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NATIONAL COLLEGE OF ART AND DESIGN

Department of Industrial Design

CONCEPT CARS TOWARDS 2000:

TODAY'S DREAMS, TOMORROW'S WORLD?

BY;

LIAM HOLMES

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To my dearest Rachel,
for all your love, support and patience.

To my parents,
for their support, help and belief.

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SYNOPSIS

In the world of car design, automotive designers provide us with their views and visions of the future role of the car in the form of prototypes or concept cars, which they think will be cars of the future.

Over fifty years, these concepts have ranged from the interesting to the outrageous, from the beautiful to the ugly. Do these prototypes give us any real vision of the future of car design or are they merely publicity stunts and advertising tools?

This thesis will investigate proposals for the future offered at major motor shows over the last four years. It will be broken into six sections: Introduction to Prototype Design, The Design Consultancies, The Big European Manufacturers, Producing Prototypes, Japanese Prototype Design and finally, the Conclusion.

Introduction to Prototype Design:

This section will give a brief history of prototype design, dealing with America and Europe, to show the background and thinking behind early examples of concept cars. Next in the section, will be an introduction to the future of car design, the problems that face designers and manufacturers when considering new production models, and finally, this section will show the importance of motor shows because it is here that the prototypes will be viewed by press and public for reactions.

The Design Consultancies:

This section will be broken into three chapters: Ital Design, Pininfarina and International Automotive Design. Examples of each consultancy's work of the last four years will be investigated, and at the end of each chapter there will be a conclusion as to the reason why the consultancy released each prototype.

The European Manufacturers:

This section will highlight three manufacturers who are actively involved in prototype design, namely, Ford, Renault and Citroen. These companies have seen the worth of prototypes and so they tirelessly show prototypes almost every year at major shows. Examples of their work will be investigated, and as before, a short conclusion will try to answer why their prototypes were produced.

Producing Prototypes:

This section will deal with companies who have rejected the idea of prototypes, but who have, however, released concept-like cars. Three examples will be used to illustrate this point. They are: BMW, Alfa Romeo and Volvo. The second part of the section will deal with the design and manufacturer of a prototype, it will highlight the kind of procedure taken, the kind of people involved, the method of manufacture and the way the prototype is shown.

Japanese Prototype Design:

This section will deal with Japanese design briefly, and will show the rise of Japanese design to its present state. It will highlight three examples of prototypes produced by the Japanese and discuss their implications in the future of car design in Japan.

Conclusion:

The final section will take each example used in the thesis and will answer the arguments presented in the text.

INTRODUCTION

The idea of the concept car started in the Forties. Then, General Motors' Chief Stylist, Harley Earl, decided that every year the company should show a collection of prototypes at its own private show, (fetchingly entitled, 'Motorama'). The prototypes were to be as different as his stylists could make them from the run-of-the-mill cars that customers could see every day in dealers' forecourts. Not only was it a way of getting one over on the opposition, Earl believed, it was also an opportunity to prove what a designer could do when left unfettered by legislation and bureaucracy.

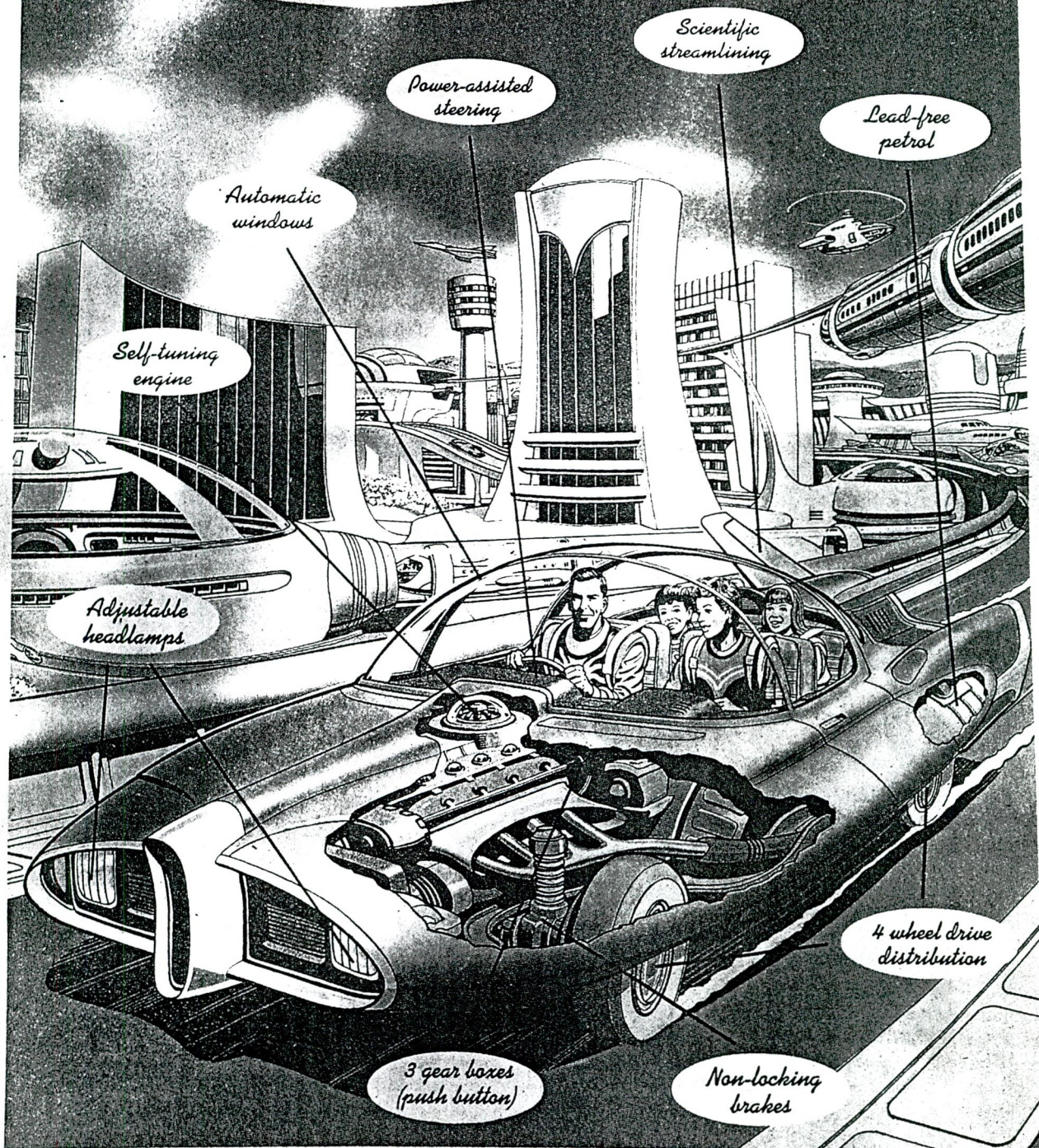
Ford and Chrysler quickly followed and in Europe, Ital Design, Pininfarina, Ghia and others started to let their imagination rip too. George Walker, Ford's Vice President in charge of styling, claimed after seeing Motorama,

"These so-called prototypes aren't as futuristic as all that; stick around for a couple of years and we'll (Ford) prove it".

This proved to be a hollow prophecy. The designers' ideas turned out to be remarkably limited: they revealed a childish obsession with speed, gave voice to vulgar ostentation and exhibited a mania for suggestive phallic-looking bumps and humps.

The early examples, exotic and carefully produced prototypes, most of which actually worked, turned out to have little to do with real future needs. The guesses at new forms of technology turned out to be hopelessly wide off the mark. It seems unbelievable that as late as 1962, grown men should seriously suggest atomic powered cars. That is, however, exactly what Ford did, producing an absurd scheme for a six-wheeled, four-seater, propelled by a 'compact nuclear propulsion unit'. From the back it looked like a Boeing 707. Yet Ford could trumpet that the preparation for the future, near and distant, is the mission to which automotive designers are dedicated.

The MOTOR-CAR of TOMORROW



A motor car of the future shown in cut-away section. In years to come, motoring will be an effortless pleasure thanks to 'scientific streamlining' and 'space age' engineering.

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Fig. 1.1. Harley Earl's (GM) Vision of the Future? (Motorama 1950)

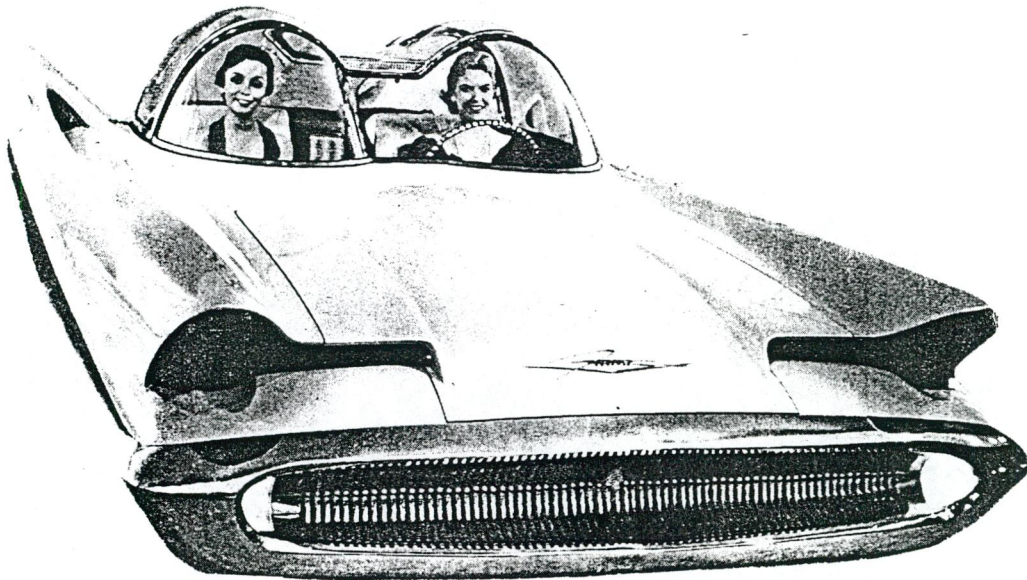
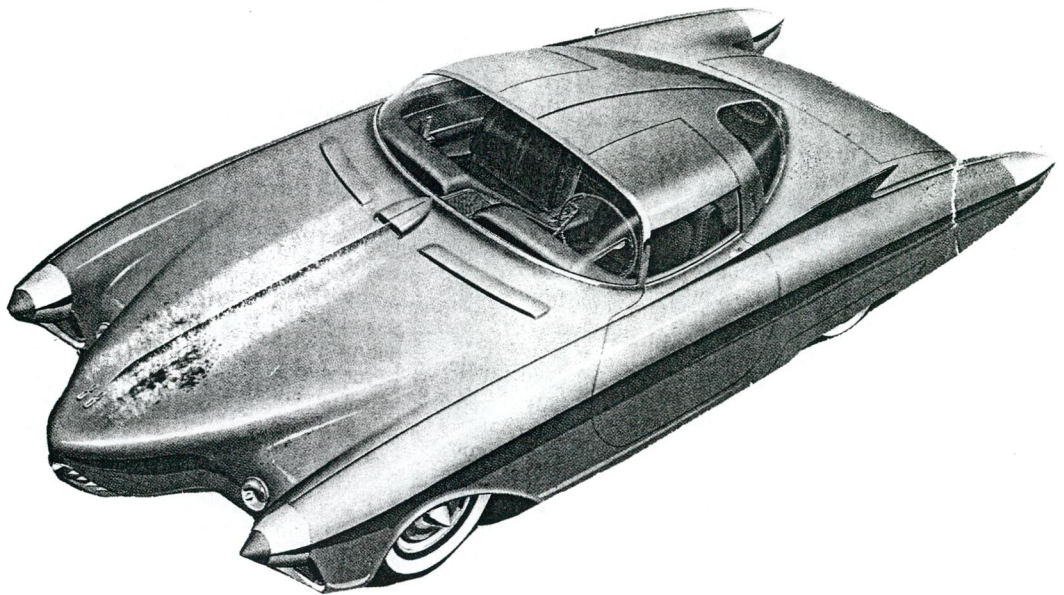
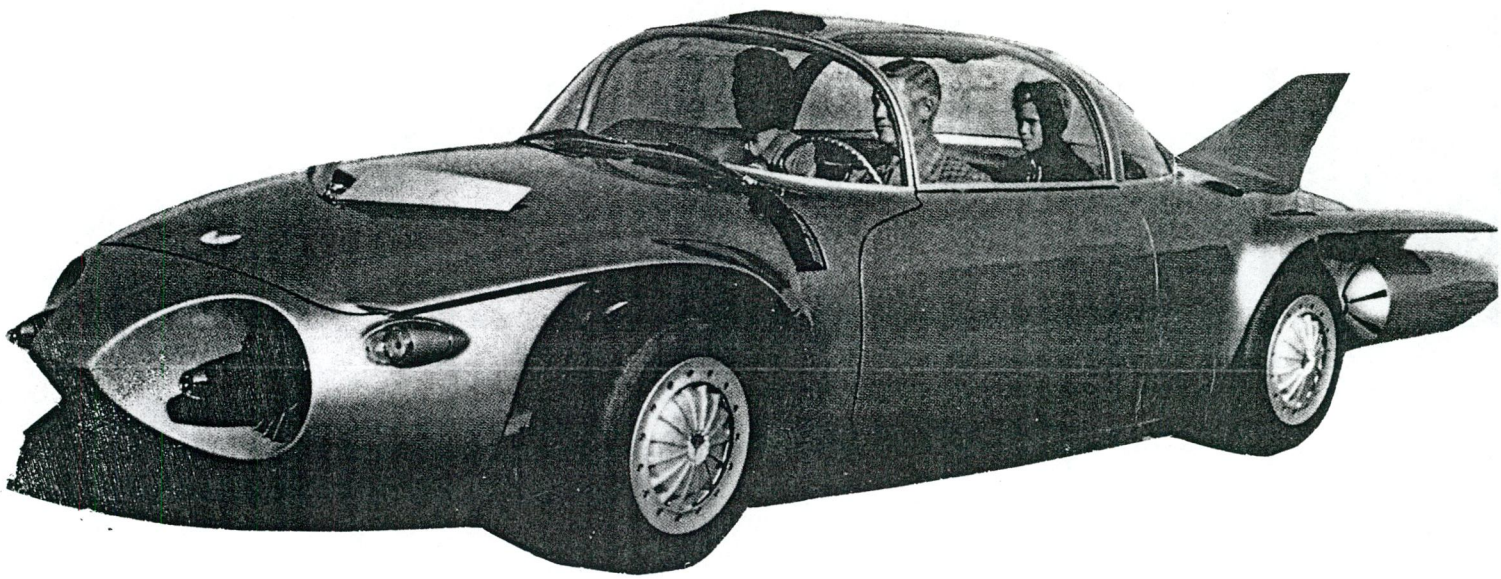


Fig. 1.2 Dream cars that influenced cars of the 60's in America. These "Dream Cars" turned the American car industry into a nightmare.

This philosophy is accepted worldwide today but all these attempts by American motor manufacturers in the 50's and 60's seriously affected the design industry in America. Only now are they beginning to recover from early mistakes in prototype design.

It was a different story in Europe. European cars have always had an air of stylish practicability about them and this trend has continued. Indeed, this practicability has not in any way inhibited proposed concepts, but in actual fact promoted them. In Europe, it is the Italians that consistently show their style and flair but Europe as a whole have been the leaders in the world of car design. Marques such as Lamborghini, Ferrari, Porsche, BMW, Mercedes, Jaguar, Rolls Royce and Aston Martin are unrivalled for build quality and excitement of design. The thesis, for that reason, will concentrate on European design to illustrate and argue the main points put forward.

In relation to the production cars on the road at the moment, prototypes are way ahead in terms of technology and form. It would be too much of a risk for car manufacturers to release these concepts immediately as market research has shown that the customer only accepts change gradually. Therefore, concepts or proposals for future production cars must be taken at a slow pace to guarantee results. This does not stop, however, the natural curiosity of the buying public as to what they could be driving in twenty years' time. Because of this curiosity concept cars are very popular, especially at motor shows where the public can view these "futuristic motive dreams", and manufacturers can judge the public's reaction to their line of thinking.

THE FUTURE OF CAR DESIGN

It remains as apparent as ever that motor manufacturers are in business to make money. Unfortunately, money is the deciding factor as to whether a certain type of car will go into production or not. Manufacturers cannot afford to invest millions of pounds in a car that will not be accepted by the public. They must compromise their investments in long term idealism for the sake of short term profit. The cars that they produce must be the cars that will be readily

accepted by the public. Therefore, progress in the design of the car is not determined by the abilities and imaginations of the designers and engineers, it is determined by the public and their degree of acceptance.

