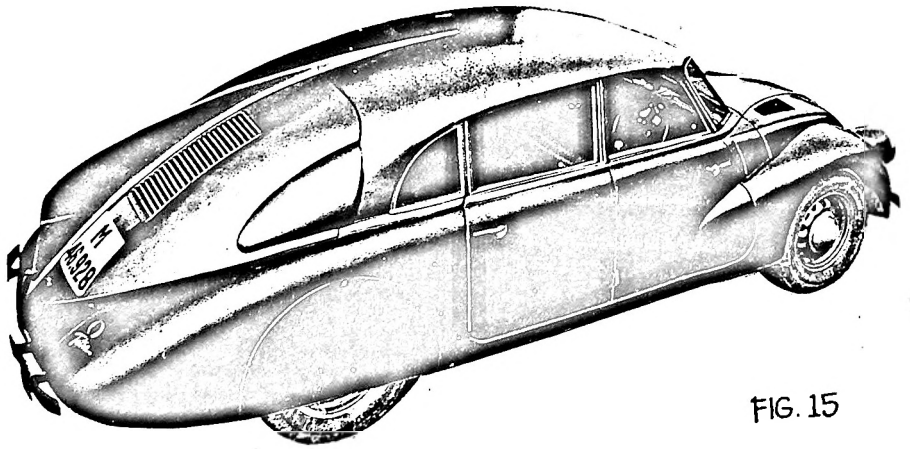


FIG. 15

By 1934, the streamlining trend had taken firm root in the mainstream of car design. At the Berlin Motor Show of that year there was a distinct move away from long bonnets formerly thought elegant, with some makers going to the other extreme by giving short stubby noses as in the 1,300cc Mercedes-Benz and the Opel, also the afore-mentioned Tatra. In America, the ill fated Chrysler Airflow (fig 16) went on sale. In spite of the fact that its streamlined shape failed commercially, it nevertheless had a profound influence, and many imitators, among them Ford's Lincoln Zepher of 1936, and the General Motors torpedo look,which lasted throughout the 1940's. Also in 1934 came the great German onslaught on grand prix racing with highly developed Mercedes Benz and Auto Unions fitted with aerodynamic bodies of a level of advancement not seen before. In general, considerable evidence of streamlining was to be found in the 1934 European Motor Shows, with new names coined by the manufacturers to describe them: Aeroform, Airstream, Speedstream, Streamliner, Airline, Speedline and Flow-Free.

There were two main streams in production high-efficiency bodies for the remaining years until the outbreak of World War II; one followed the Airflow theme, while other makers built developments of Jaray's theories.

A development of major importance came in 1937, when Professor W.E.Kamm published results of the aerodynamic research he carried out in Stuttgart Polytechnic's wind tunnel. He proposed replacing the tapered cigar tail with a vertical cut off one, arguing that to be fully effective, a tapered tail would have to be up to 50-60 ft long. The tear drop shape also had other disadvantages. A long tail was vulnerable when parking, and a properly proportioned tear drop-shaped body would restrict forward vision.

FUNCTIONALISM IN CAR DESIGN

In 1933 the great Bauhaus architect Walter Gropius was commissioned by the Adler company of Frankfurt, Germany to design the bodywork of their eight cylinder sedan. The result was perhaps a clear demonstration of Bauhaus thinking in an automobile. The form of each of the elements - bonnet, body, wings, was carefully and rationally articulated according

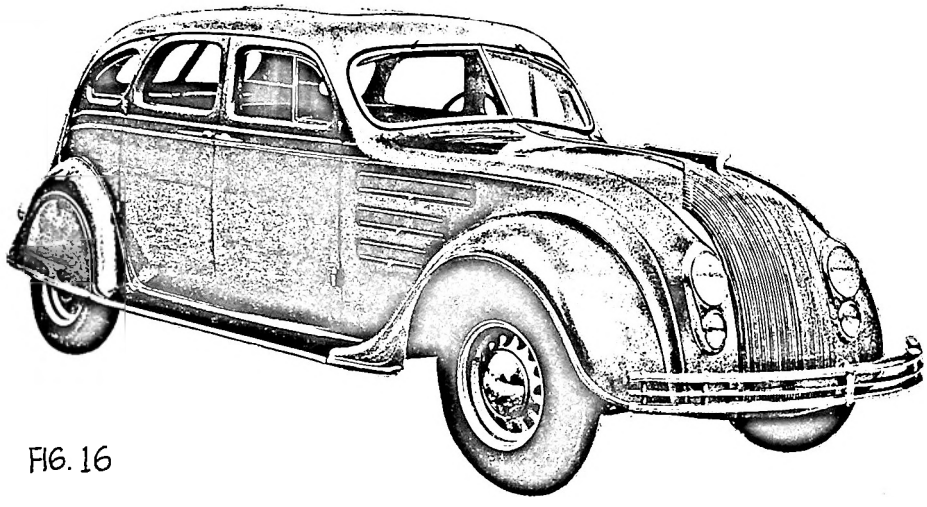
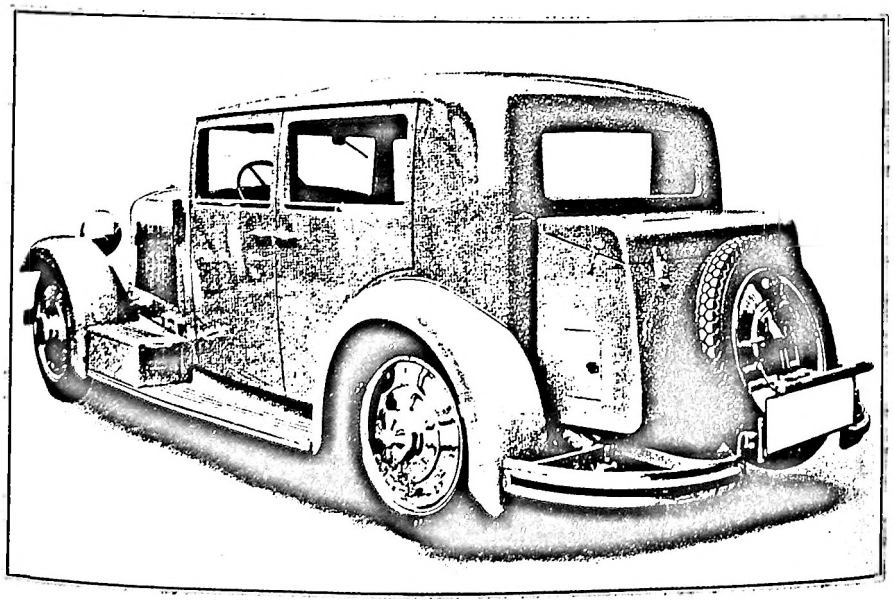


FIG. 16

FIG. 17



to its function, with respect to geometrical clarity and simplicity. This was in stark contrast to the philosophy of streamlining, in which the shapes of a car were subordinate to one overall theme - aerodynamics - and consequently blended together, the whole car progressing towards an integrated whole. Perhaps it was ironic that such an antithesis to streamlining, as was Gropius's car, should have come from Germany, given that country's superiority in aerodynamic expertise. (fig 17).

Reyner Banham wrote about the Adler in his "Theory and Design in the first Machine age", where, although acknowledging the car's beauty, he pointed out that, compared with contemporary vehicles, like the Czechoslovakian Tatra, it was a rather backward piece of design, and showed a "lack of understanding of the revolution in vehicle shape taking place at the time" [3]

(The car was among the first, however to have reclining seats.) An earlier Adler, also by Gropius, and shown at the Berlin Salon in 1931, had double-entry doors, which could be either front or rear opening as required, by turning the handle at the appropriate end of the door.