Unfortunately, the buying public only wants what it knows, it does not know what is possible in car design and so is very slow to understand and accept ideas that have only recently become feasible. But there is a natural curiosity as to how the automobile of the future will look and function.

The automobile industry has made great progress in the last decades in: mechanical and engineering achievements, performance, safety and in the evolution of the philosophical concepts of cars. Thus new body architectures have been created. The automobile is on the one hand a "moving sculpture", and on the other hand, it is also a tool and vehicle which has many implications for man and his relationship to the environment.

Car design is now a multi-million pound industry, employing millions of people worldwide, many of whom are of the opinion that they can show us today a vision of the future of car design.

This belief in association with keen public interest has caused massive growth in research and development of car design. Everyone dreams of owning aptly named 'dream cars' such as Ferrari, Porsche or Lambroghini. Everyone loves excitement and car design is seen as exciting. Having the supposed power to perceive the future, the car designers' perceptions are realised in the forms of concept or prototype cars. Every good motor show displays not only the cars of the present, but also those of the future. Not the ones you will be able to buy in three years' time, of course, these are securely under wraps back at headquarters, as these cars would reveal the manufacturers' immediate plans. It is the prototypes, the one-off show specials, which serve the twin purpose of attracting the crowds and pointing the way to the future.

Motor shows are places where designers can try out ideas. These ideas

are often built into a prototype which is downright outrageous in shape and colour; the more astonishing the better because it is likely to attract attention but that is not the real objective of the prototype. Manufacturers will be watching reactions: will they laugh, will they be amazed, will they say nobody would ever get them in anything like that, or will they look longingly and want to drive it back to their own garage?

These days, a good deal depends on that kind of reaction. It comes from other motor industry visitors to the stand, from journalists and, of course, from the public. By the end of a major motor show, the designers of a prototype have a much better idea of what features people really liked - and so they will be considered for future developments to be incorporated into production cars.

Once upon a time, show stopping prototypes were the prerogative of the specialised design houses, especially those in Italy. Back in the 1960's, the big Turin-based design houses, Pininfarina, Ital Design and Bertone, vied with each other to catch the attention of both the public and the motor industry. Look, the prototype would say, look at just how beautiful a car you could be building if you let us design it for you. Just as often, it would be a car which was simply not practical, merely stunningly beautiful or sometimes stunningly ugly. The intention would be in part to start ideas which would eventually catch on and partly boost the reputation of the design studio.

CHAPTER I

ITAL DESIGN AND GIORGETTO GIUGIARO

To illustrate the kind of proposals offered for the future, examples of Italian design must come first. The Italian dynasty in car design is recognised worldwide and it is they who have led the world through post war years with unmistakable style and flair as reflected in their automobiles.

Anyone who is old enough can remember Bertone's amazing Carabo of 1967 and realise the way in which it influenced the shape of almost every supercar of the 1970's. Another example of this kind of influence came in 1988, when Giorgettto Giugiaro put forward proposals for three vehicles. In that year, La Carrozeria Italiana favoured two complementary trends; the luxurious high-tech minivan and the open top fun car, the Eurostyle minivan and the roadster were meant to live in the same garage. While the role of the minivan was to commute to work, supermarket and school, the runabout was a plaything for evenings and weekends. Giugiaro's trio of vehicles were the only proposals to show both styling trends. His minivan, (the Asgard), was described as an extrovert people mover, which features included a very large glass area, a number of expensive bodywork details and a pretty, versatile and luxurious interior.

Based on the same mechanicals, Ital Design also created a pair of modular sports cars, christened Apsid, (coupe), and Aztec, (Syder). All it took to change from roadster to closed top model was to exchange a set of six clip on P.V.C. body panels.

Giugiaro would still get most people's vote as the most inspired single designer. He has produced cars which alter the way we think about the modern family saloon and through his trilogy of 1988, this was achieved.

Giugiaro was born in 1938. He attended technical, styling and design courses in the Academy of Fine Arts in Turin. At the age of 17, he was

ITAL DESIGN

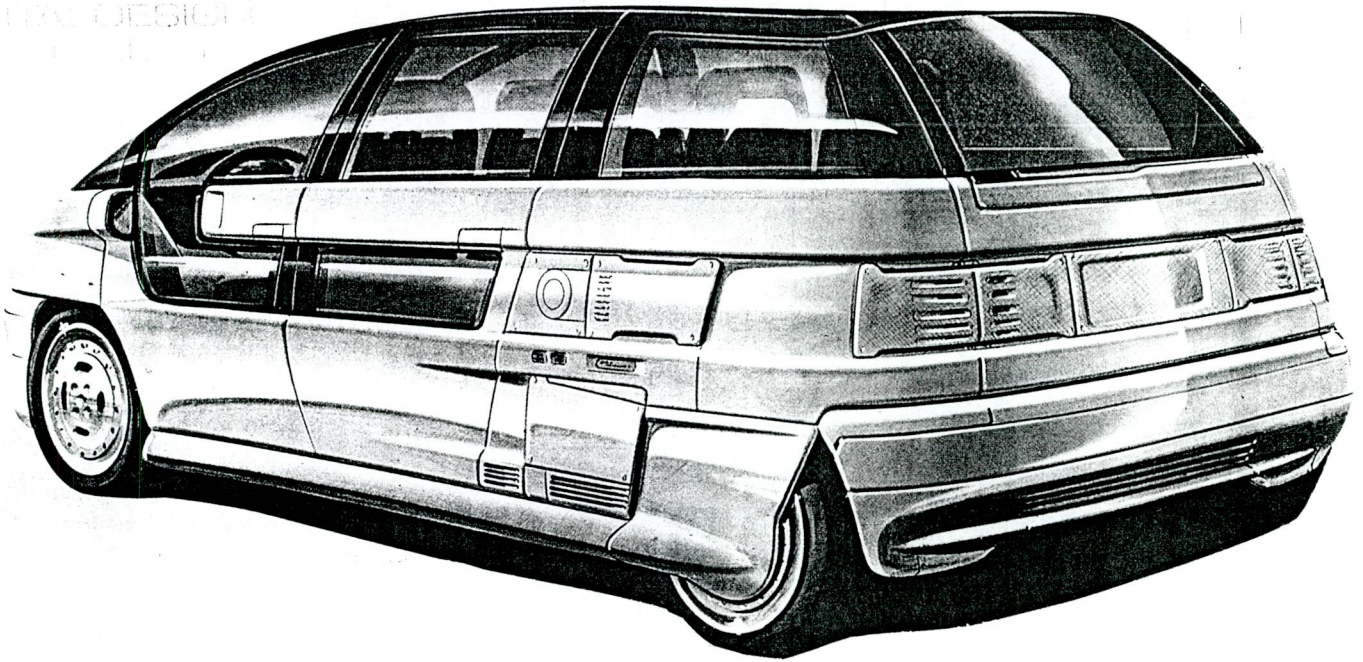


Fig. 2.1 The famous Ital Design logo with Asgard

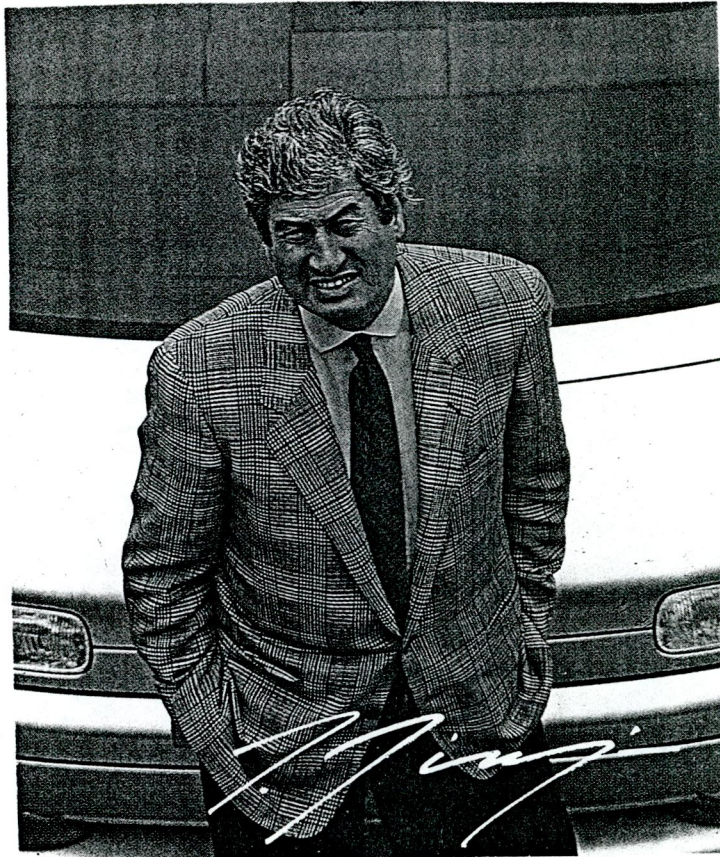


Fig. 2.2 The "Maestro of Italian Car Design", Giorgetto Giugiaro

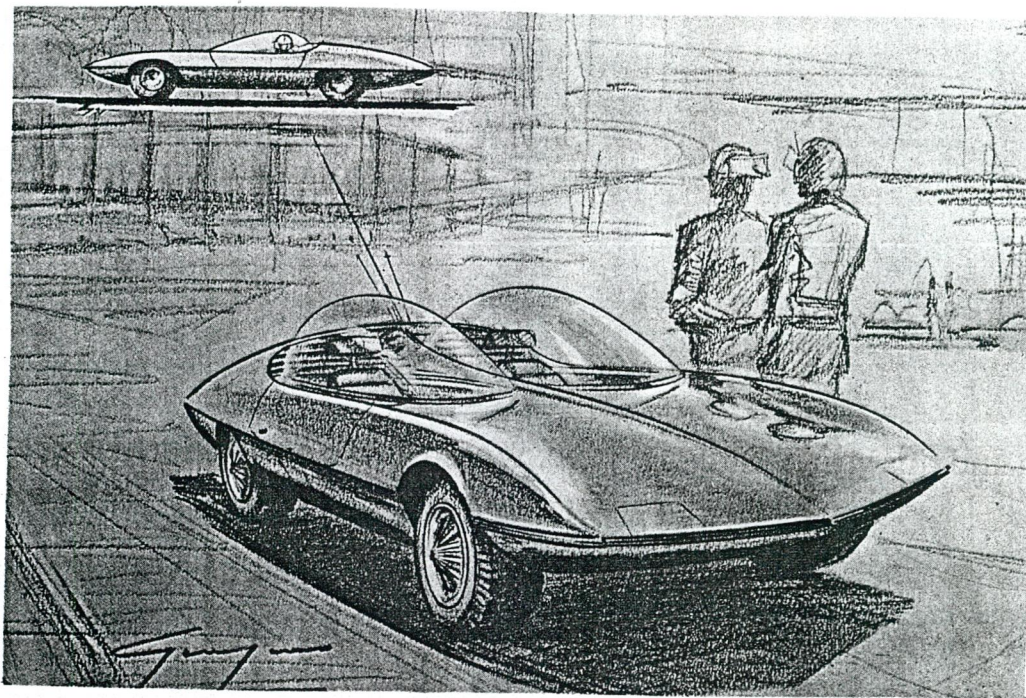


Fig. 2.3 Sketch from 1959 which shows Giugiaro's thoughts on the sports car of the future.

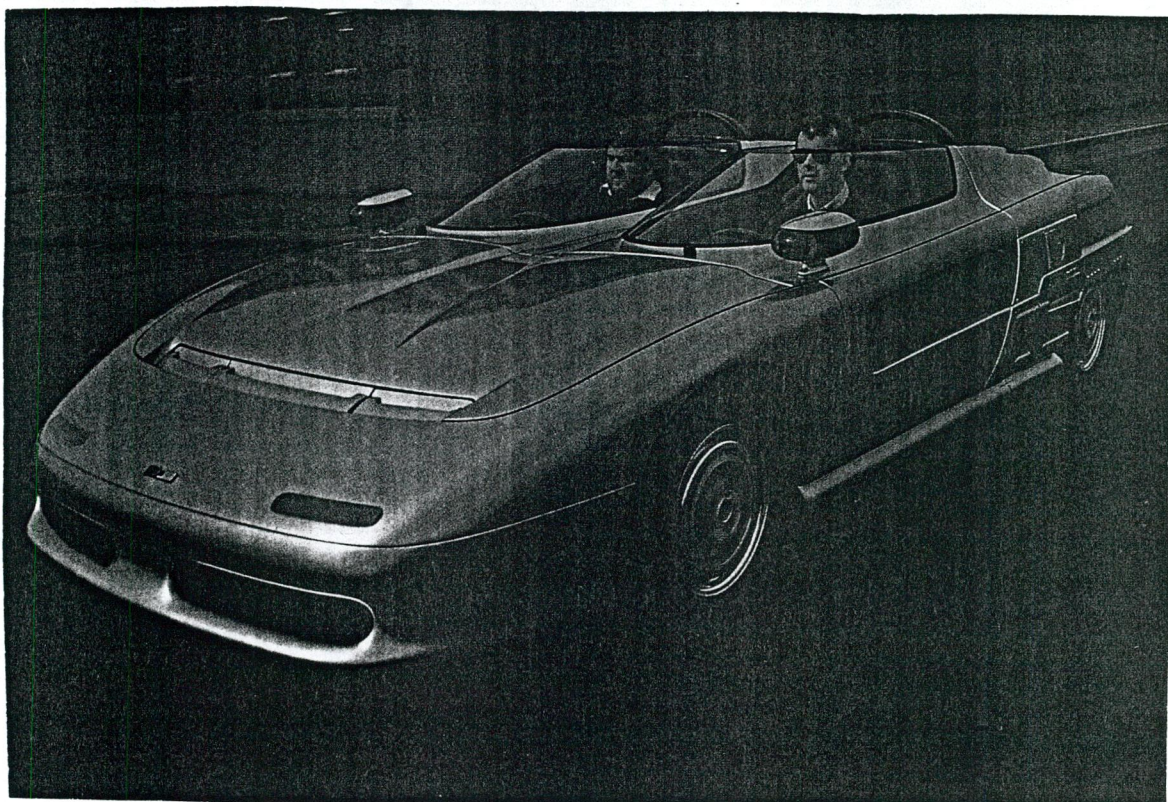


Fig. 2.4 Eventually in 1988, Giugiaro shows the dual cockpit concept to the world, and names it Aztec.

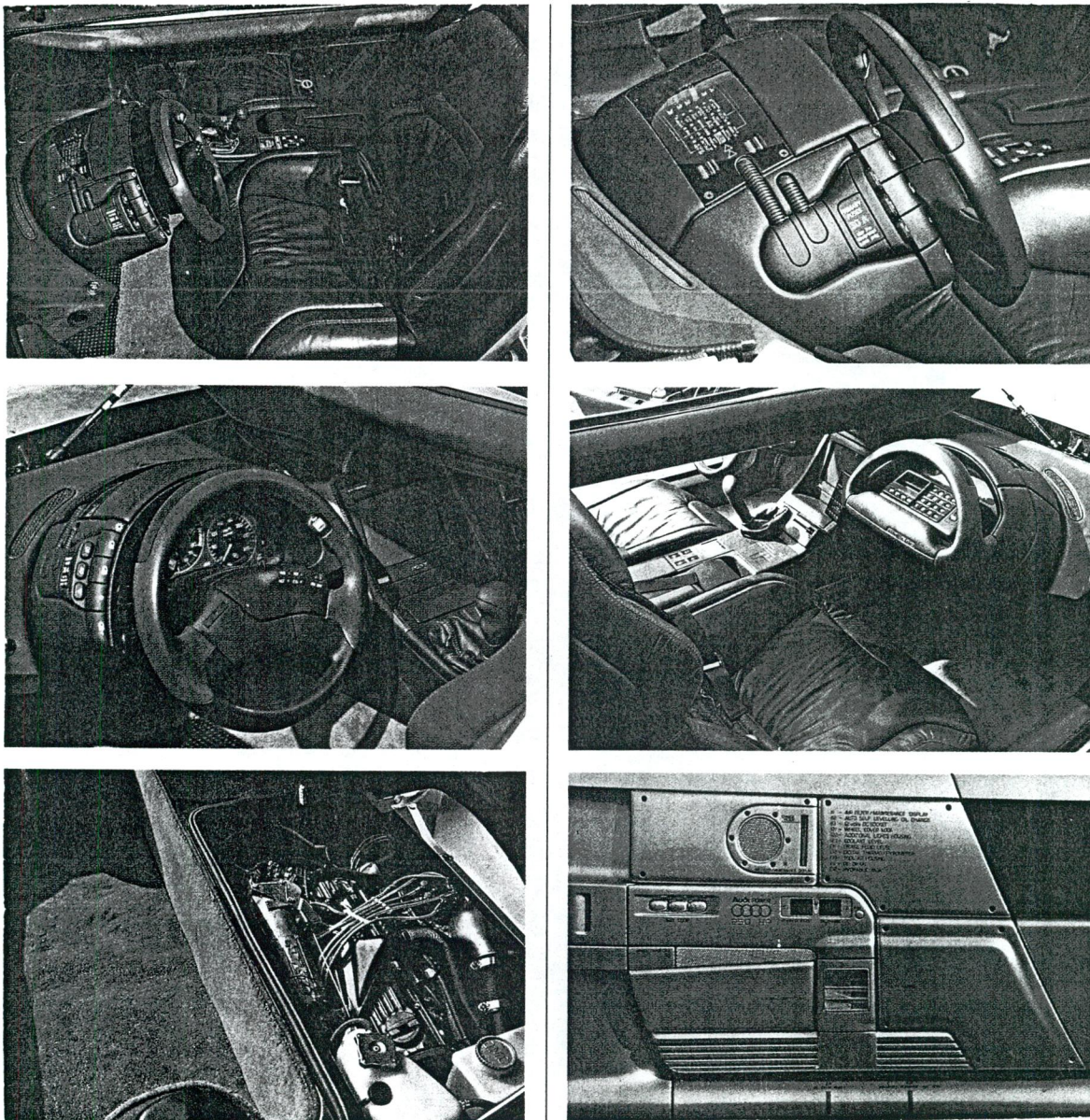


Fig. 2.5 (a) Top left: Roomy luxurious Aztec/Aspid interior
 (b) Top right: Head up display
 (c) Middle left: Facia uses analogue gauges
 (d) Middle right: Passenger gets dummy wheel
 (e) Left: Turbo Audi engine sits transversely
 (f) Right: Side buttons aid securing

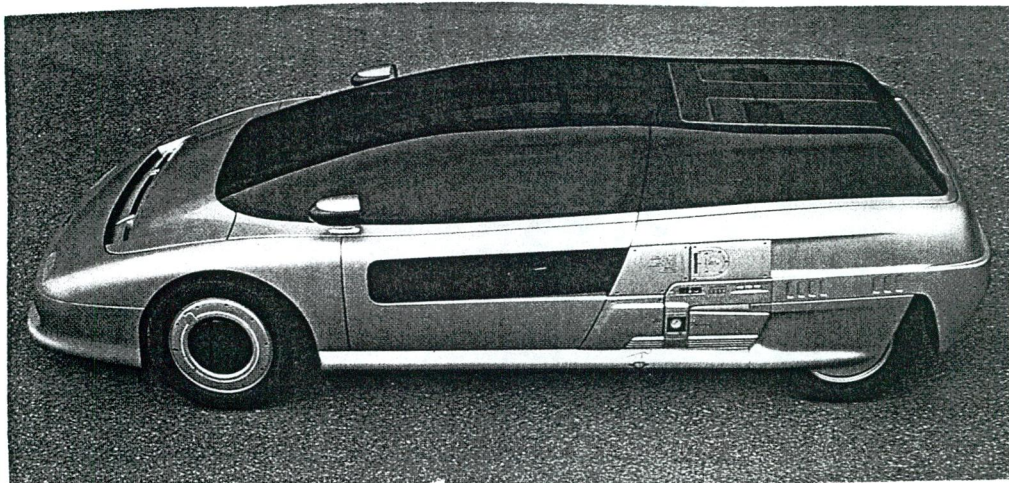


Fig. 2.6 Above: The Aspid. (Closed version of the Aztec).

hired by the Style Centre of Fiat where he worked until the age of 21. In 1959, he joined the Style Centre of the car body builder, "Bertone". In co-operation with Nuccio Bertone, he designed cars such as the Alfa Romeo, Guilia G.T and the Fiat 850 Spyder. They also worked very closely together on prototypes of advanced research.

In 1965, Giugiaro left Bertone to become the Chief Executive of the Design Centre at Ghia. In 1968, he started his career as an independent designer, creating his own company, Ital Design, an organisation capable today of offering all services relating to the design of motor cars, and also the design and manufacture of prototypes.

Giugiaro likes to be involved in the design of products to be produced in large quantities and also likes to be involved in the design of advanced prototypes. Some of Giugiaro's sports cars that have gone into production are now considered classics. Examples include: the Maserati Bora, the Lotus Esprit, the DMC de Lorean and the BMW M1. (Giugiaro has been re-commissioned by BMW to design the M1 replacement, due out in prototype form at the Geneva Motor Show of 1992). (Ciferri, Feb. 1991, p.4). Amongst the more prestigious saloon cars have been: the Volkswagen Range, the Fiat Panda and Uno, the Lancia Delta, and the Audi 80.

In the world of Ital Design, Giugiaro is decidedly an atypical personality. He was born and bred in the atmosphere created by the designers and car body makers. But since his youth, Giugiaro decided to play a new complex role. He did not want to be just a stylist but wanted to design style and technology, production methods, value analysis, components and circuitry, all at the same time.

"Giorgetto Giugiaro is important in the history of Italian design because he has changed the thinking behind car design. The automobile was once thought of as something noble and aristocratic. Giugiaro has reinjected nobility and style into the car, meant as a consumer product too. In this light, it has joined the evolution of the very concept of design where good looking is whatever most corresponds to general wishes. Giugiaro possesses the highly noteworthy ability to clothe technology and establish it as an object for daily use that people can relate to both immediately and directory".

(Porgetto, Nascita Del, 1983, p.30).

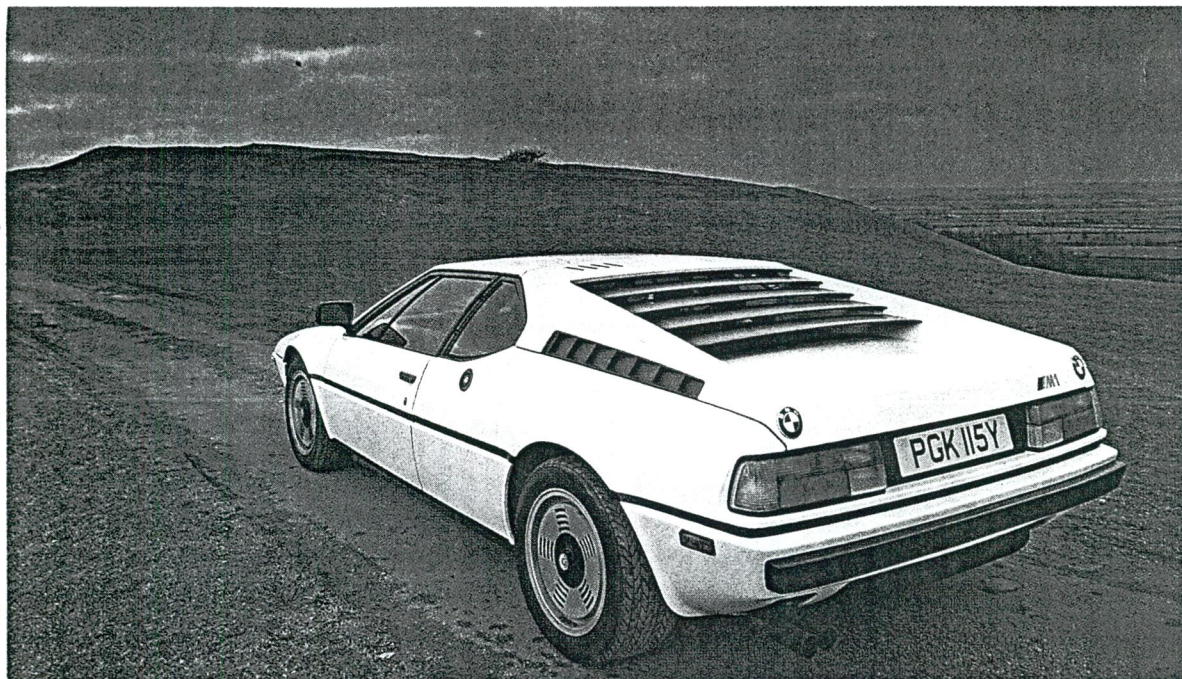


Fig. 2.7
Left: Old BMW M1

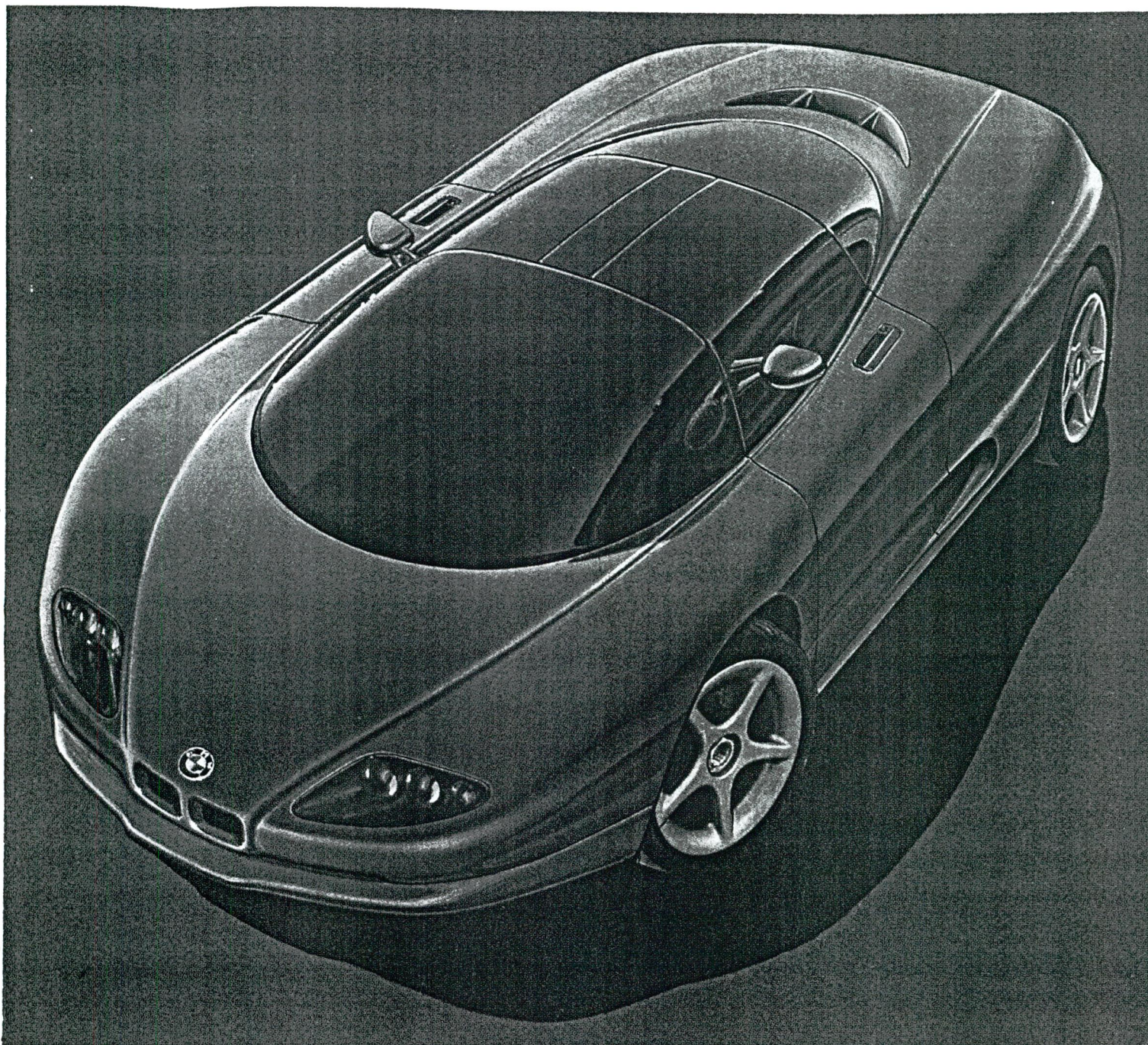


Fig. 2.8
Below: Proposal
for BMW M1
replacement

Even so, Giugiaro admits to a dual personality.

"My professional life",

he once admitted,

"is split in two. The work of a designer ties me to plans, it dictates technological restrictions, standards and economic limits, which are often insurmountable. Sometimes, they can be got around by means of an imperceptible play on proportions and a meticulous reconstruction of details. Artistic fervour, on the other hand, pushes me to go back over the pencil traces in laying down a supporting concept".

(Giorgetto Giugiaro, June 1990, p.15).

For some time now, Giugiaro's creativity in car design has been mainly of the second kind. It can be seen in his Kensington prototype onto whose progressive shape he has grafted a Jaguar's cultural features. A measure of his regard for this British marque is that he designed and built the Jaguar Kensington without any direct commercial motive.

"I didn't design this car with a view to a contract from Jaguar or anyone else," he says emphatically, "but some people thought that our specialities were either exotic sportscars or basic small ones. I wanted to show what I could do with a high class saloon".

(Giugiaro, 1990, p.52).

Giugiaro says that he attracted new clients as a result of the Kensington's display in Geneva early last year. Jaguar was not one of them as the company prefers to keep design work in-house at its Whitley Engineering Centre. Jaguar chief stylist, Geoff Lawson, and his colleagues are reported to have looked long and hard at Giugiaro's interpretation of their work. Though they are reluctant to criticise the man who most car designers regard as the maestro, they clearly did not like the Kensington.

On the road, however, the Kensington, sparkling silver in the sun, turns heads in a way that no other Jaguar Saloon could. It wafts along quietly and effortlessly, just like any viz Jaguar. Apart from stiffer shock absorbers and wider tyres, there has been no change to the

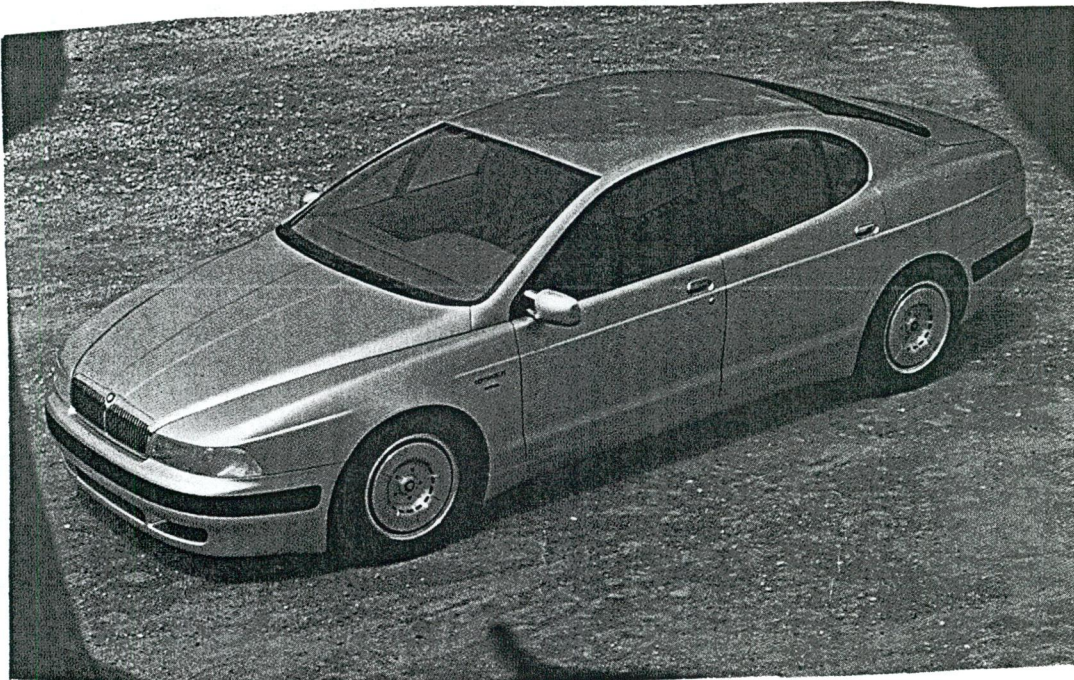


Fig. 29 Giugiaro's Kensington Project

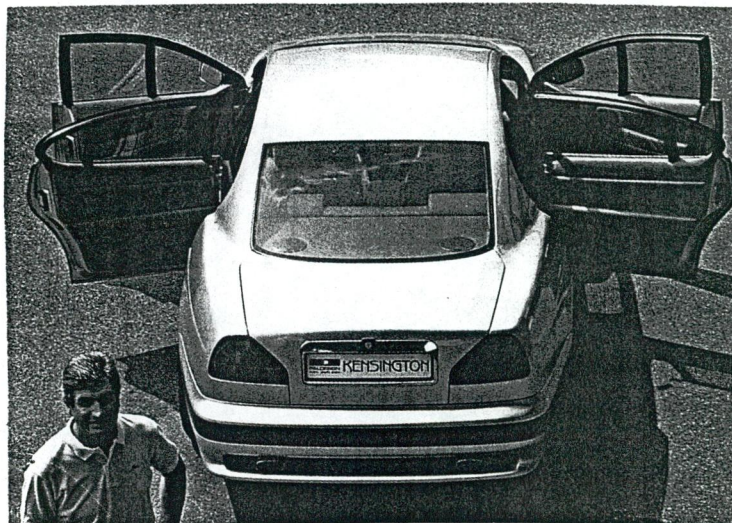


Fig.2.10 (a) Above: Giugiaro, with his labour of love



Fig.2.10 (b) & (c) "Jaguar models have a purity and a continuity"
(Giorgetto Giugiaro, 1989)

mechanicals of the car. The Kensington's only gimmick is its remote control door opening. By pressing buttons on a small keypad, one or all of the doors can be opened or closed from a distance, and they can also be power-operated from inside the car. Tiny optical sensors on the doors prevent them from knocking over a passer-by or trapping the legs of someone getting in or out.