AMERICAN STYLING IN THE LATE THIRTIES

The Americans were to take a completely new approach to car design and were to excel at sports car styling. With the disappearance of the Wealthy American Dynasties after the 1929 - 1932 slump, hard pressed United States manufacturers sought to attract custom by ever more flamboyant and enterprising styling exercises. A new breed of ritzy, glamourous automobiles emerged - Deusenberg, Auburn, Stutz, Peerless, Lincoln, and Cord. The Americans capitalized on pressed steel's need for deep curves, swages and mouldings, and turned them into important styling features. The only main drawbacks were very thick roof pillars, a result of poor understanding of stress principles. This seemed rather retrograde to the Europeans, who had developed very slim pillars, whole cantilevered roofs in some cases, (for example, Letournier et Marchand of Paris in the early thirties). The Americans also capitalized on the new streamlined look which had caught the public's imagination. The interpretation of functionalism had changed by the early thirties, from the static geometrical forms of the Bauhaus to the dynamic, organic forms of nature. The public had - consciously or unconsiously - caught

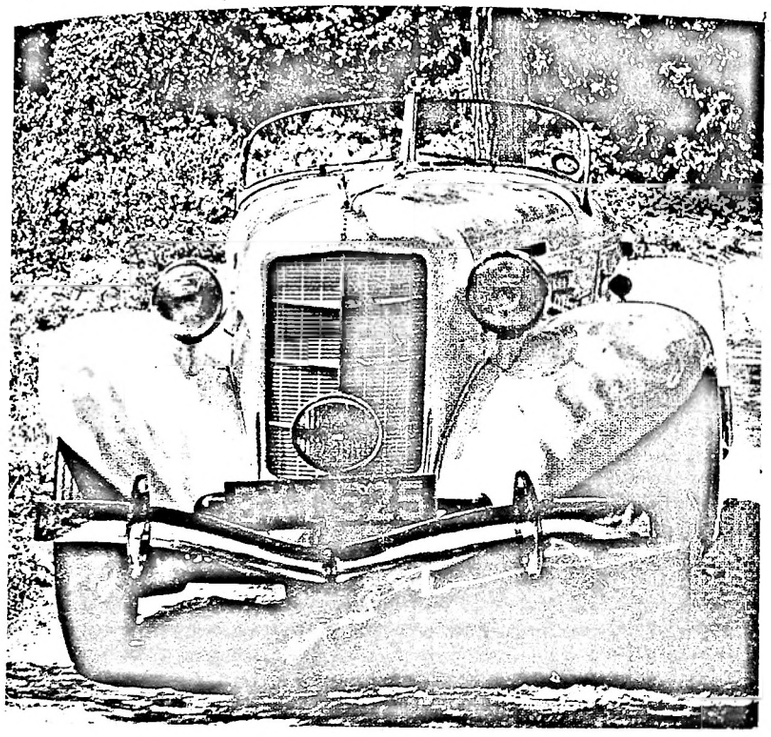


FIG. 18

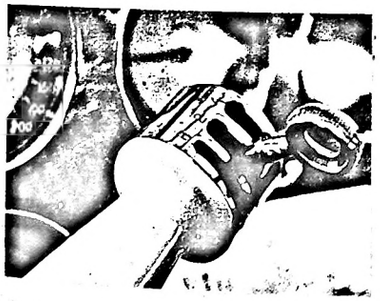
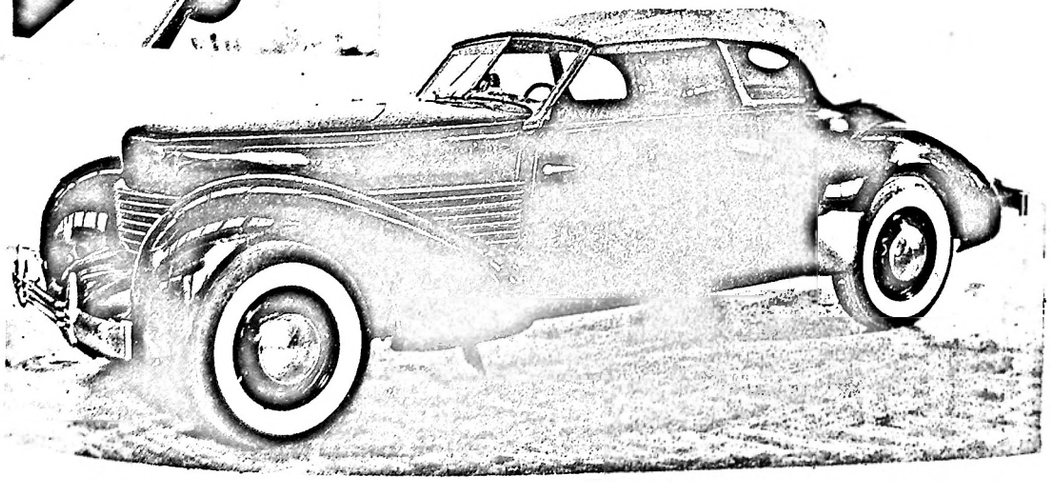


FIG. 19



on to the analogy between natural and man made 'streamlined' forms, natural ones being fish, birds and such like. The fact that the cars were not really aerodynamically efficient as they looked, did not matter.

Unlike the products of the European Car Stylists, which appealed to a cultured elite which had patronized artists and craftsmen for centuries. The new American cars were aimed directly at the masses. By appealing directly to the emotions, of the public, the American corporations laid the basis for the marketing strategy of the 1950's and 1960's.

The sports car makers Auburn, who were recognised style setters, bold, but not to ritzy, and combining simple but sound engineering, came to epitomize the new vogue. Their 851 Speedster of 1933 (Fig 18) had a big long, flowing body, with a pointed boat-like tail. The supercharged version had 4 flexible exhaust pipes protruding on each side of the bonnet. Imagery borrowed from the race track and aviation industry was all over it; a steeply shaped, V-shaped windscreen, wings moulded after aircraft wheel spats. Big and brash, it was a supreme boulevard car.

Car styling was becoming an invaluable asset to the major American Corporations. In 1927 General Motors established its Art and Colour Section - the original corporate styling studio. It was created for Harley Earl, who was to rise to fame in the 1950's as a proponent of tail fins. The formal organization of styling studios for the big corporations was very important, for the Americans now had their own "think tanks", and no longer needed to borrow ideas extensively from European coachbuilders, as they had done in the past.

The Auburn Speedster of 1935 was followed by the epochal Cord 810, (fig 19) a year later. This was styled by Gordon Miller Buehrig, who also designed the Auburn. It was so advanced, and so widely copied, that some of its design features remained in use for nearly thirty years, and it is widely regarded as one of the milestones in the evolution of car styling. When it came out, Buehrig patented "a new original, and ornamental design for an automobile." It featured many innovations: independent front suspension, front wheel drive, retractable headlamps, and a hood (bonnet) that hinged at the rear. Notable were the absence of running boards, prominent hinges (they were flush fitting) and superfluous ornamentation, the designer relying on the simplicity and completeness of its concept, and it's excellent proportions. The fuel

filler was hidden beneath a hinged flap, and the tail lights were streamlined. A particularly appealing aspect of the car was its sculptured look, achieved by a contrast of flat surfaces and sharp curves. This, in a way, was paralleled across the Atlantic, in the English 'razor edge' school of body building, which featured sharp edges contrasting with subtly curved panels. This latter style demanded great skill on the part of the panel beaters, shaping the panels to carefully control the play of light over them.

The Cord 810 also had rheostat controlled instrument lighting, variable speed windscreen wipers, complete sound insulation, and a radio as standard. Its retractable headlights were adapted from Stinson aircraft landing lights, and it had a marvellous gearbox: gears were preselected by a tiny, electrically linked gear lever moving in a miniature gate on the steering column. The unit was a failure however, as it was too complicated. The Cord was in fact dogged by many technical problems, and was withdrawn in 1937. Its development was also retarded somewhat by the fickle enthusiasm of Erret Lobban Cord, who owned the company.

When it was decided to launch the new car at the New York Motor Show in November 1935, corners had to be cut to build the 100 cars that qualified a production model for entry to the exhibition.

To save time and money, only two dies were used for the doors on four door models: right front and left rear and, because a big enough body press to turn out the roof as a single unit was not available, the panel had to be welded together from a number of mouldings. Interior handles were acquired cheaply at a bankruptcy sale, and fitted with showy round plastic knots. Instruments were also a job lot, but Buehrig devised an aircraft style dashboard that showed them off to excellent effect.