Giugiaro says that styling a Jaguar was a great challenge,

"The history of Jaguar is so rich, their models have purity and continuity. So this was not so much basic research as the application of craft to design, a car which, when seen from any angle is unmistakably Jaguar".

(Giorgetto Giugiaro - Driving Giorgetto's Jag, Autocar and Motor, 15 Aug. 1990, p.36/38).

Like all the concept cars displayed at the world's motor shows, the Kensington is intended to create a debate. No-one expected Giugiaro to produce a lightly modified version of what had gone before and he did not imagine that everyone would approve of such a radical change of style. Giugiaro says, "My feeling is that Jaguar does not have the courage to introduce a completely different body shape". With his Kensington, Giugiaro may have given Jaguar the courage to produce something radical - even if the end result is different. (Giorgetto Giugiaro, Autocar and Motor, 2 May 1990, p.54).

Another prototype which reflects Giugiaro's "unrestrained sensations" is the I.D. (Ital Design) 90, a modern interpretation of the Bugatti myth. Giugiaro points out that the car was interpreted in complete freedom, it was not linked in any way to the imminent rebirth of the prestigious French marque, (now Italian owned), though his two seater is based on technical drawings of the mechanicals of the new Bugatti.

The Bugatti theme is, from a certain point of view, more arduous than the preceding Jaguar, because of the difficulties and risks involved. For these reasons, Giugiaro preferred to work alone, marrying his imagination with all the past experience gained in the development of sports models and evolutionary shapes. However, he did not neglect current shape trends and these elements are reflected in his design.

Seen as a whole, the front end reveals a coherently uniform design.

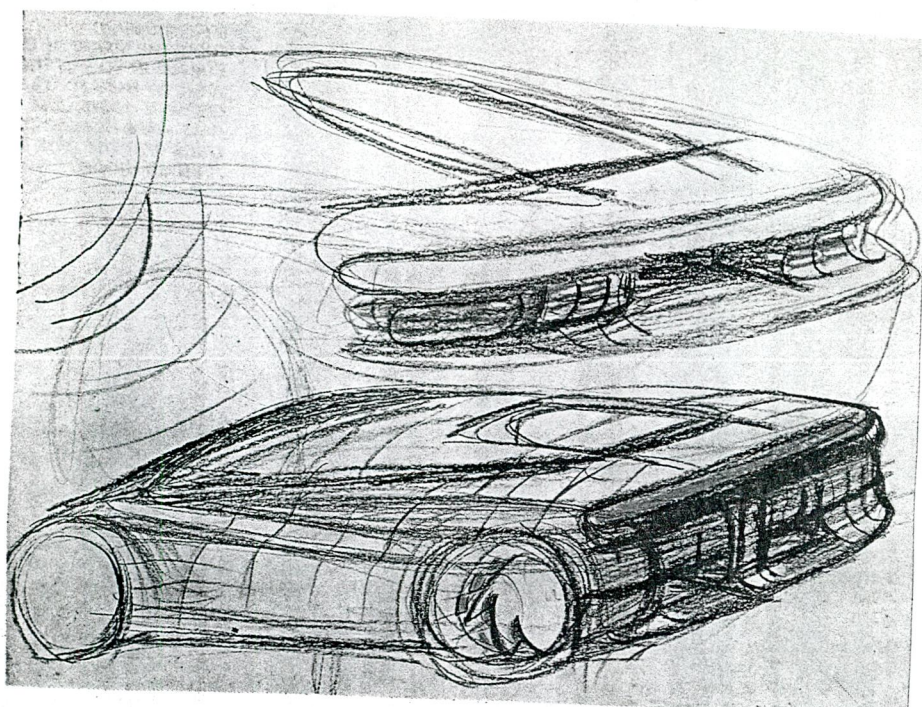


Fig. 2.11 (a)
 Left: Early sketches
 of the ID 90 idea.
 Penned by Giorgetto
 Giugiaro himself

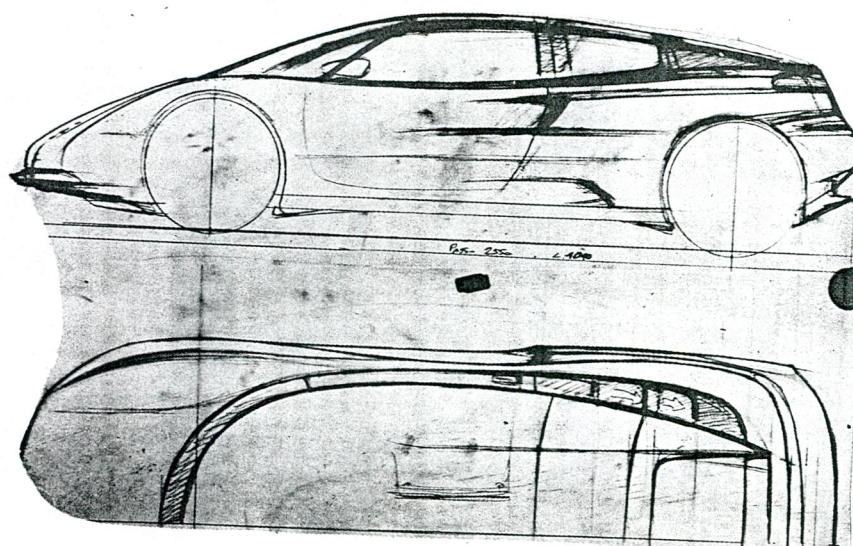


Fig. 2.11 (b)
 Right: The emergence
 of the ID 90's
 definite form

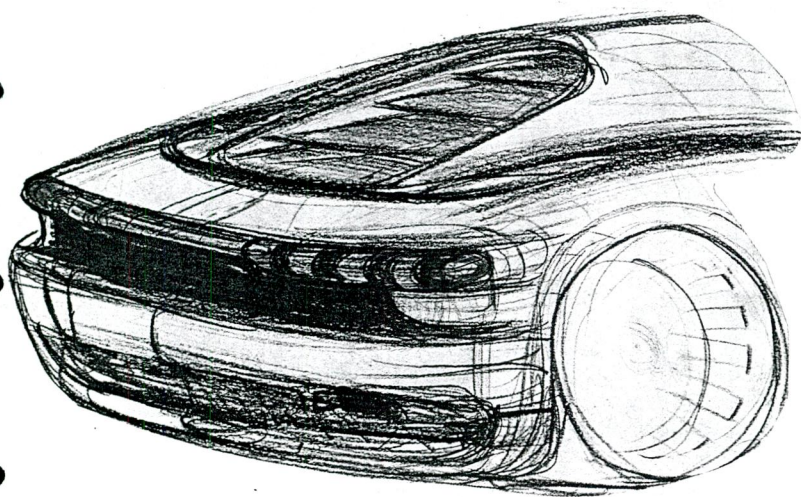


Fig. 2.11 (c)
 Left: More sketching and
 development of the rear
 of the car

The upper recess at the rear is balanced by the lower one, formed by the bumpers which house two exhaust pipes at each side and the slimline spoiler that aids the exit of air flow from the underbody. The design of the wheel rims in lightweight alloy are reminiscent of the legendary 1926 Royale.

As this is a static model in painted plaster, the "ID 90's" interior has only been sketched by Giugiaro. It has two typically sporty seats with an enveloping shape and a dashboard, the design of which is linked to the movement of the front end.

Giugiaro is satisfied with his work and it is a remarkable achievement in view of the fact that it took the designer and his team just forty days to produce the model. But is the ID 90 to simply be a static model for shape research?

Giugiaro replies that the work would be followed up with a running prototype in sheet metal. For the time being, the mechanicals and Marcello Gandini are the obstacles to turning these intentions into a new Bugatti.

These three examples of Ital Design's work represent both sides of prototype design. The trilogy of 1988 reflected the then trends in car design. The three cars changed the thinking behind the future role of the car. Their release was so greatly received that the Aztec went into limited production in Japan.

Giugiaro's Kensington project was executed in total freedom, and as he did not design this car with any direct commercial motives, it simply became a publicity show car. The car did, however, lead to contracts from motor manufacturers, therefore, it was a very effective advertising tool. It could, however, influence future Jaguar designs as it was highly praised by public and press.

The ID 90 project is debatable. Was Giugiaro trying to attract a Bugatti contract or was it like the Kensington, in that it was done in complete freedom? Even though Bugatti disassociated themselves from the project, BMW are now currently working with Giugiaro to produce an M1 replacement. This happened as a result of the ID 90 project.

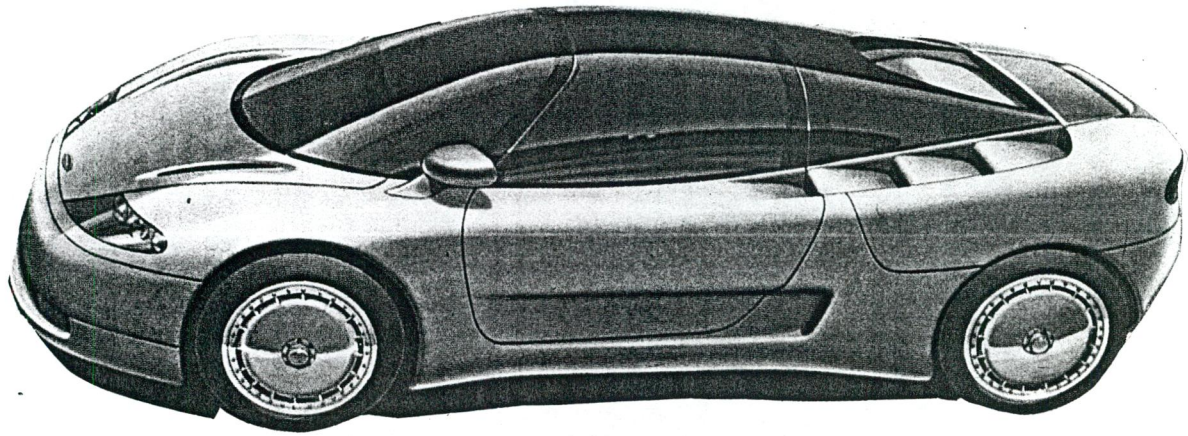


Fig. 2.12 Finished rendering of Giugiaro's Bugatti ID 90

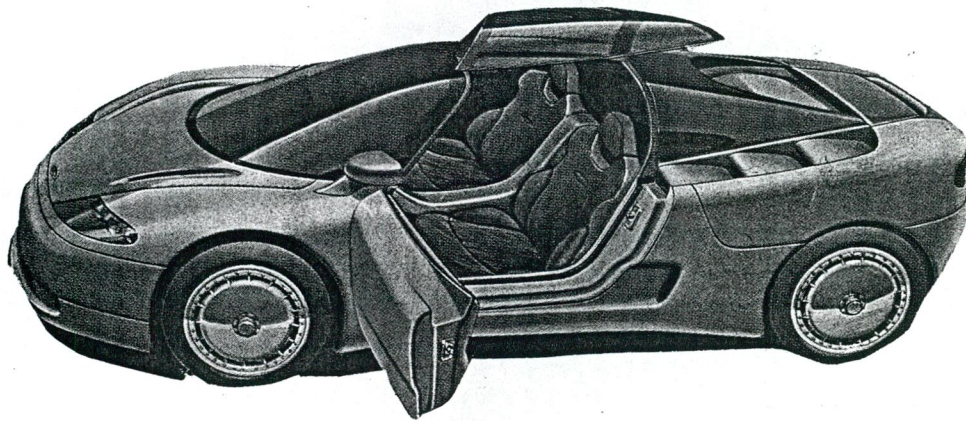


Fig. 2.13 Rendering which shows proposed interior of ID 90
(Giugiaro hopes to have a "runner" of ID 90 very soon (Jan.1991))

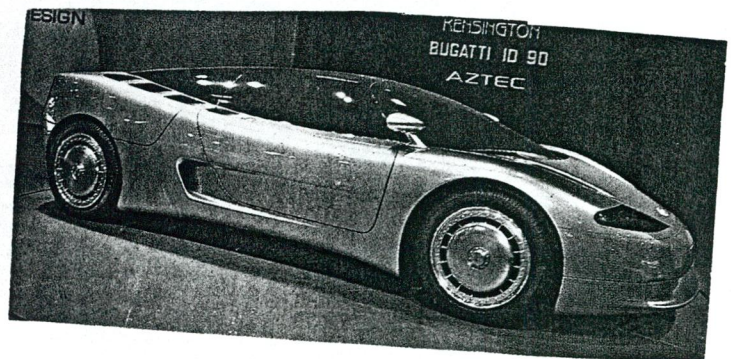
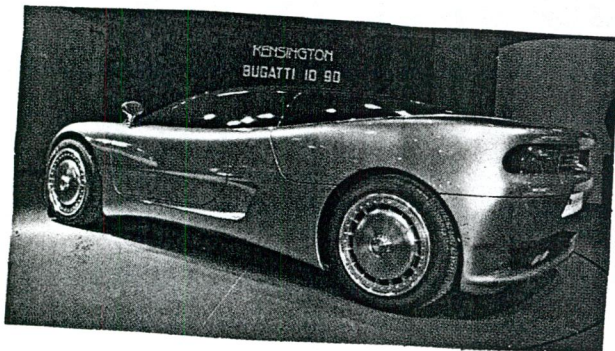


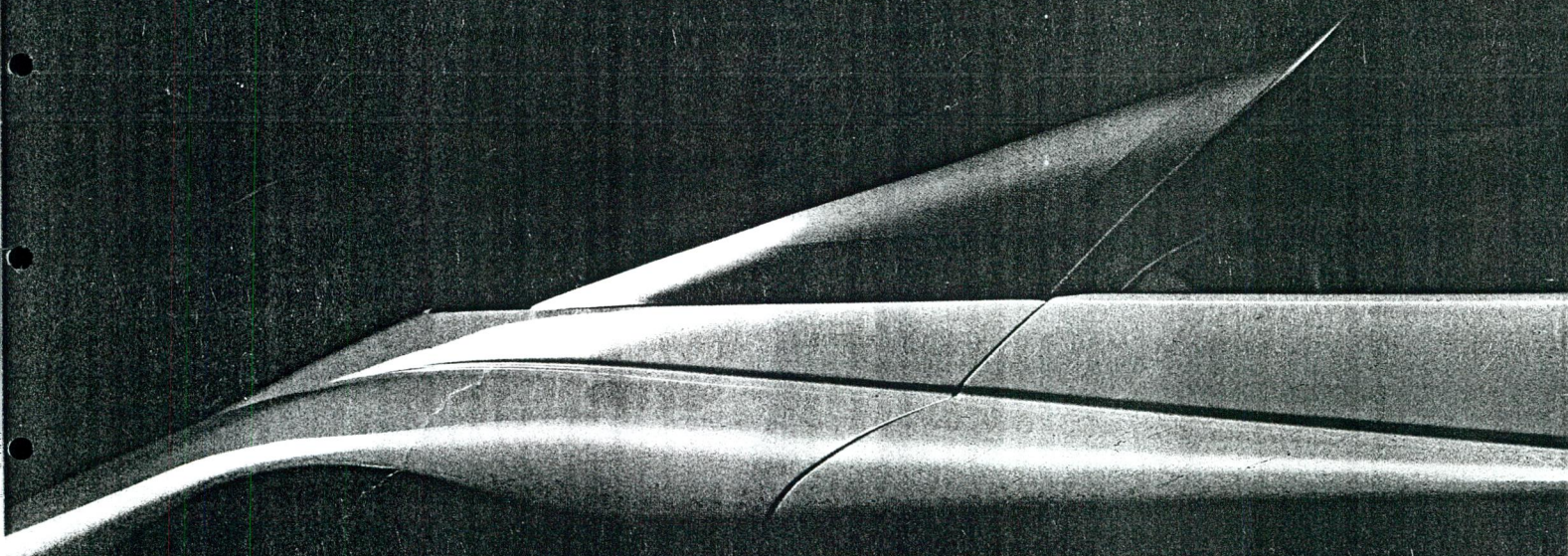
Fig. 2.14 (a & b) The static model of ID 90 completed in just 40 days

Therefore, the ID 90 represents two kinds of concept cars, it was an advertising tool which attracted BMW to hire Giugiaro and from first pictures of the M1 replacement its proportions are very much similar to the ID 90

L I N E A P I N I N F A R I N A

foto G. Bellia

NOF M



pininfarina

L A T R A D I Z I O N E D E L N U O V O

CHAPTER 2

THE PININFARINA DYNASTY

The mythical Battista, also known as Pinin-Pininfarina, often said of his children: "Children are a businessman's greatest source of capital". Thus, on 8 September 1926, when Sergio Pininfarina was born, his mother, Rosa Copasso turned to her husband and said, "Today the industrialist, Mr. Farina, has doubled his capital". She proved to be correct: Sergio Pininfarina went on to change the world of car design, under his father's guidance.