Buehrig, indeed was not new to cosmetic jobs of this sort, for he had created the 1935 Auburn speedster largely around 1928 body dies.

In the Cord's last year, a supercharged version, the 812, was introduced. This featured some detail revisions visually, executed by independent designer Alex Tremulus, who was brought in after Buehrig left the firm. In response to dealer demands that he hang more chrome over its sides to boost sales, Tremulus replaced three louvres on each side with a large chrome panel, from which emanated two flexible, chromed exhaust pipes.

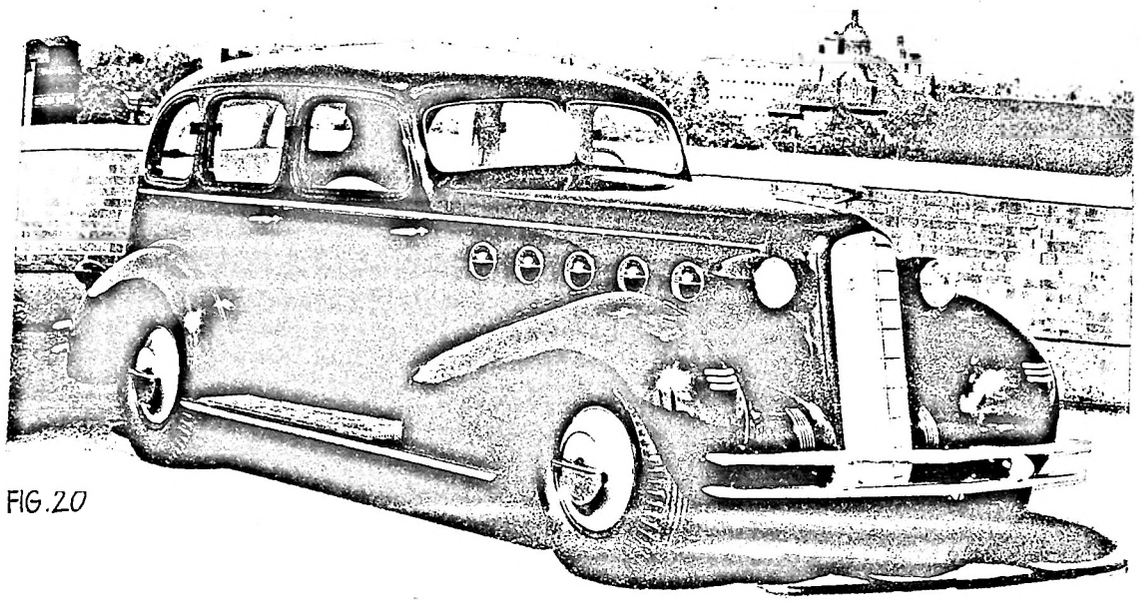
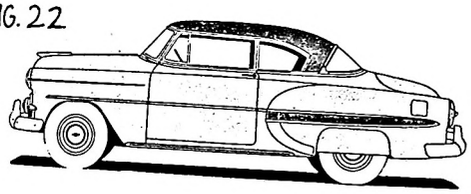
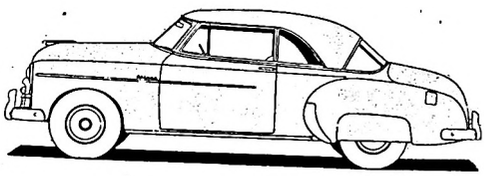


FIG. 20

FIG. 22





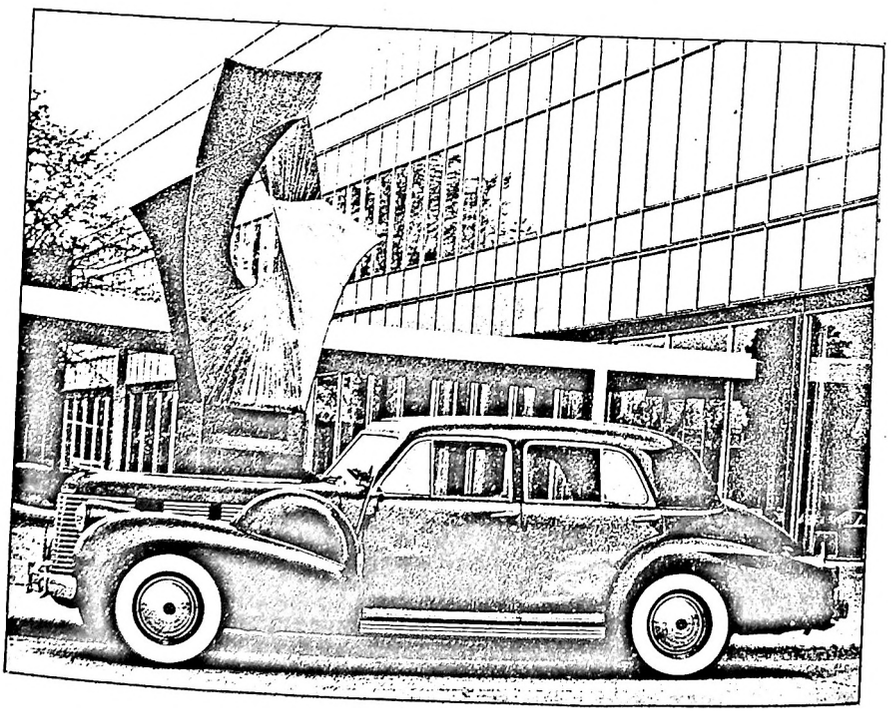


FIG. 21

It is interesting to note that, although the Cord is a very streamlined design, its body shape is more orthogonal than curvaceous, and its elements, wings, bonnet, and so forth can be seen as separate units, rather in the manner of Gropius Adler; and not yet merging into a whole.

It spawned a long line of followers, and design features from it remained in use for nearly thirty years. Before working on it, Buehrig worked briefly at General Motors styling studios in 1933 when the designer Julio Andrade was working on the 1934 La Salle there. It is not known whether Buehrig had any influence on the La Salle, yet there are points of similarity between it and the Cord, notably the side treatment and fender shapes. (fig 20)

The 1938 Cadillac Sixty Special (fig 21) reflected the Cord's styling, again in the side proportions and fender shapes, and General Motors retained the same characteristic proportions for the window and door panels as on the Cord for the next twenty years. This is still evident in the G M Chevrolets the early fifties. (fig 22)

The Lincoln Continental of 1940 (fig 23) was also very much an interpretation of the Cord, with its excellent proportions, simplicity and freedom from extraneous decoration. Later Continentals adopted the coffin nose of the Cord as well. The 1940 Continental, designed by Ford's chief stylist, Eugene Gregoire, was a true classic. It combined the best of European and American styling themes in one graceful package. Like the Cord 810, it was selected to take a place alongside Pinin Farina's Cisitalia, by the New York Museum of Modern Art in its exhibition of "Eight great automobiles" of 1951.

The Ford stylists however, could not leave well enough alone; and by 1946, scroll lettering, heavy decoration around the headlamps, and chrome quarter lights and window surrounds had been added. Its slender peaked nose and waterfall radiator gave way to a heavy, toothy, grille and bulky coffin nose. (fig 24) shows a contemporary National Geographic advertisement for it.