He did live under his father's shadow for a long time but eventually he managed to fulfil ambitious goals of his own. Along with his brother-in-law, Renzo Carli, he developed the Turin factory to its present state. Pininfarina makes between 20,000 and 25,000 car body shells a year, it has a workforce of 2,000 people and a financial report for 1987 which recorded sales worth 360 billion Lire, (£833Million). Pininfarina is known worldwide and has three new models: the Alfa Romeo 164, the Peugeot 405 and Ferrari F40, all doing very nicely indeed.

Sergio Pininfarina, an extrovert of rather dashing appearance, wears classic clothes and has an Oxford air about him. He loves music and literature and is something of a golf fanatic. He shares this passion, and others for Juventus and Ferrari, with his three children. His most impressive feature is that everything he does, he does well. (Cinti, Car Styling, June 1988, pp.36/39).

Pininfarina was never a car designer and neither for that matter are his children, Andrea, Paolo and Lorenzo. He was, however, a good manager and during the 60's and 70's, with Renzo Carli, had the sense to build a team of young car designers with production and engineering expertise that could carry on the creative traditions for this talented and inventive dynasty.

Today, Pininfarina works openly for GM, Peugeot and the Fiat Group, (Alfa Romeo, Fiat, Lancia and, of course, Ferrari), has a long term consultancy arrangement with Honda, and designs in secret for a score of

pininfarina

Fig. 3.2 (a)

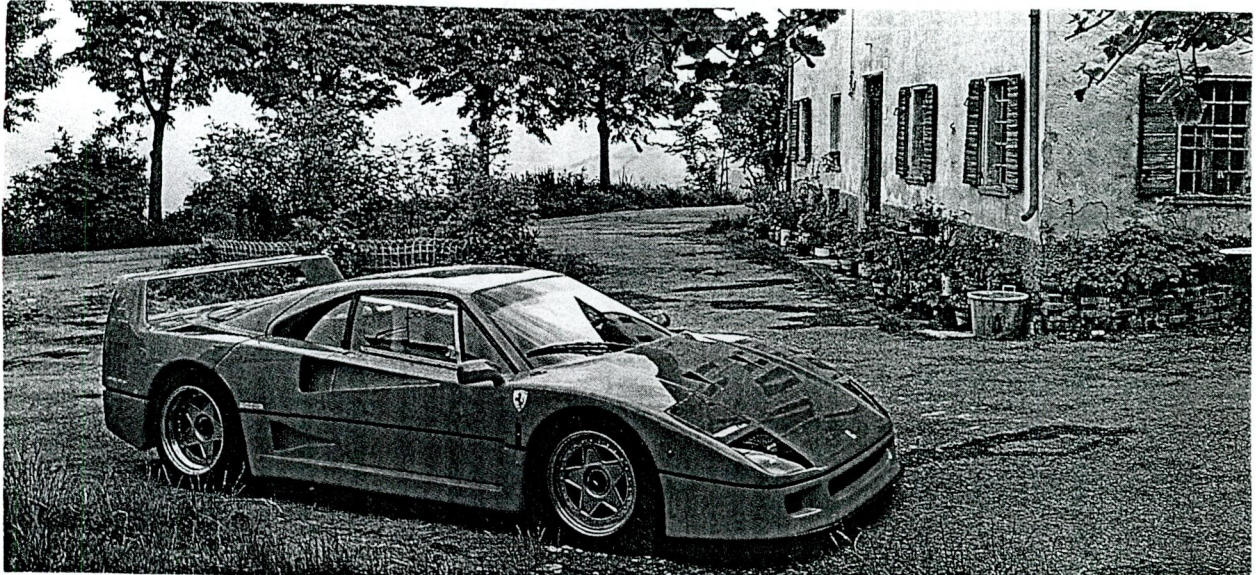


Fig 3.2. (b)



Fig 3.2 (c)

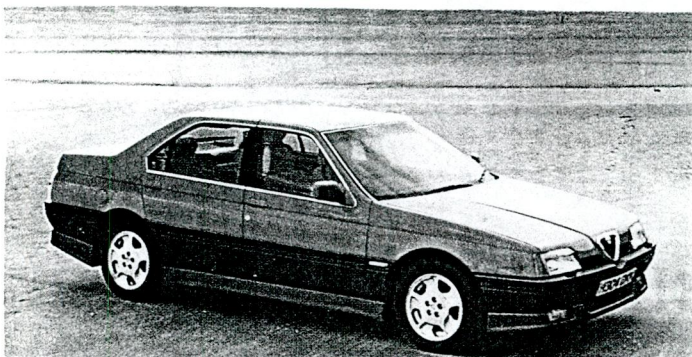


Fig 3.2 (d)

"Doing very nicely indeed", three of Pininfarina's most famous cars, the Ferrari F40 (top), the Peugeot 405 (middle) and the Alfa Romeo 164 (bottom)

other car manufacturers.

Of the world's design houses, only Bertone can claim a longer heritage than Pininfarina. Battista Farina started a coachbuilding firm, Stabilimenti Farina, with his brothers twenty years before he established his own business in Turin in 1930. Within a few years, Carrozzeria Pinin Farina had acquired a reputation as an innovator through the pioneering use of inclined windscreens and horizontal grilles. In those days, cars were built on separate chassis and it was a relatively easy task to design and build individual coachwork for wealthy clients, or small series runs for car makers.

Even during the 30's, Battista Pininfarina was interested in aerodynamics. His 1936 Lancia Aprilia Aerodinamica coupe moulded its wings into the body to form a shape and proportions that were adopted by a number of pre war racing cars and later became the basis for the post war design revolution. This interest in slippery automotive forms inevitably led to the opening of the Pininfarina wind tunnel in 1972. It was the first in Italy and has been in almost constant use in developing full scale production and racing cars.

Today, Lorenzo Ramaciotti is the design chief at Pininfarina e Ricerche SpA. Quiet and reserved, Ramaciotti believes in teamwork achieving the kind of solutions that have become the hallmark of Pininfarina.

"Our strong results have always been achieved by teamwork", declares Ramaciotti,

"there has always been very steady control so the results are easily recognisable even if individual designers left, and the same is true today. Our cars are always designed by teams, never by one man"
(Pininfarina, The Design Dynasty, 12 Oct.1988, p.51).

A source of frustration to a man like Ramaciotti is that few car makers today are prepared to gamble on an innovative design, although he understands only too well the reasons that lie behind the lack of originality in design.

"It is very difficult today to take risks, decisions are shared so no individual will have to take responsibility. Before a decision is taken to make a new car you have to pass through different management levels - marketing, sales, engineering - then it goes to a clinic. At the end, the final decision is a mathematical average. You cancel out the high and low points. The problem is that being an average, the expression is average in order to minimise the risk and the investment".

(Pininfarina, 12 Oct.1988, p.52)

The Turin Motor Show has always been a showcase for the Italian design houses and the same year Giugiaro was showing the Asgard, Aspid and Aztec (1988), the most exciting car at the show, according to press and public reaction, was a coupe from Pininfarina which was designed around the Lancia Delta Integrales, four-wheel drive mechanicals, called HIT, (High Italian Technology). This design exercise was said to blend classic elegance and good aerodynamics with clever packaging. HIT was a good looking car but hardly an aesthetic breakthrough; and the Pininfarina designers admitted that the shape took second place to the use of new lightweight materials. To demonstrate how space age materials can improve the power to weight ratio, the engineers used composite fibres to shape all bodywork panels as well as the floorplan. Reportedly, the methods of gluing, bonding, clamping and riveting the different panels to one stiff lightweight hull are indicative of future production techniques.

Fiat is currently working with Pininfarina for a Calibra rival due in 1993. The coupe is scheduled to appear in September 1993 - well behind the Calibra, the Volkswagen Corrado and a proposed new Ford Capri. Fiat's real trump card, however, is that Pininfarina will design and produce the coupe. Sources say the new car will feature proportions very similar to Pininfarina's 1988 research prototype, HIT. While HIT was essentially a development vehicle for Pininfarina's chassis and body composite technologies, the production car will feature a traditional steel-based body, with synthetics used only on the bonnet, the wings and doors.

(Ciferri, Autocar and Motor, 20 Feb. 1991, p.4).

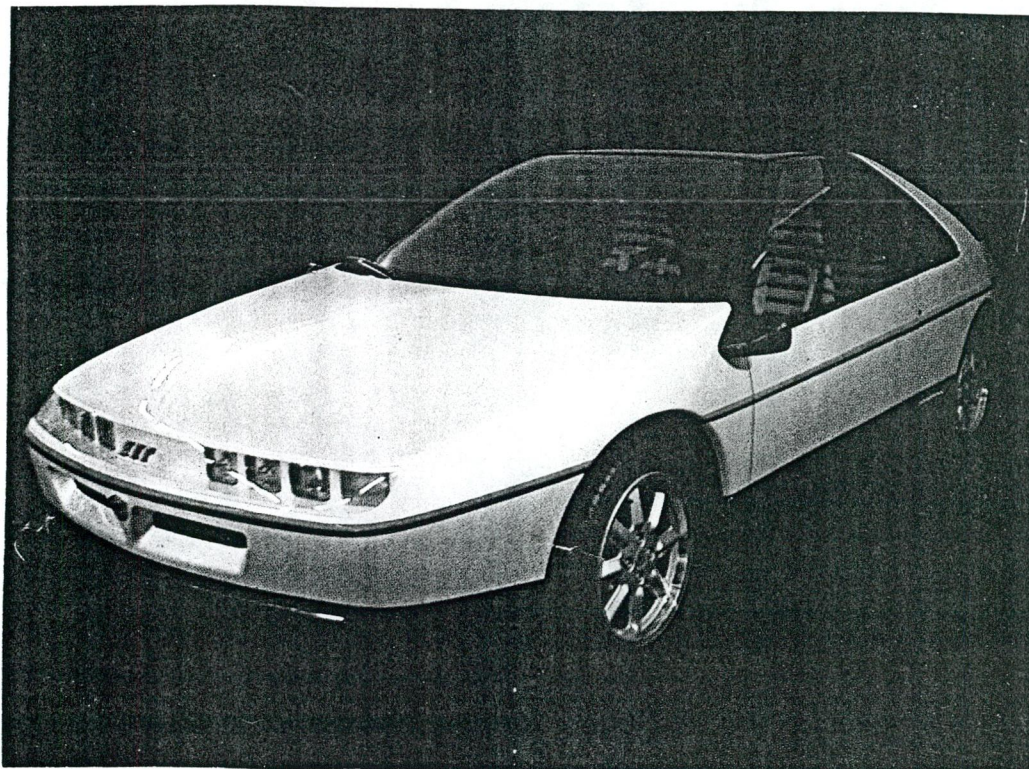


Fig. 3.3 Pininfarina HIT (High Italian Technology
 "The styling took second place because of research into
 high tech manufacturing methods and materials". (1988)

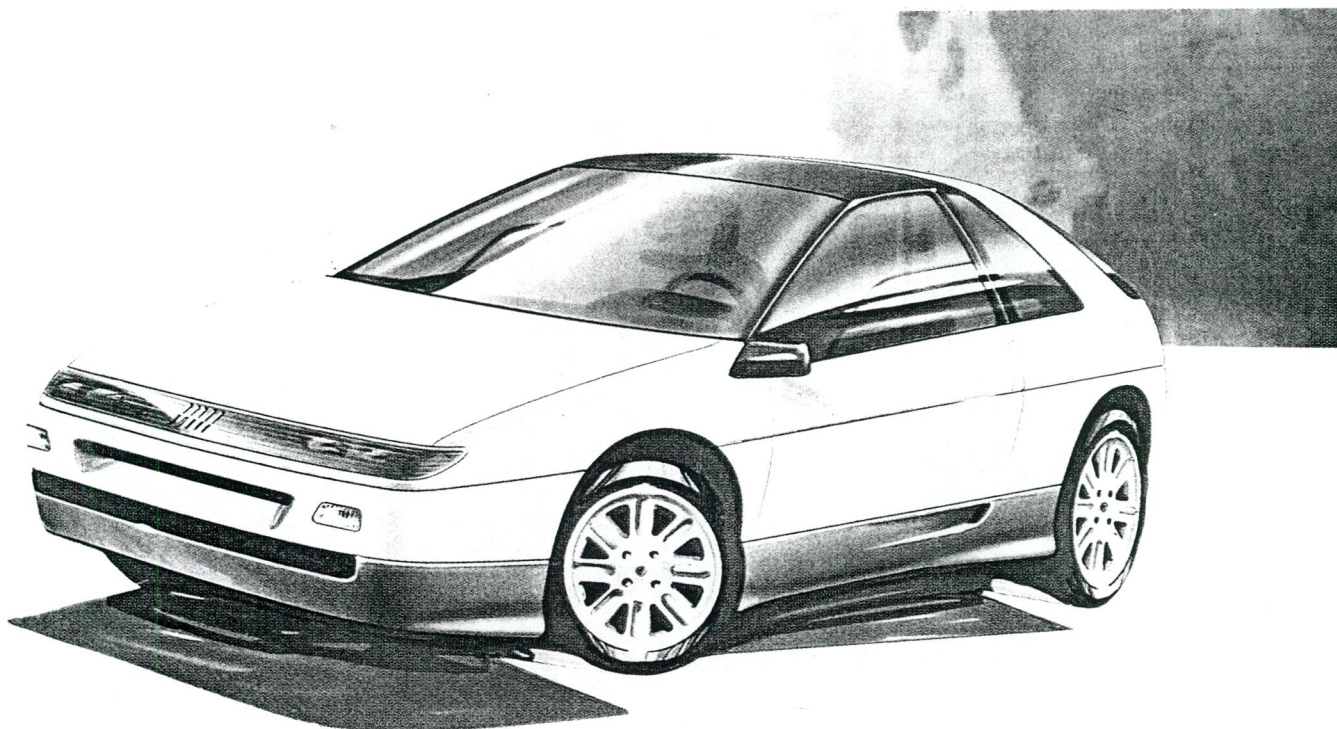


Fig. 3.4 Fiat's proposed Coupe for 1993

In 1989, Pininfarina waited until late in the year to produce their year's work. They waited until the Tokyo Show to produce a dramatic and visually stunning car. Stealing the limelight from Japanese manufacturers at the Tokyo Show is very difficult. Pininfarina, however, seems to enjoy a challenge and there was no doubt that the Ferrari Testarossa based concept stole the show. It's a provocative, some would say, extreme, shape with one of the great supercars as its base.

The key question when it was shown was whether it revealed the shape of future Ferrari's? That question was only partly answered by Ramaciotti,

"Mythos is only a Pininfarina concept car. But it is not, and was never intended to be, just a piece of sculpture. It's a basic research exercise that addresses new formal themes; a stimulating experience which can be transferred, duly corrected and adapted, to the needs of tomorrow's production cars"

(Mythos Experiment, 15 Oct. 1989, p.18).

It is highly unlikely that the Mythos, or anything closely reassembling it, will ever go into production. But previous experience of Pininfarina design studies - like the 1968 PS, the 1969 512S and the outlandish 1970 Modulo - suggest it will influence Ferrari road cars in the late 90's.

The Mythos, a very aggressive mid-engined, two seater, emerged after a period in which Pininfarina's prototypes had been particularly sensible, concentrating on experiments with new materials and new manufacturing technologies, sometimes with predictable results. Like the aforementioned HIT of 1988, the Mythos, however, marked a return to more basic formal research.