The Continental was originally developed from the Lincoln Zepher, which (together with the Cord 810), was the sensation of the 1936 New York Motor Show. The Zepher (fig 25) was a variation on the Airflow theme but more efficient and attractive, and much more successful commercially. Ford never emphasized the fact that the Zepher was

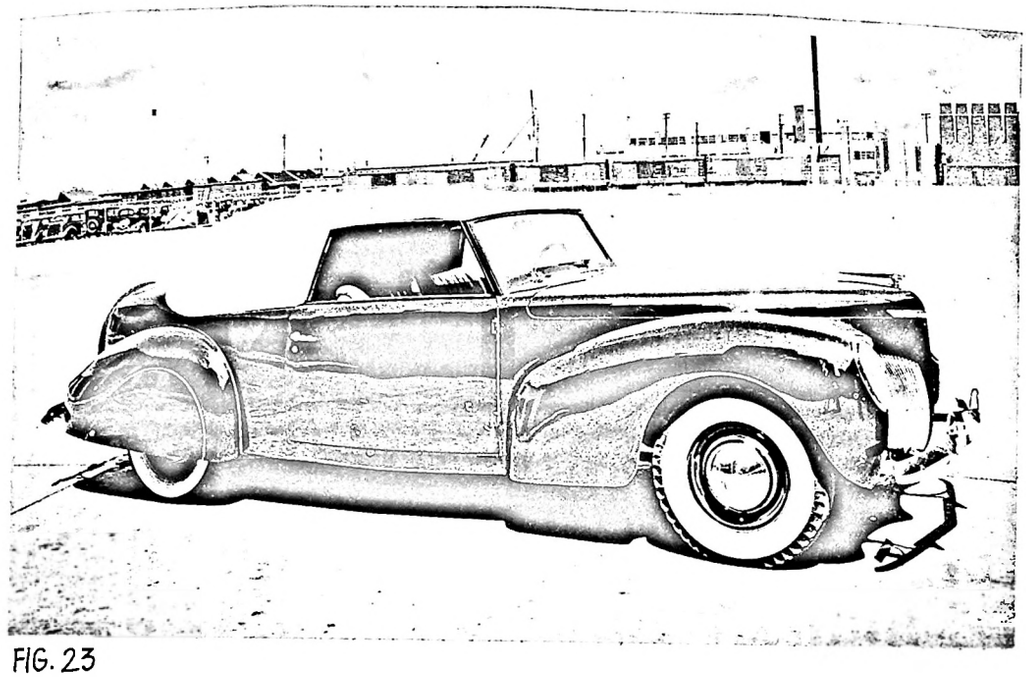


FIG. 23

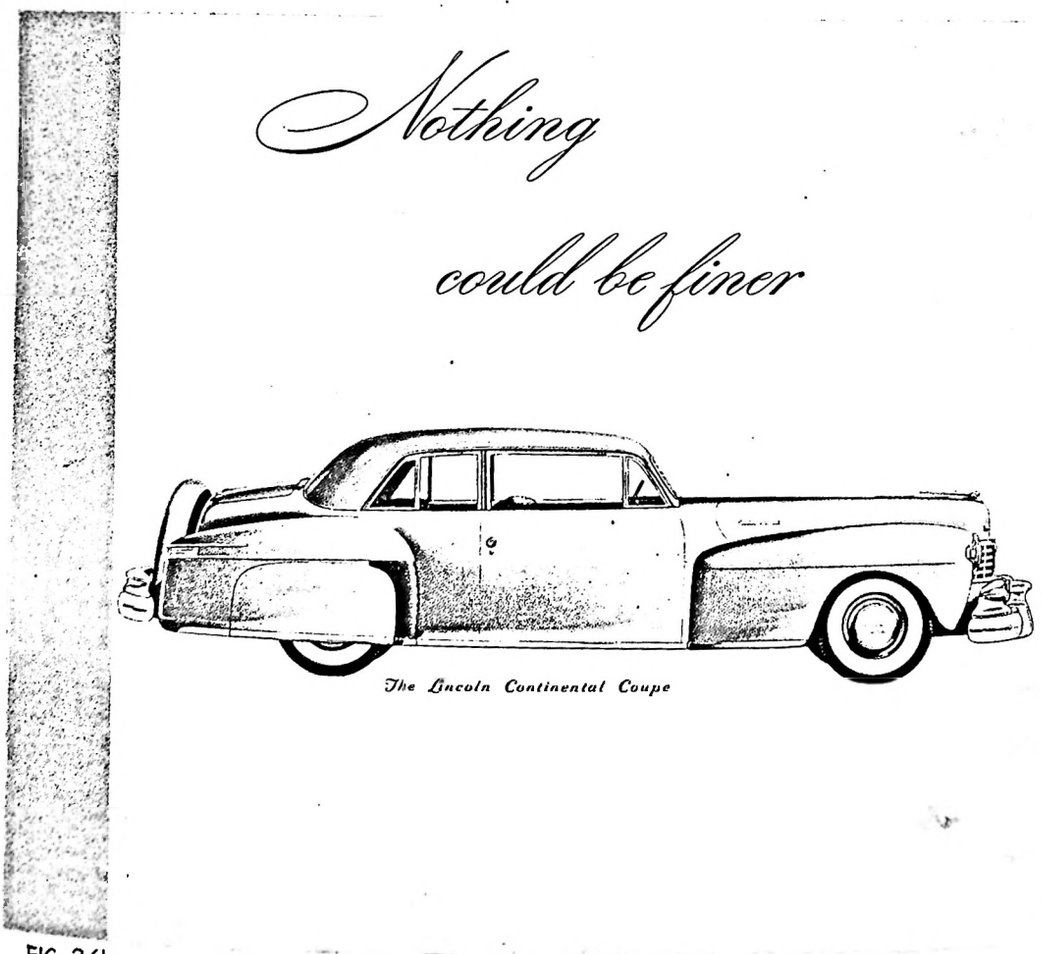


FIG. 24

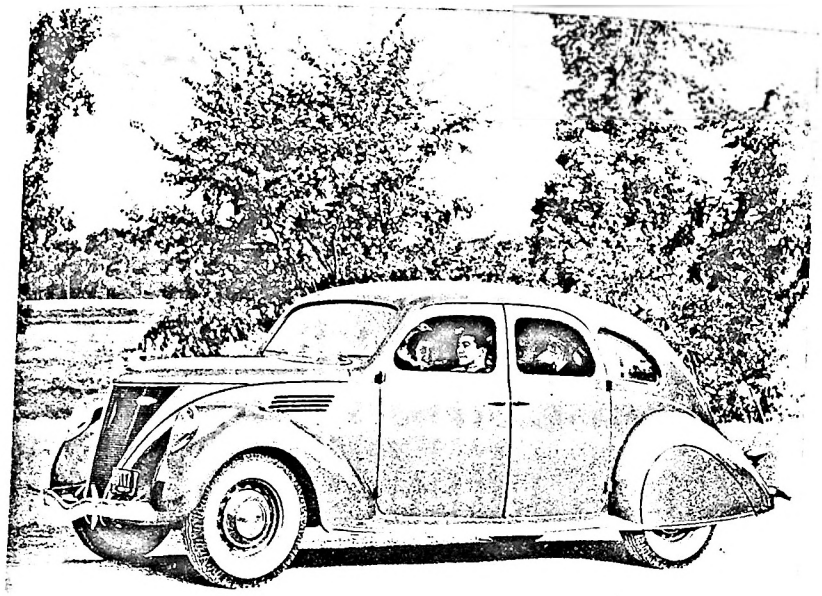


FIG. 25

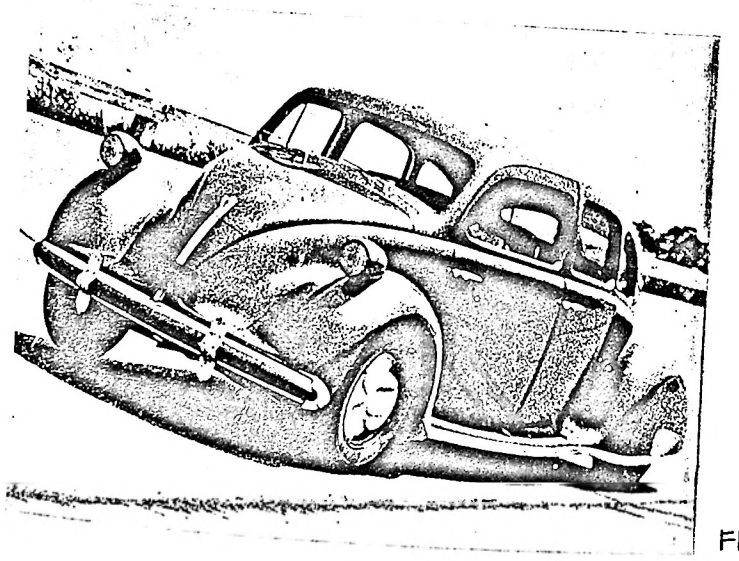


FIG. 26

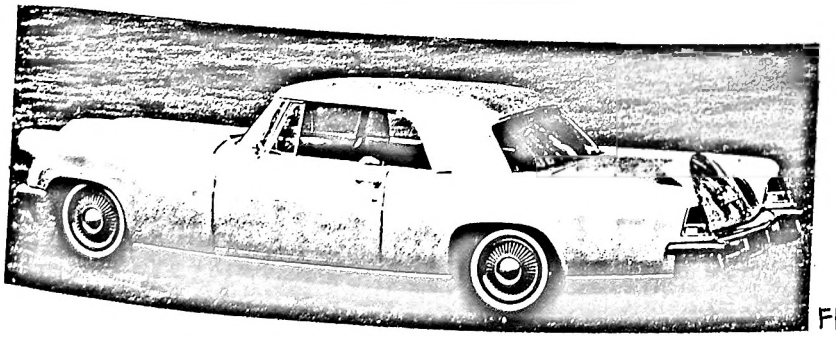


FIG. 27

"streamlined" for fear that this dirty word would be connected with the Airflow's sales disaster. Like the Airflow, it was of unitary construction, and developed from a Briggs Manufacturing Company prototype of 1933 (fig 26). That car had a rear engine, and was built to the designs of John Tjaarda, who originally conceived the idea in a stillborn project for Deusenberg in the late 20's. Tjaarda, who was a former squadron leader in the Belgian Air Force, was very much aware of aerodynamics, and was absolutely convinced that the engine belonged in the rear of a car. He was to collaborate with Buehrig for the design of the Lincoln Continental MK II which made its debut in 1955. (fig 27) This was a beautifully elegant and restrained design, and great things were expected of it, however, it found no place in a time when tailfins and ostentation reigned supreme in America, and was quietly withdrawn in 1957.

CHAPTER 4 THE ITALIAN INFLUENCE

EMERGENCE OF THE 'GRAN TURISMO'

As the thirties progressed, the 'gran turismo' concept began to emerge as a development of the grand routier. The main improvement was the adoption of high effieiency, aerodynamic bodies, with closed coachwork quickly becoming desirable with the very high speeds being attained by competition cars. The trend can be seen in France and Italy simultaneously. In France, fast roads and the availability of high performance chassis such as Bugatti or Delage led to the development of efficient long distance coupes with very clean bodies: Gangloff, the Bugatti coachbuilders, turned out a series of striking coupes to the designs of Jean Bugatti, on Type 50 Bugatti mechanicals from 1930. These were superceded by more aerodynamically clean bodies on the Type 57 in 1934. Chapron, Letournier et Marchand of Paris also created GT cars, as did Saoutchik and Paulin.

In Italy, the Mille Miglia road race did much to develop the new breed of fast coupes. In 1933, the 'carrozzeria' (coachbuilders) Castagna and Viotti, of Varese and Turin respectively, were building two-seater GT bodies for Alfa Romeo on their 8c Mille Miglia models. Ghia and Farina worked along similiar lines, and Touring of Milan built a number of svelte coupes and roadsters for BMW from 1936.

Touring's work was of fundamental importance in the development of the GT, both before and after the War; indeed they are sometimes credited with having invented it. Founded in 1926, by the Lawyers Felice Bianchi Anderloni and Gaetano Ponzoni, the firm concentrated on light flexible body structures from the beginning, having acquired the sole rights to the Weymann system for the lombardy area. They thus benefitted from never having known the problems associated with the heavy rigid vehicles of the period, and it was not long before they evolved a lightweight construction system of their own - The Superleggera ('Superlight') principle. This was a neat and simple solution in which a light structure of slender steel tubes were welded to a framework and overlaid with aluminium panels, which were simply clipped on, instead of being welded to the frame; this ensured that the body was flexible under stress, as when driven over bad roads. The Supperleggera also allowed greater styling freedom in the use of curved forms, and the whole idea was so successful it became the mainstay of

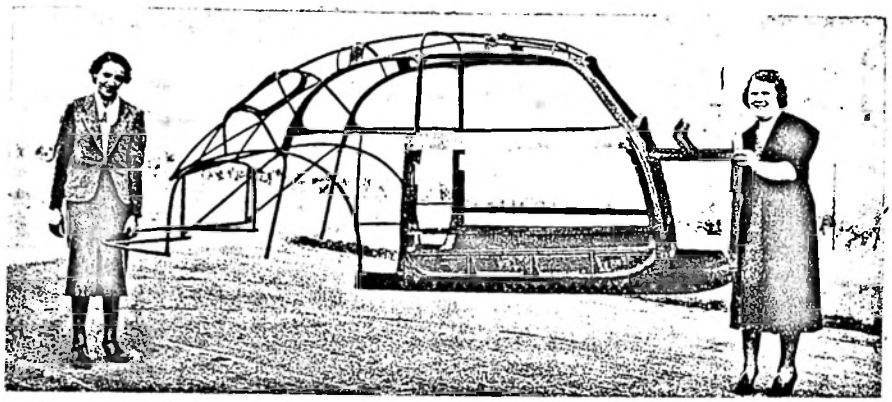
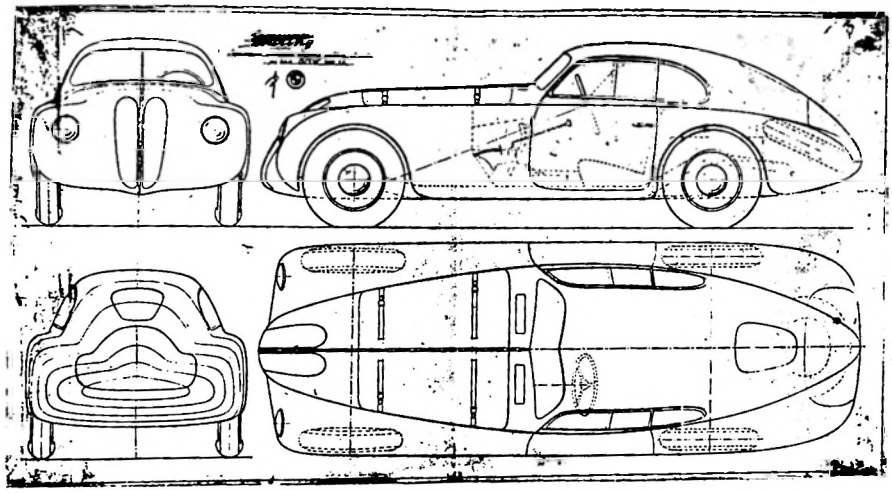
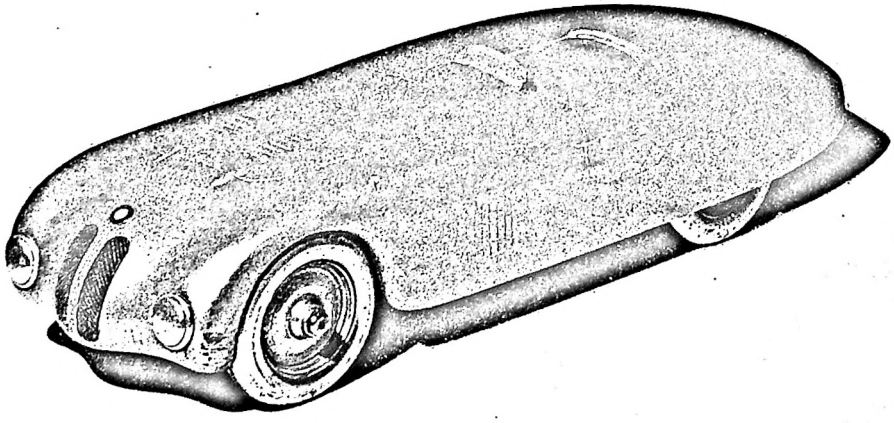
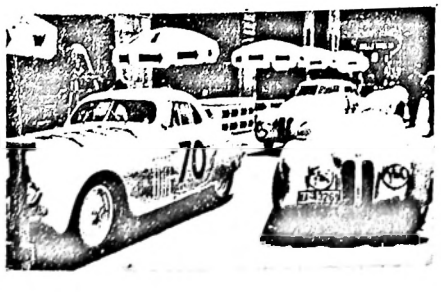


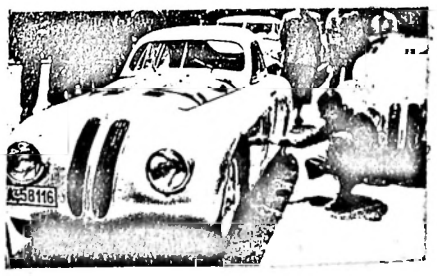
FIG.28

FIG.29









Touring's International success for the next two decades. The company promptly changed its name to Touring Supperleggera and adopted the motto: 'Il peso e il nemico e la resistenza d'aria l'ostocolo' - 'weight is the enemy and wind resistance the obstacle' (Fig 28).