The choice of Ferrari mechanicals for such a strategical concept car for Pininfarina, was a must:

"Enzo Ferrari asked my father 37 years ago to give an image and a definitive family feeling to the prancing horse cars. So started the Ferrari/Pininfarina co-operation - a

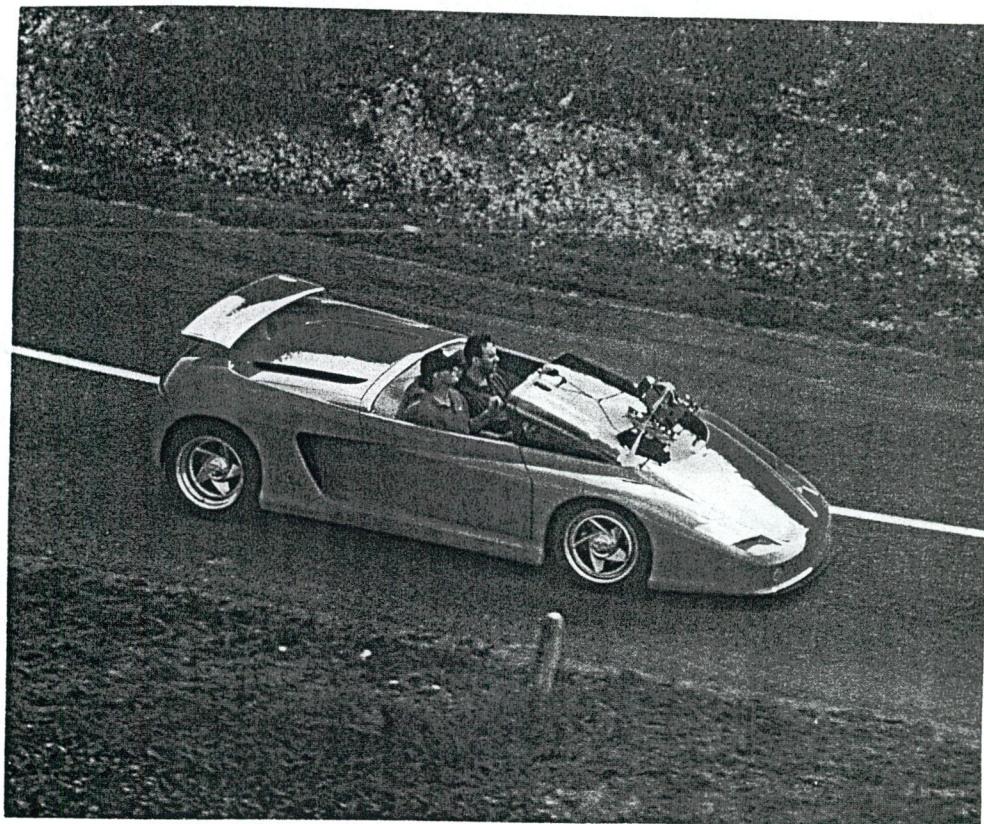


Fig. 3.5 Pininfarina's, "Mythos Experiment"

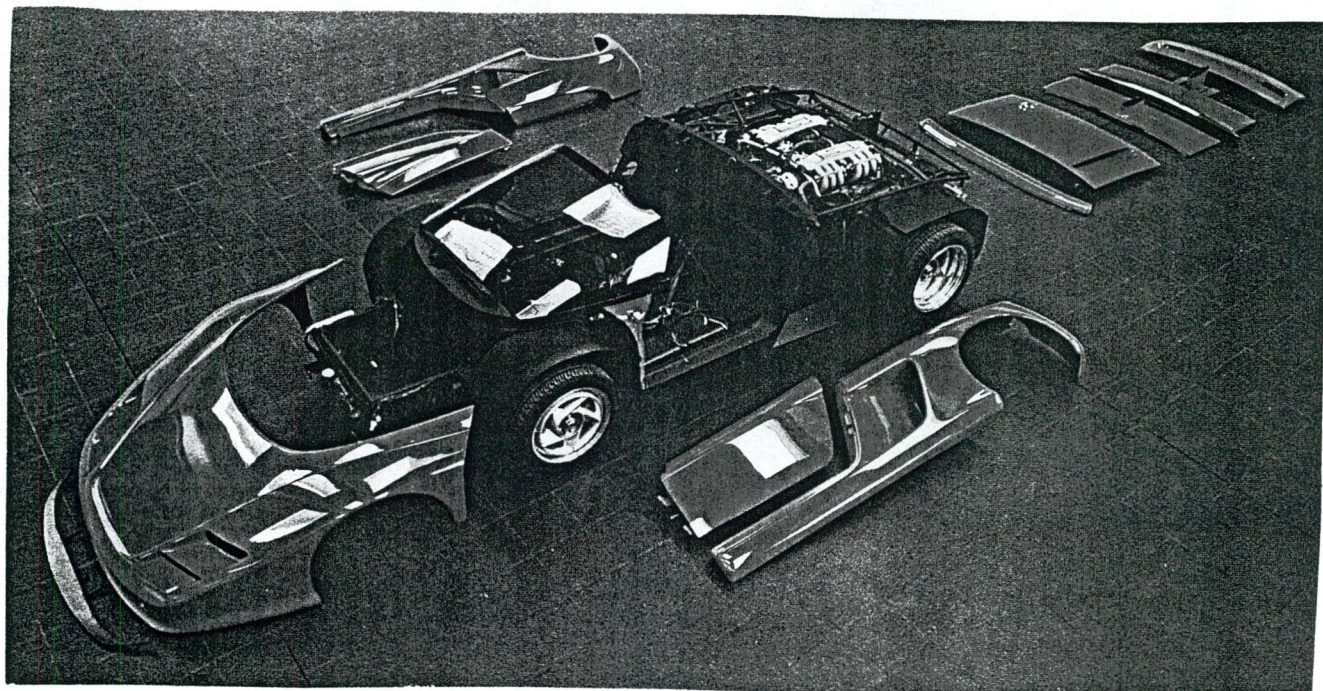


Fig. 3.6 Illustration of Pininfarina's excellence in prototype building

marriage that produced some of the nicest and most desirable cars of our times and which is also the basis of our history and our success". Says Sergio Pininfarina

(Cinti, Reasons for a Myth, Dec. 1990, p.23)

The exterior design of the Mythos reveals a new trend from Pininfarina. They developed the theme of the relationship between volumes and so developed and ratified the design problems which arise when engines and radiators are mounted at the rear, which calls for a rear track much wider than the front. The effect of this layout is of intersecting volumes, while the body of the car emerges from a much wider tail. The result of this task is gorgeous: the transition from one body to the other is extremely fluid and not forced, so the car appears as a homogenous form in spite of being made from two quite distinctive elements.

The design research which led to the Mythos we see today, was developed in three different configurations - Coupe, Targa and Barchetta. The latter was singled out because of the link with racing cars and neither a hard top nor side windows were envisaged.

From the design point of view, the shell of car body was styled carefully so that it would blend naturally with the external surfaces, not only with volumes but also with colours, most of the interior is the same colour as the bodywork. The design is essentially symmetrical; the flow of the dash is repeated in the base of the seats. The two large dials of speedometer and rev counter stand out amid the analogue instruments, their shape repeated in the steering wheel whose three spokes are set in such a way as to provide a perfect view of the instruments and to repeat the double circular motif. The door panels, covered in black and red leather, have a sculptured shape and thanks to the absence of window mechanisms, offer a deep shell which acts as an armrest.

Innovatively designed, the Mythos does not offer anything new mechanically. The Testarossa power plant is unchanged - a 48 valve, 5 litre, flat 12 cylinders developing 389 BHP at 6300 rpm. The only modification is the exhaust, brand new since the shortened rear overhang of the Mythos doesn't fit the original system.

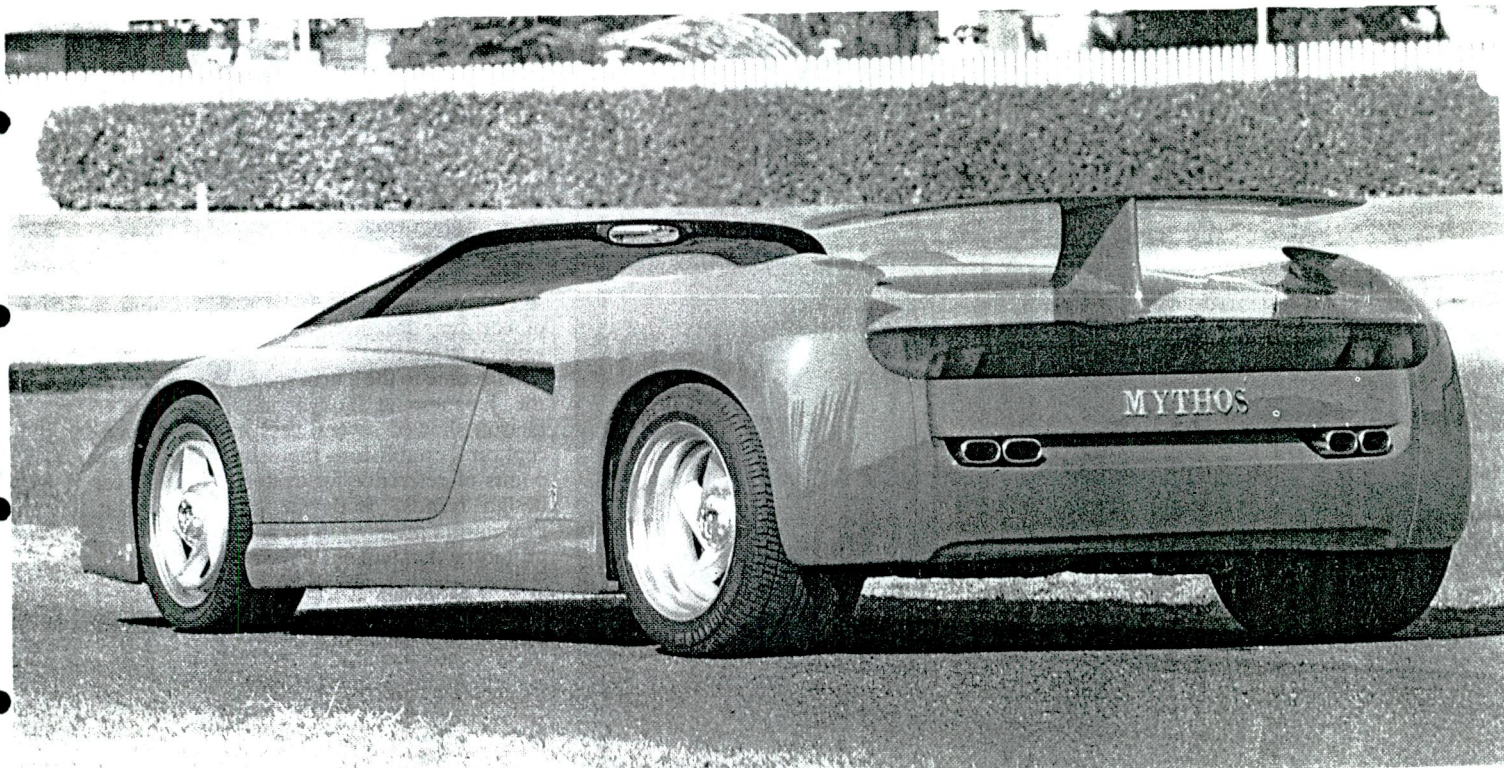


Fig. 3.7 Above: Shows the mergence of two distinct forms to form one beautiful car

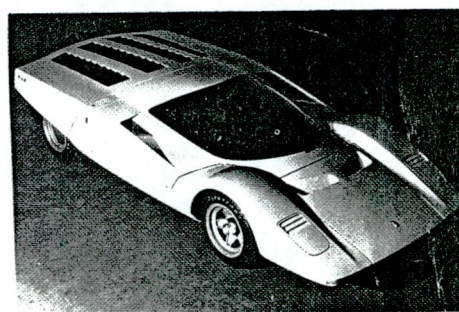
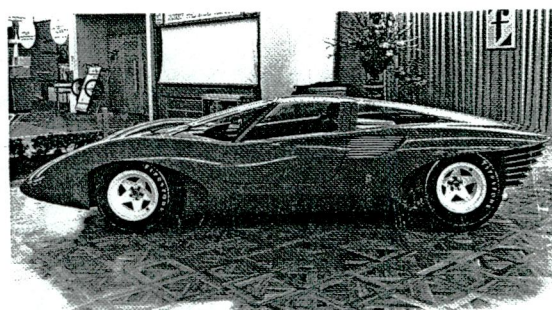
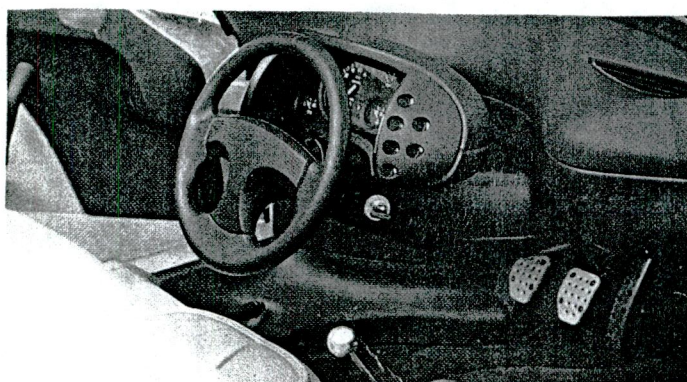


Fig 3.8 (a) Above: Exterior reflected in interior

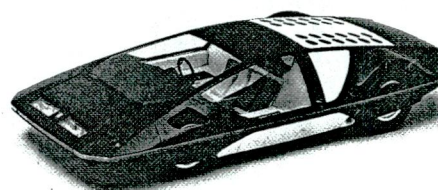
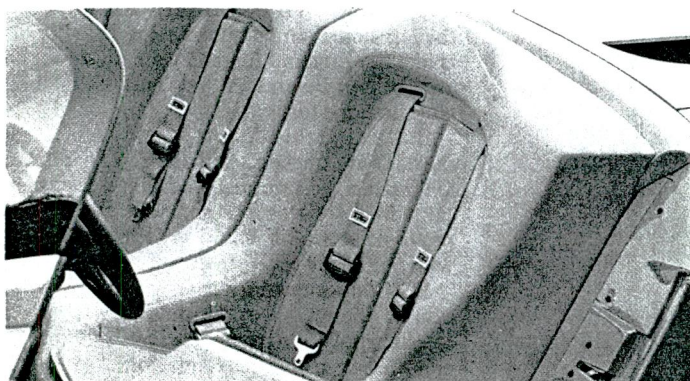


Fig. 3.8 (b) Above: Wraparound seats show 60's influence

Fig. 3.9 Past influences from Pininfarina

The real advantage of the car over the existing Testarossa comes from the weight saving achieved by the carbon fibre body. It is 2756 lbs, 562 lbs less than the Testarossa. The top speed, however, would probably be lower owing to poor aerodynamics caused by open roofs. The lighter and more stylish Mythos, though, would offer the pleasure of driving in the open on a sunny day. Only time will tell, that this concept of 1989 will affect Ferraris of the future.

In complete contrast to the Mythos, Pininfarina followed the 1989 concept Ferrari with something completely different. An aerodynamic study called CNR E2, it made a great contrast to the Mythos. The Mythos was a pure styling exercise, the CNR E2 was serious research.

The bland looking three box, four seater saloon features an extraordinary Cd of 0.193 and is said to be fully driveable. With such outstanding aerodynamics, the 57 BHP of the Fiat Tipo 1.4 litre engine is claimed to push it to 127 mph. The CNR E2 easily accommodates five passengers and their luggage and would be easy to mass produce since it is far closer to a contemporary saloon than a futuristic four-wheeled cigar that countless other aerodynamic research prototypes suggest.

These three examples of prototype research by Pininfarina show the different approaches the company has taken in the past few years. The HIT was a research vehicle which revealed new materials and technology which could be used for future production cars. These new methods seem to have influenced Fiat greatly as they are now currently working with Pininfarina to produce a coupe that will use some of the materials and technologies explored in the HIT project, and it is rumoured it will have similar proportions to the concept car of 1988. Therefore, the HIT represented research and development which Fiat have seen as suitable for a future production car of theirs.

The Mythos of 1989 was a styling exercise which created a lot of publicity for Pininfarina. Like the other Ferrari examples of the late sixties and early seventies, this Pininfarina could affect Ferraris of the 90's. Judging by past experience with Pininfarina concept cars for Ferrari, it probably will.