The first complete Supperleggera cars appeared from 1934; from then on, Touring moved towards an ovoidal approach in its use of forms, the mudguards slowly becoming integrated with the bonnet. In 1939, they were commissioned by BMW and Alfa Romeo to produce designs for highly aerodynamic models. For this they undertook painstaking research on wind tunnel models and proposed both open and closed bodywork, with slab sides for the coupe. Both these designs made their debut at the 1940 Mille Miglia, the victory of the wind cheating BMW also spelling international recognition for Touring (Fig 29).

The BMW 328, as it was called, had its mudguards merging with the bodywork, though they were still very much perceived as separate to the main body, With its aerodynamic efficiency, advanced lightweight construction, and sleek sculptured looks, the 328 quickly became the standard to judge late thirties sports cars by, and provided a hint of what was to come after the War.

CISITALIA: ROLLING SCULPTURE

Then came World War II. As the world struggled to get back on its feet, there was a distinct pause in the evolution of the sports car. General shortages and petrol rationing in Europe ensured that production was geared more to sterwer, more utillitarian vehicles than high performance cars. In general, early post war sports cars were either based on, or were, pre-war designs.

In America, the war created an atmosphere in which the large corporate auto industries were heavily built up. In England, the war removed both cheap labout and the well heeled upper and middle classes, while in France, it led to lenghty political and economic instability. In doing this, it effectively destroyed the coachbuilding industries in these three countries. As Germany recouped after its crushing defeat, the need was for basic transportation, and the cabriolets on Adlers, Audis and Horch's of earlier days gave way to the Beetle.

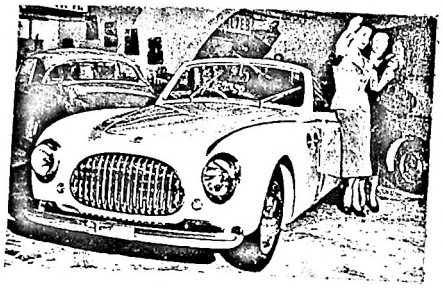
Italy, though a comparitively poor country and one badly hit by the war, was nevertheless full of new styling talents. It was only in Italy that the coachbuiling industry had the adaptability to need the

challenge of the changed post war period, and the vast Fiat organization was to be its main benefactor. Disatisfied with the standard offerings from Fiat, Lancia, and Alfa Romeo, the native Italian drivers, with their response to outline and what Laurence Pomeroy once called "the Latin passion for superficial logic and neatness of form"[4] turned to the 'carrozzeria', the small body specialists of Milan and Turin. Soon, an embryo industry developed to meet the demand, and a stready stream of attractively styled cars began to emanate from the styling houses of Milan and Turin, largely based on standard Fiat mechanicals. The Mille Miglia and Fiat production cars were two factors of fundamental importance in this early developement. One bred a tradition of high speed aerodynamic sporting cars, the other provided an inexpensive platform on which to build. The result was a great number of cheap, attractive, high speed coupes, which formed the cornerstone of Italy's post war success.

This trend had already started during the war with Touring's work on the BMW 328 probably being the best known example. In terms of aerodynamics the Italians owed much to the Germans, who had set a precedent with their smooth bodied grand prix and sports racing cars of the thirties, such as the Mercedes Benz and Auto Unions of 1934. Touring very much followed German practice on the BMW 328; it was a slab sided statement of the basic Jaray theme, with evidence of Professor Kamm's thinking in the contours of the coupe. Thus a long heritage of aerodynamic research pioneered in Germany was evident in post war Italian GT cars.

America was also to contribute to the great flood of automobile design that came from Italy in the twenty years from the end of the war. From the brash die castings and chrome of Detroit, the Italians drew inspiration for detail design. These were the days of umbrella-handle handbrakes under the dash panel, of steering column gear levers, and of plastic knobs on the fascia. The Italians made full use of the new plastic materials that could be easily moulded into fantastic shapes for fascia panels and other interior details, and were to show the same elan on the inside as they had done on the outside of the car.

Lastly, the Italians were to dominate the post war scene by bringing their unique sculptural sense to bear on the automobile. It is said that the historical Italian genius is for sculpture, as the French is for romantic poetry, and the British is for poetic drama. Perhaps the first most famous expression of the Italian sense of form in the



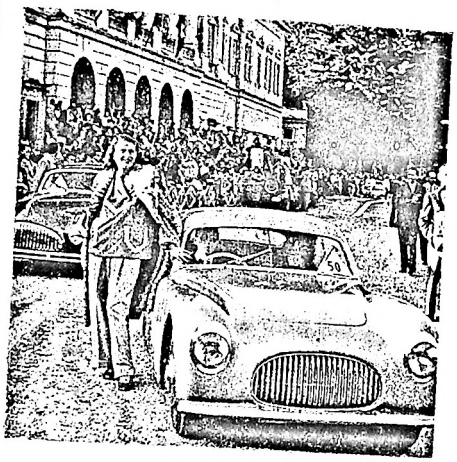
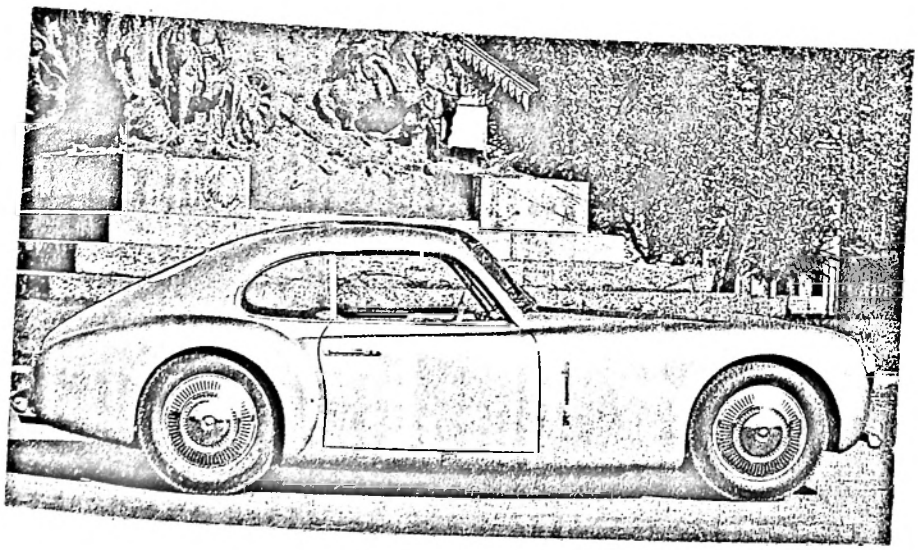


FIG. 30



automobile came in 1947, when the new sculptural talent Pininfarina, was commissioned to style the Cisitalia sports car, by the industralist Piero Dusio, who had founded the Cistalia sports car factory. (Fig 30).

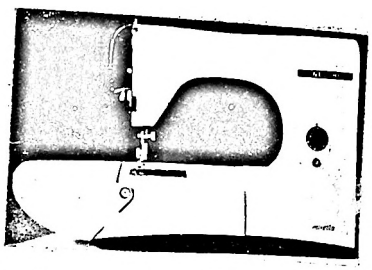
The Cistralia was a GT coupe, laid out on a tubular chassis (a novelty for the time) with an aluminium shell welded to a steel framework. Its tubular chassis was designed to conform to the shape of its bodywork, which, for the first time, allowed the bonnet to be lower than the wings. The mudguards had now been completely integrated with the body; only a low relief moulding on the sides hinted at their existance, and alluded to pre war forms. Headlights were now mounted in the wings and a low wide grille, together with the low slung body, emphasized the horizontality of the car. The roof also sloped in a flat plane to the tail.

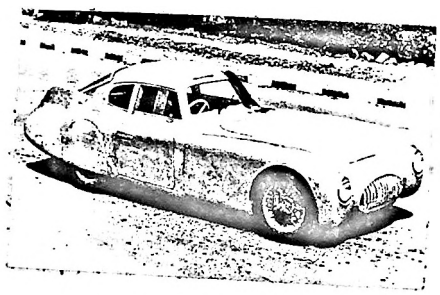
Particularly appealing touches were the rubber trim at the centre of the two segment windshield, in place of a chrome one, outside door handles replaced by recessed push button rods, and side windows without excessive chrome plating, also without a central pillar.

Above all, the Cistalia was marked by a unique sculptural flair, and a scultor's masterly handling of form and proportions - the work of Battista 'Pinin' Farina, who had established his "Carrozzeria" in 1932. Pinin Farina ranks alongside the Castiglioni brothers, Marco Zanuso, Gio Ponti, Marcello Nizzoli, and many others as one of the all time great industrial designers of Italy. Ann Ferebee in "A History of Design from the Victorian Era to the Present"[5] cities the Cisitalia, along with the Olivetti Lettera typewriter, the Necchi Mirella Sewing machine, and the Vespa, as resembling Futurist sculpture in their fluid forms. (Fig 31).

This seems entirely logical in the case of the Cisitalia for motion fascinated the Futurist artists. Futurist sculpture - for example, Umberto Boccioni "Unique forms of continuity in space" 1913 (fig 32) - recreated the experience of motion in a still sculpture. This sense of motion filtered through to architecture and consumer products, where corners, instead of meeting at right angles, taper into a streamline. The Cisitalia is very much of this idiom, and makes an interesting contrast to Gropius's Adler sedan discussed earlier. Both cars represent opposite approaches to design. The sculptural elegance of the Cisitalia is of, to borrow Miss Ferebees's phrase, the Expressionist mode of Industrial design, while the geometric forms of the Adler exemplify a functionalist approach. Also, the Italian car's components are shreathed in a curaceous envelope, while those of the

FIG.31





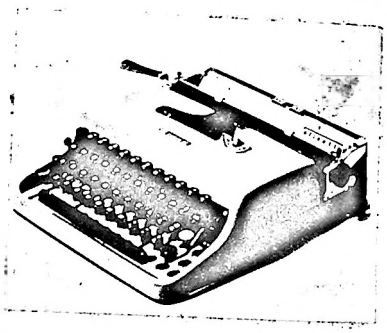
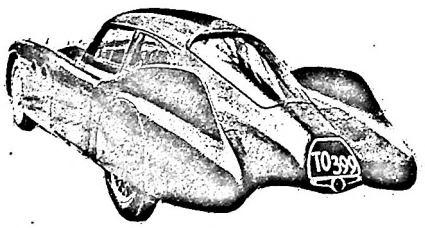


FIG.32



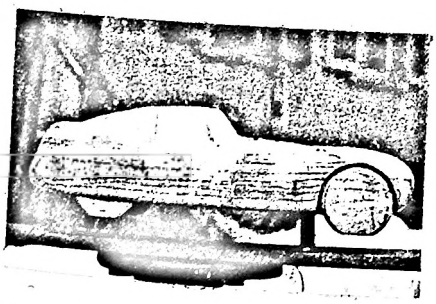


FIG.33

German car are articulated separately. In saying this we must allow for the fact that Gropius' car was of an earlier age than the Cisitalia, and so had to be composed of separate forms - wings, bonnet, and so forth. Even so, its parts received more individual attention than contemporary Italian cars, - for example the Alfa Romeo 1760 (fig 13) - which can be seen as moving towards a more unified shape. With the advent of the Cistalia, a new era was born, one in which sculpture would take a leading role in the design of automobiles. The car has been hailed by Arthur Drexler as 'rolling sculpture' and a 'monolithic sculptural unit' in the 1951 exhibition of 'Eight Great Automobiles' at the New York Museum of Modern Art. Pinin Farina himself, very honestly, recalls the car as a result of happy coincidences and pure emotional design rather than an intentional revolution in style.[6].

Of course, he was not solely responsible for the car's design. It was the result of a long and painstaking evolution, both on the race track at Mille Miglia and in the wing tunnel. There were many Cisitalia prototypes (fig 33) and all underwent intensive development. Pinin Favina was brought in at the final stages of the car's development, and gave it that final touch of class. His role was more one of an overseer, coordinating the various talents of his design team, and guided by his unique artistic sense. The car started out as being no different from all the other GT coupes taking shape in Italy at the time; it was Pinin Farina's contribution that made it unique.

BARCHETTA : ADVANCED AEORDYNAMICS

Touring were to figure again in sports development in 1949, when Ferrari turned to them for a racing shell for their V12 2 litre sports cars. The result - The Barchetta, (fig 34) - was in its own way as epochal as the Cisitlia had been. It replaced the first post war Ferrari's, the 166 Cosa series, which had long narrow racing shells with exposed wheels. It superceded this with a smooth body clean enough to outpace even larger machinery less slippery in outline.

It was also a very habitable sports car. The cold 'wet elbow' sustained by all who drove the classic exposed wheel sports car, was no more. The Barchetta pilot sat low behind the scuttle with high cockpit sides to protect him from the slipstream. The slab sided enveloping shells of 1939 to 1946 where the wheels and brakes were shrouded, were now superceded by a more elliptical body cross section in which the