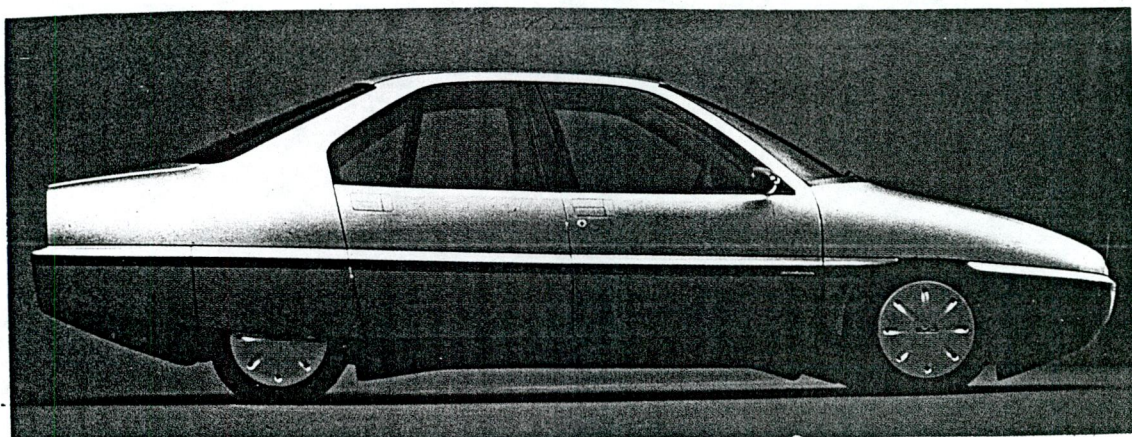


Fig. 3.10 (a) Pininfarina's Aerodynamic Project, Codename CNR E2

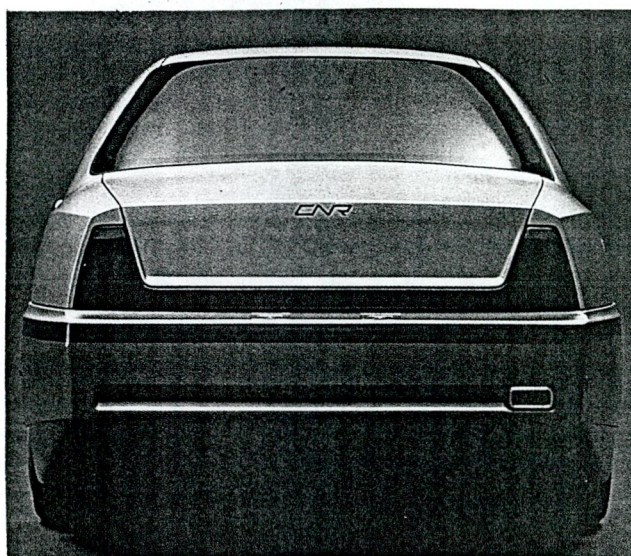


Fig. 3.10 (b) CNR E2, rear view



Fig. 3.10 (c) CNR E2 is a four-door, has a Cd of 0.19 and a top speed of 128 m.p.h.

When Pininfarina released the CNR E2 in 1990, it represented the change back to more serious research. As mentioned earlier, Pininfarina were always innovators in aerodynamic research and had the first wind tunnel in Italy. The CNR E2 was another prototype into aerodynamic research, but unlike other examples it boasted an outstanding aerodynamic coefficient that was not as bland looking as other examples of aerodynamic research have shown.

CHAPTER 3

INTERNATIONAL AUTOMOTIVE DESIGN (I.A.D.)

While Pininfarina were showing their exercise in aerodynamics, and Giugiaro his Bugatti ID90 and Jaguar Kensington, both were being upstaged on their home ground of Turin, and it has been described as the day Italian flair stood still.

At last, a consultancy had grown up, come to Turin and taken on the Italians at their own game on their home ground and won. The Turin Motor Show of 1990 marked the end of Italian monopoly in the automotive design consultancy.

The great Italian designers have rivals at last. Skills of a high order are to be found in many British companies, even though some of the names are still much better known within the industry than they are to the public. A good prototype at a major motor show is one way of changing all that. One company which realised that some time ago is I.A.D. which have shown a whole series of remarkable projects in recent years.

International Automotive Design, based in Worthing in Sussex was born 14 years ago and grew in that time from a four-man team to one of the world's biggest design engineering consultancies, now with studios in California, Frankfurt, Tokyo and Turin. It has been a phenomenal growth and has taken the automotive world by storm. The first concept car to really thrust I.A.D. into the limelight, was an extraordinary car called "Alien", unveiled in 1986. It was described as a modern compact two-seater sports car for the 1990's. And it was a startling concept in that its power plant and transmission was housed within a rear mounted pod, which looked almost separate from the tear-shaped passenger compartment.

Then, at the Frankfurt Motor Show in 1987, I.A.D. unveiled two concept cars of a sophistication which raised many motor industry eyebrows. Unlike many concept cars, one, the Impact was complete mechanically and fully driveable. The other, the Interstate, was non mobile. Impact

broadly definable as a leisure/utility vehicle and utilising four-wheel drive, incorporates many of the features which I.A.D. believe should be on production lines now, rather than too far in the future. The Impact was based on a Ford Sierra platform and used the mechanicals of the Sierra to make it fully drivable.

"THE DAY ITALIAN FLAIR STOOD STILL".

(Autocar and Motor, April, 1990)

This headline was taken from an Autocar and Motor article on the Turin Motor Show of 1990, and it dealt with I.A.D.'s biggest triumph to date, and the presentation of its most radical prototype to the world. Its Venus sports car was arguably the design star of last year's Turin Show - a brave thing, tackling the Italians in Turin and daring to win.

The first photographs of the Venus appeared late in 1989, and was then no more than beautifully constructed clay model.

"I wanted it to have the adrenaline of a jet fighter",

said Alan Jackson, (I.A.D's Director of Design since February 1989). The car was supposed to be fit for Tom Cruise in "Top Gun"; to be able to reflect the gung-ho cellulose manifestation of Reagan's America, with all its toothy smiles and "Tom Cats", short skirts and sidewinders. The opening scenes from Top Gun, with F-14s scuttling to and from an unnamed death cruiser, set to music and filmed in American glamourvision, sowed the seeds for Venus in Jackson's imagination. Quite how successfully the Venus has captured the jet fighter adrenaline is difficult to judge. Jackson was looking far beyond what he calls the dreadful old cliché of the teardrop cockpit section. What he thinks makes Venus a car fit for Tom Cruise is the detailing. The whole car with the exception of the pods that enclose the wheels, would be in a burnished pewter silver, and heavily sectioned into surface mounted access and engineering panels.

Top Gun, however, was not the only source of inspiration. Jackson alluded to the motion of a stalking panther in his brief which went to I.A.D.'s Design Studios in Worthing on the English Southcoast and

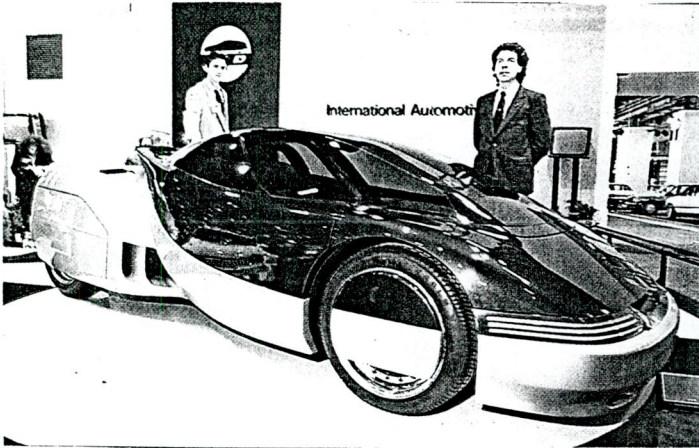


Fig. 4.1 I.A.D.'s Alien Concept



Fig. 4.2 John Shute, founder of I.A.D.

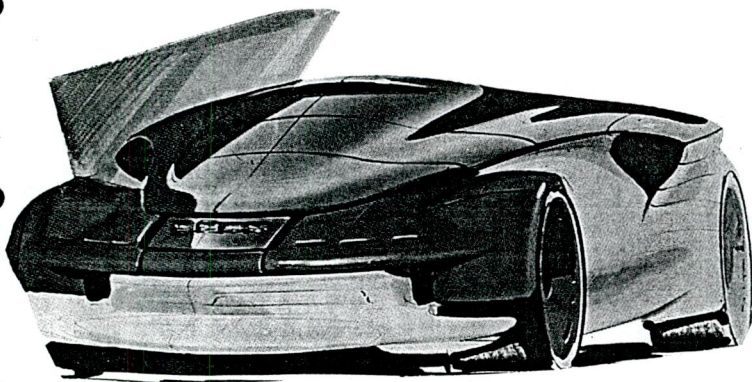


Fig. 4.3 (a & b) Early sketches of the Venus

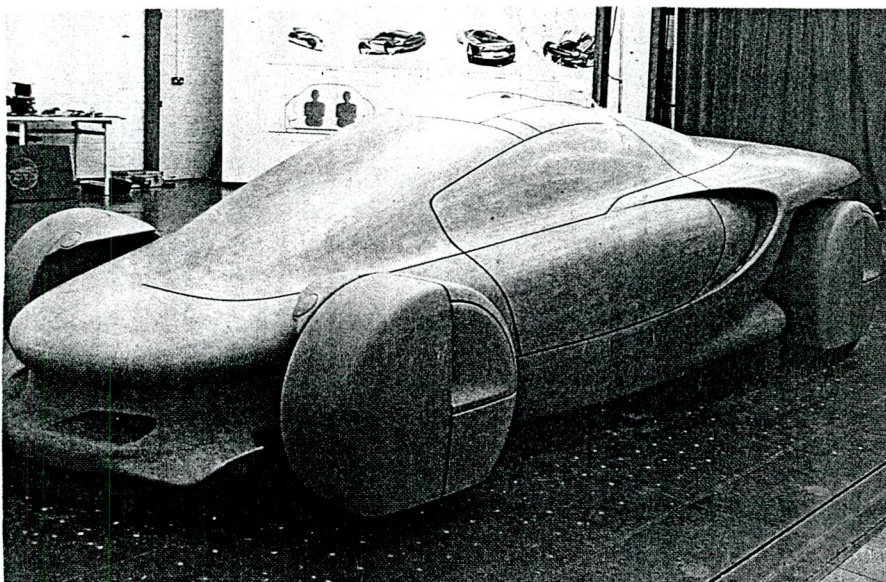
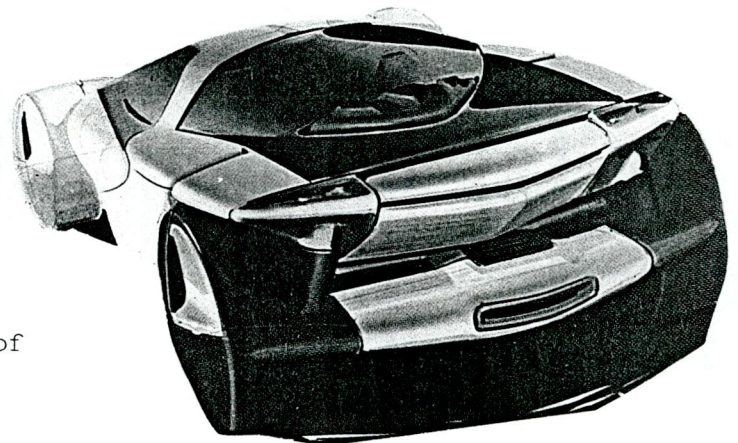


Fig. 4.4
Left: The full size clay "buck" of the Venus

Huntington Beach on the American West Coast.

The successful design, by Michael Arni, a 31 year old Royal College of Art graduate, sponsored by I.A.D., picked up on Jackson's themes of a jet and a panther and incorporated them into the front of the car. Arni's original drawings, which looked as though a manta ray had spread itself across the Venus' upper flanks, highlighted the panel joining the two-wheel pod so the front of the car would move with them, like the rocking shoulders of a stalking panther.

Arni's design developed apace and Jackson began to realise that his "jet fighter" was being conceived in Worthing not California.

"At one stage, we had a dozen designers working on the project, all of them independently, but it was obvious that Michael knew exactly what I wanted from the start"
(Star is Born, 25 Oct. 1989, p.41)

At that stage, the project had just begun and both Jackson and Arni tempered their enthusiasm with sheer business sense, "We're not selling cars as such", says Jackson, "We're selling the development of cars".
(Star is Born, 25 Oct. 1989, p.42).

Or is the Venus just an interpretation of the development? In Turin, the Venus stole the show and according to a report on the Show, (Turin - Best is British, June 1990, p.103),

"The Venus prototype looked simply breathtaking, despite all attempts to bury it at the very back of the Design Hall. Venus, outrageously well built for a show car, in its yellow GRP and black perspex looked uncomfortably quick for a car with its Lotus engine not connected to its driveshafts".

The examples of I.A.D.'s work in prototypes is similar to that of Ital Design and Pininfarina. Their Alien concept of 1986 was a publicity exercise which did not work, I.A.D.'s credibility in 1986 was not the same as it is today so the project was greeted with mixed reaction. I.A.D. then concentrated on more 'sensible' projects and so built up

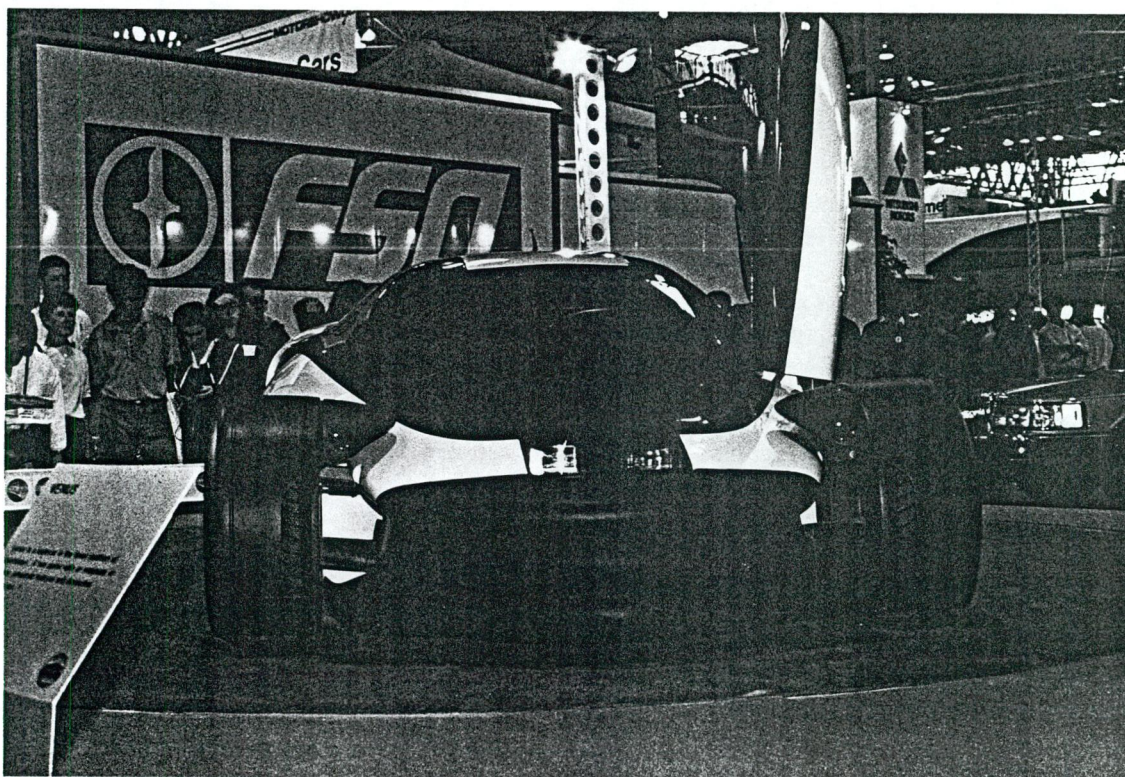


Fig. 4.5 (a) Front view of the Venus Concept Car

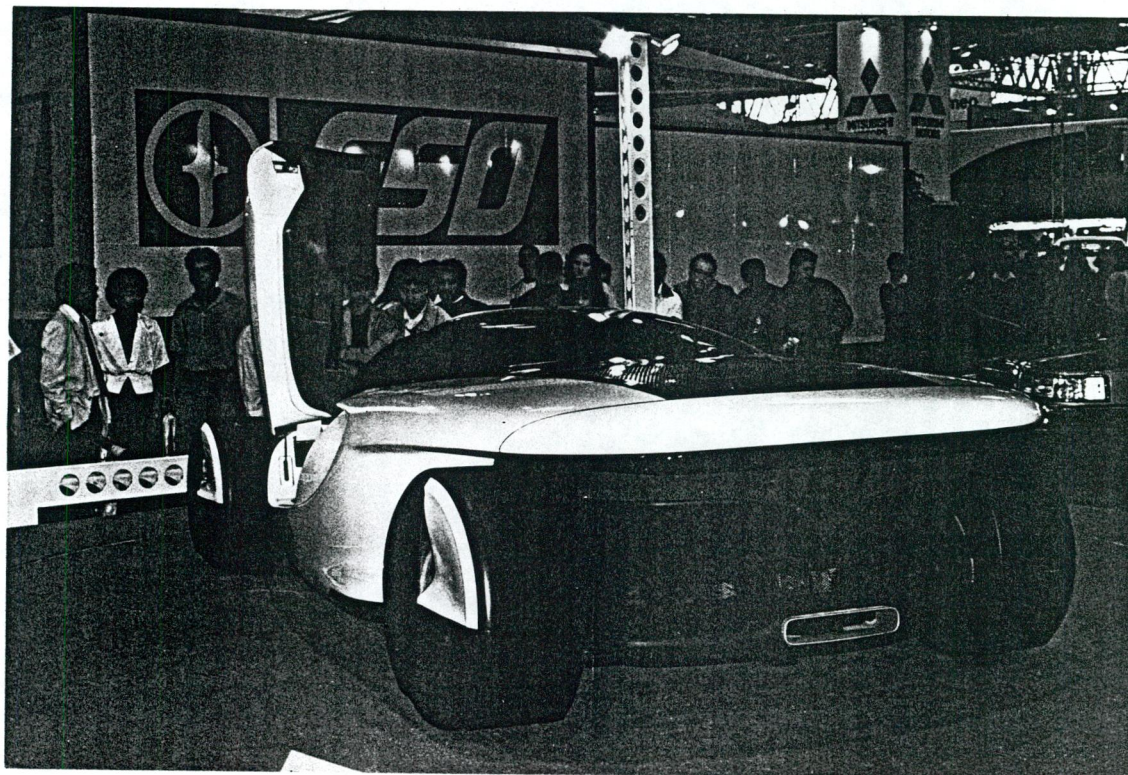


Fig. 4.5 (b) Venus finished in GRP and tinted perspex on show.
When shown in Turin in 1990, it stole the show.
Headlines included, "The Day Italian Flair Stood Still".

their credibility to a point where they were starting to be recognised worldwide.