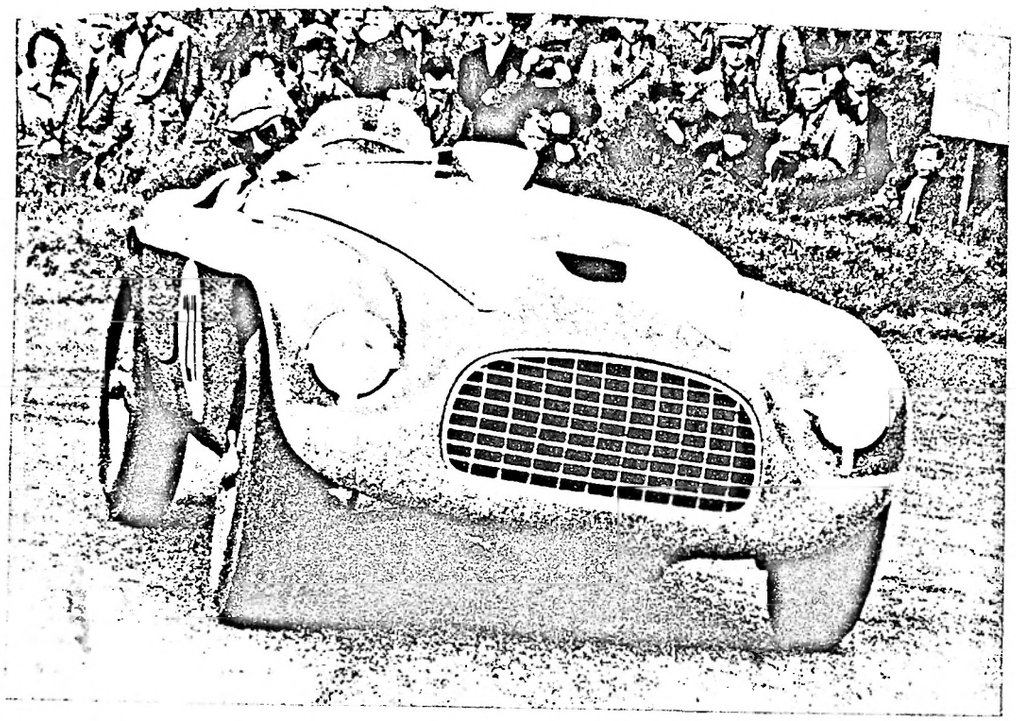


FIG.34

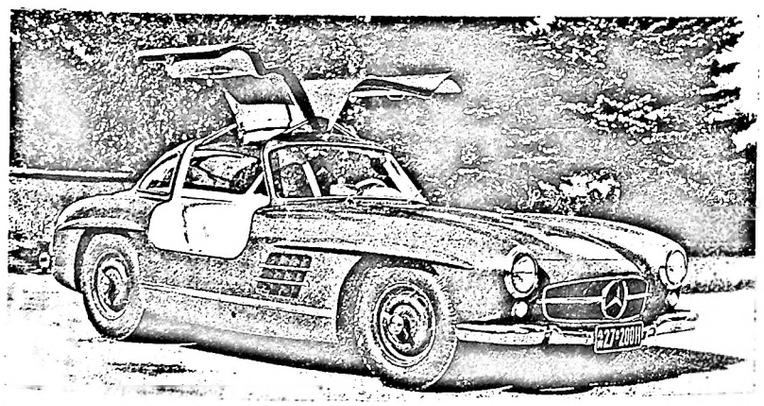
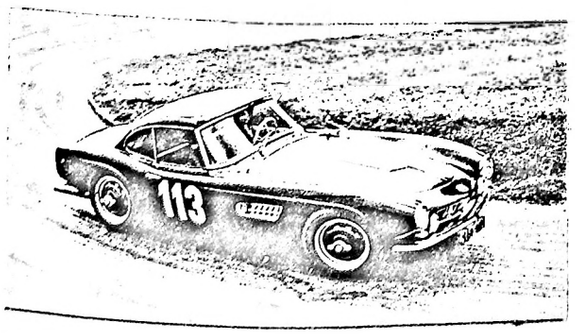


FIG.35



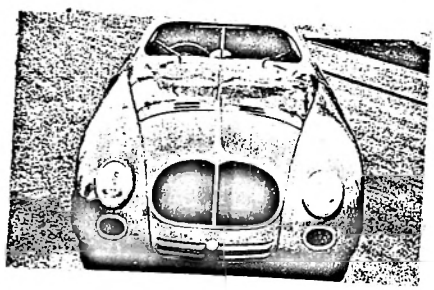
sills received a strong turnunder to expose the wheels to some degree. Brake cooling was improved, and a much lighter appearance characterised the car. The elliptical 'egg box' grill came from the 166 Corsa, while a waist mounlding was applied along the sides to control airflow.

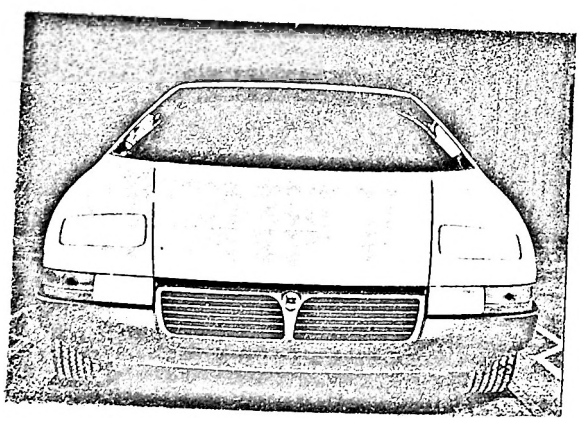
The neat detailing of the body contours around the radiator and headlamps was characteristic of Touring at the time. Like the Cisitalia, the Barchetta was destined to survive as a source for a great many cars. In Britain, its influence was seen on the Cooper-Mg and AC Ace of 1953, culminating in the AC Cobra of the seventies.

The Barchetta influence is very much in evidence in Europe's first generation of sports cars to emerge since World War Two; among them the Mercedes 300SL of 1952 and the BMW 507 of 1955 (fig 35). Both cars have well defined pontoon-like shape, and incorporate side mouldings like the Barchretta. In the Barchretta, these mouldings controlled airflow; while their function seems more decorative in the BMW 507. The latter car was designed by Albrecht Goertz, a German born designer who worked for Raymond Loewy before working for BMW. He is quoted in 'Road and Track' magazine of December 1975 as including the ridges to add "a feeling of lightness and speed". The 507 is also notable in that it exposed 2-3 inches of chassis frame underneath its sides, a creative which had a limited following.

The coachbuilding firms of Milan and Turin were gaining an important new experimental function; interacting with and influencing the style centres of the big car manufacturers. Pininfarina, later Bertone and more recently, Ital Design, have been instrumental in this. Interestingly, there is remarkable continuity of line in at least two examples of old and new Italian car design. Compare an Alfa Romeo coupe of 1940, bodied by Touring, with the Medusa, a 1980 show car designed by Giorgio Guigario of Ital Design (fig 36). Both cars have similar characteristic proportions of bonnet and wings.

FIG. 36





CONCLUSION

Sports car development is always closely bound up with racing car development. The first sports cars for private use were derived from competition touring cars, and featured a short chassis to bridge the gap between the heavy lumbering racing machine and the touring chassis with a two seater roadster body. A low centre of gravity developed on the race track helped make the cars look more purposeful and sporting than their touring counterparts. The American Mercer Raceabout of 1910 is one of the earliest sports cars.

Competitive racing, with its intense technological development, continued to lead the way. The famous Prince Henry Trials of Prussia helped establish the bonnet line as being on a level with the waist line of the body, resulting in a lower more unified shape. Later, grand-prix racing evolved a narrow, streamlined, cigar shaped torpedo body, developed in the light of aerodynamic knowledge gained from the aviation industries. An example of this was the Bugatti Type 35, which was both a grand-prix car and civilized enough for road use. Wheels were completely exposed on low, wide axles, and covered by close-fitting cycle-type mudguards. These gradually evolved into longer, more flowing wings, sometimes connecting to a running board, as on the Alfa Romeo 17-60 of 1930. Of course some cars had wings before cycle mudguards, but the general pattern was as described.

The Inter-War period saw, on the one hand vast increases in mass production and the opening of vast new markets; and on the other, the car as an object of high fashion and artistic expression. Highly articulate craftsmen produced designs of great sophistication and individuality for an exclusive market. In the twenties, France's network of long and fast highways led to the development of a new kind of car, a long distance high speed cruiser known as the grand routier. Such cars did much to develop lightweight construction, often using fabric covered Weymann bodies in place of the old rigid steel-panelled 'composite' body.

Sports cars of the thirties began to reflect the contemporary streamlined style of industrial design, for example the American Cord 810 of 1936, with its 'Borax' radiator louvres and retractable headlamps. Much progress in the science of aerodynamics was also made

in this period, and the work of Paul Jaray and the Professors Kamm and Everling of Germany were embodied in a new breed of high speed sports car - the 'gran turismo', a development of the grand routier.

The 'gran turismo' or GT, underwent intense development in post-war Italy. Lessons learned at the racetrack in the Mille Miglia and in the wind tunnel combined to produce an ultra low, smooth body shell of high aerodynamic efficiency. Usually of aluminium, the body had a light and flexible chassis/body framework of tubular steel. Much thought had gone into the provision of maximum interior room with minimum exterior volume. Two cars stand out as exceptional examples of this breed: the Cisitalia of 1947, and the Barchetta of 1949. The Cisitalia had the virtue of being styled by the emerging talent, Pimin Farina, and marked the arrival of sculpture as a leading factor in car body design. The Barchetta was more advanced aerodynamically, and showed the way forward in this respect for a generation of sports cars. The Cisitalia pioneered many concepts - a smooth, sculpted body shell enveloping the car's components, a low and wide stance, sculptural quality - that are still in evidence today.

In the post war era, sports car production is largely confined to low volume, expensive, ultra high performance cars such as the Ferrari or Lamborghini; the inexpensive sports car for the common man seems to have all but disappeared. As it was the practice of manufacturers in the 20s and 30s to offer roadster bodied derivatives of their standard saloons, so today's auto makers offer high performance versions of their saloons, but retaining the same body. If we equate the early touring cars with today's saloons, we may surmise that the sports car for the masses has come full circle, once derived from the tourer, and now merged back into it.

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