When Venus was released in 1989/90, it marked the beginning of a new era for I.A.D. and automotive design. The Venus was an advertising tool which shot I.A.D. into super stardom. The Japanese flooded I.A.D. with work after the Tokyo Show of 1989 and when seen in Turin in 1990, European manufacturers then realised I.A.D.'s potential as serious competitors with the Italians. The Venus example is important in that I.A.D. had realised what it needed to put English automotive design on the world map, what it needed was a stunning and startling prototype - Venus was such a car.

CHAPTER 4

EUROPEAN MANUFACTURERS

While major manufacturers used motor shows to show the public their latest models, they were constantly being upstaged by the consultancies, who were showing off their prototypes. This was a time when the major manufacturers realised the real value of the prototype business and so they began to make their own. It wasn't difficult to see their worth. It was discomfoting to see crowds swarm around the design studios' studies, and be asked why they were not building machines like that. The temptation to upstage the design specialists and, at the same time, attract the crowds and gauge public reaction to their ideas was just too strong for the likes of Ford, Renault, Volkswagen and Citroen to resist. These manufacturers have consistently shown prototypes at the major shows and examples from Ford, Renault and Citroen will be used to show the general trend and direction that these companies are currently undertaking.

Two examples of prototypes will be taken, firstly, the companies' exploration into style and shape and, secondly, the companies' research into standards of technology, build, engineering, comfort and safety.

CHAPTER 4

SECTION 1: FORD MOTOR COMPANY

Designs for small cars tend to be either wild or whacky or bulbous and boring. The whacky variety rarely makes it to the showroom because the marketing men say they will never sell. As a result, we are all too often left with the boring variety. The smaller the car, the harder it is to create a pretty and practical package. The chief frustration is what to do with the engine. However, a new two-stroke unit, the size of a football, may revolutionise the approach to small car design. Invented by Australian, Ralph Sarich, it is being evaluated by Ford designers. Unfortunately, the project is so sensitive, no picture's of the engine are available, (in January 1991).
(Revolution - the Orbital Engine, Jan. 1991, p.17).

The orbital engine is so small that Ford stylists can treat the positioning of it as a secondary consideration. This news was only recently revealed to the press but Ford have for a long time, been investigating and experimenting with small car design; one such project was the Zig and Zag project.

Zig and Zag are the leisure vehicles of the 21st Century according to Ford's Ghia Design Studio in Italy. Zig, is a tiny radical ragtop, Zag, a minivan, and the key to the concept is shared componentry, (like Giugiaro's trilogy of 1988).

Filippo Sapino, Managing Director of the Studio says,

"In the future we will probably have a family of cars smaller than the current Ford Fiesta. To make production of such very small cars profitable, we should be able to build an entire family of products using as many common components as possible"
(Sapino, Ford Develops 21st Cent. Minicars, 1990, p.32)

Zig and Zag are the products of a young design team. Zig was penned by David Wilkie, a 31 year old graduate from the Royal College of Art in

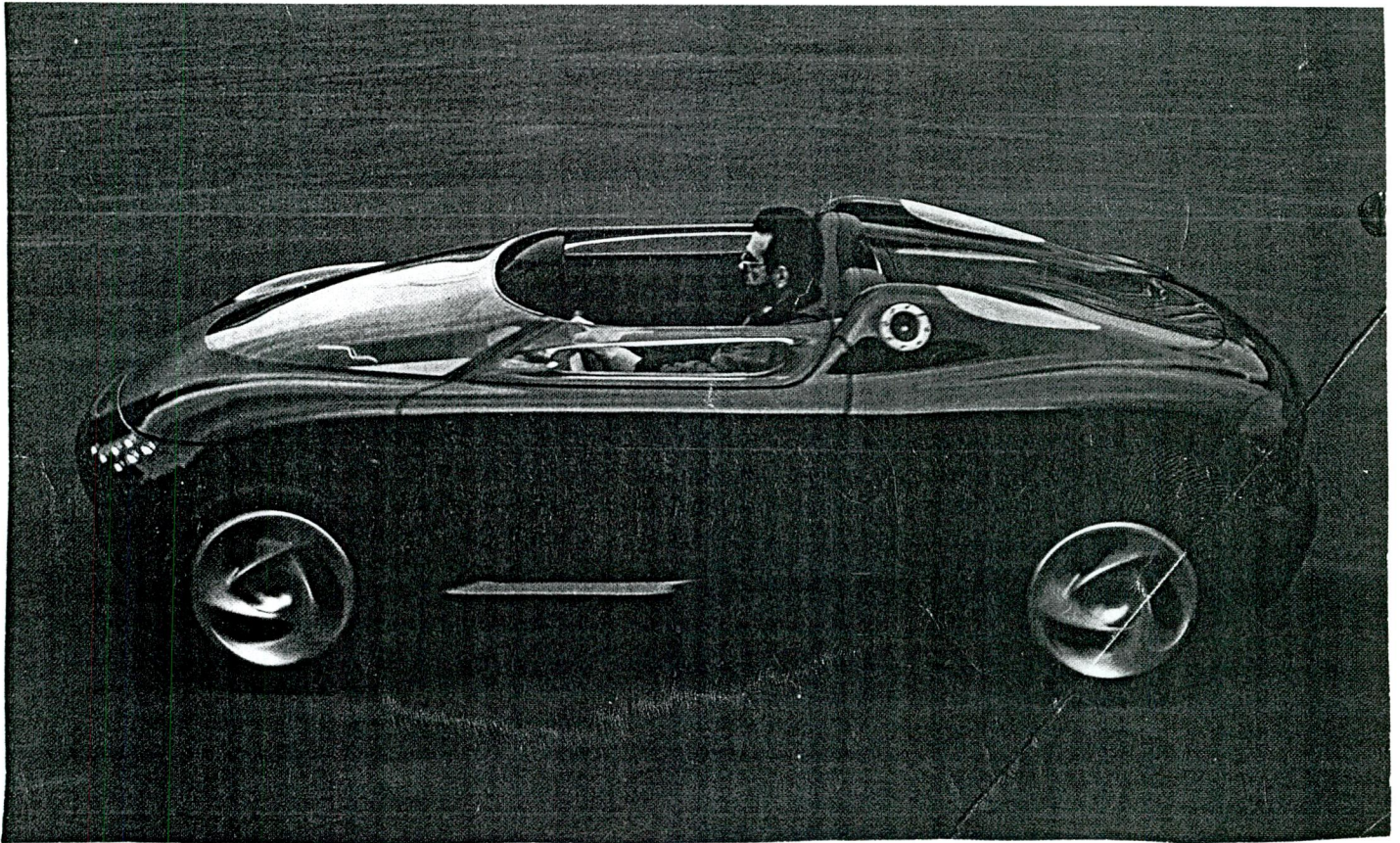


Fig. 5.1 Ford's research into small vehicles, Zig (above) and Zag (below)

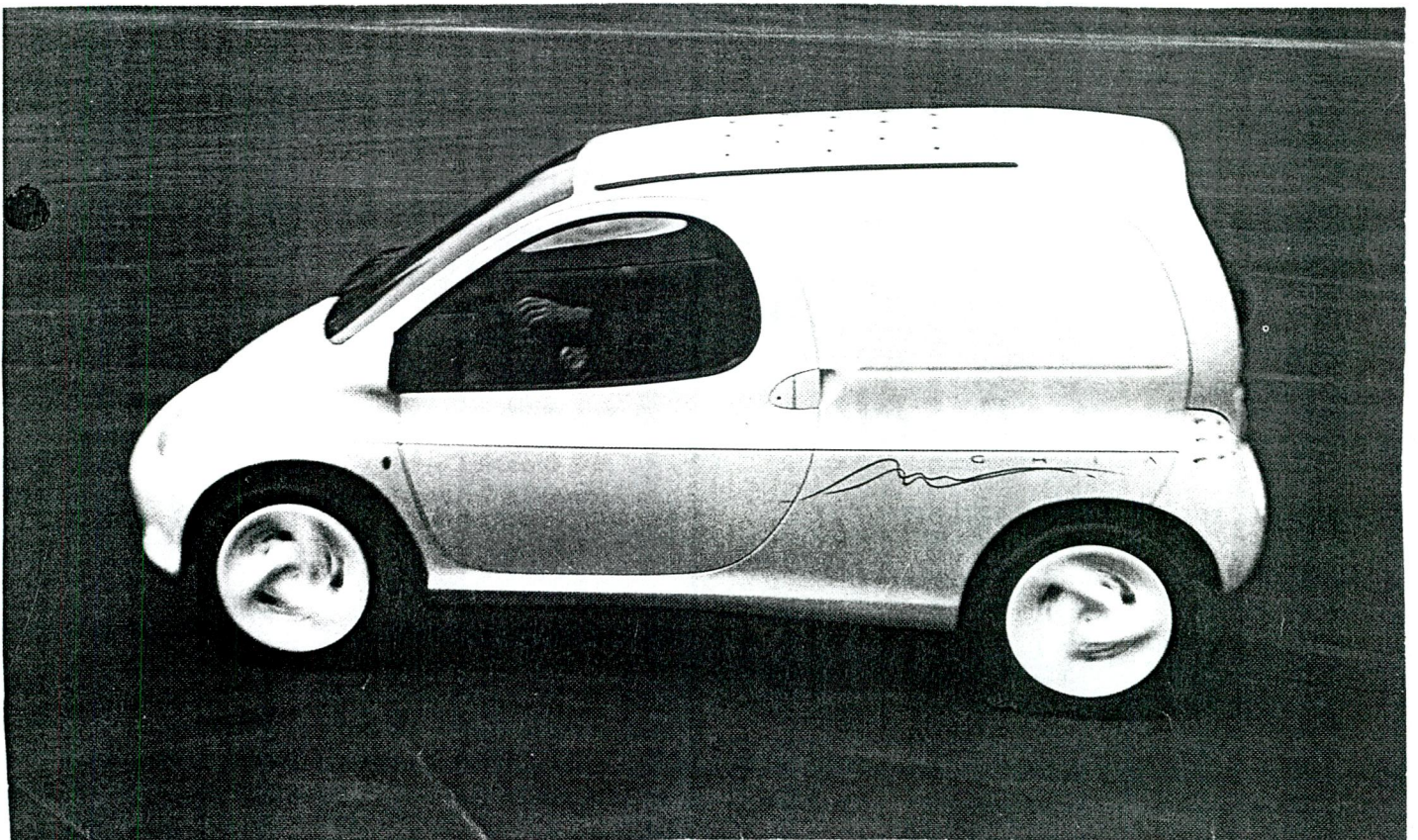


Fig. 5.2

London. Wilkie had one idea in mind when he designed Zig: to make a sports car that is fun to drive, something very close to 50's and 60's racing Barchettas. Practicality was not a priority. He explains.

"When the weather looks bad, you leave this car in your garage".

(Ford Develops 21st Cent. Minicars, 1990, p.32).

The father of Zag is Claudio Messale. 30, born in central Italy, he attended the Scuola di Arte Applicate e Design de Turino, (the sole truly respected car design school in Italy).

"When we started research in September 1989, we were thinking of making Zag a light commercial vehicle only.

The idea to transform it into a micro-MPV

(multi-purpose-vehicle), came later. Here in Italy, there is a clear trend for young people who prefer light commercial vehicles derived from passenger cars, to the true passenger car itself".

(Claudio Mesale) (Ford Develops 21st Cent. Minicars, 1990,p.33)

The third person involved in the Zig and Zag programme is Sally Wilson, 29, from England. Wilson was educated at the Royal College of Art, where she got a Masters in Textile Design. For Zig and Zag she took responsibility for the exterior and interior colour schemes. The exterior colours are to show that these are the opposite extremes of the minicar family - black for Zig, white for Zag. The interiors are radical in the extreme. Wilson loves the vibrant colours of mountain bikes and she has injected as many as possible into the two cars. The results are shocking and wildly impressive.

The Zig and Zag project gives a good example of the trend Ford are taking in research and development. The two cars show both sides of prototype design, the serious research side, in that they are exploring and developing the Orbital engine for possible production, and the styling side of the project which incorporates radical styling and colours to enhance the effect of the project when shown to public and press at motor shows. Ford are continuing the small car theme to further develop the Orbital engine.

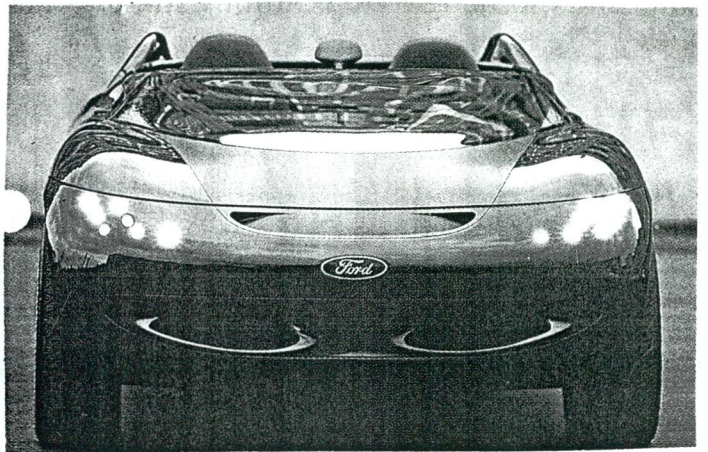
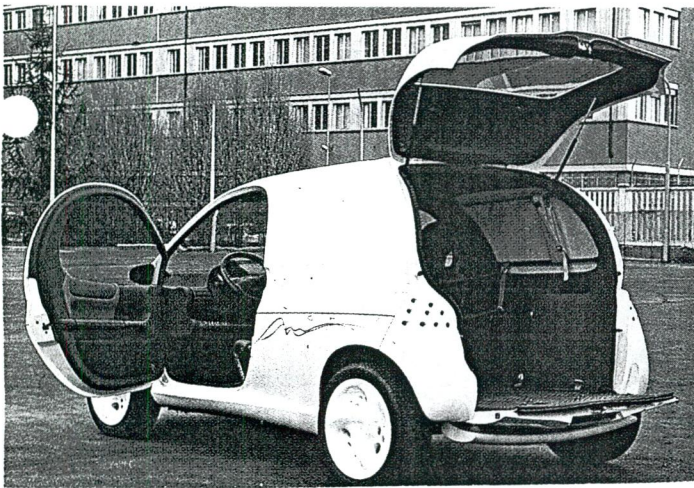
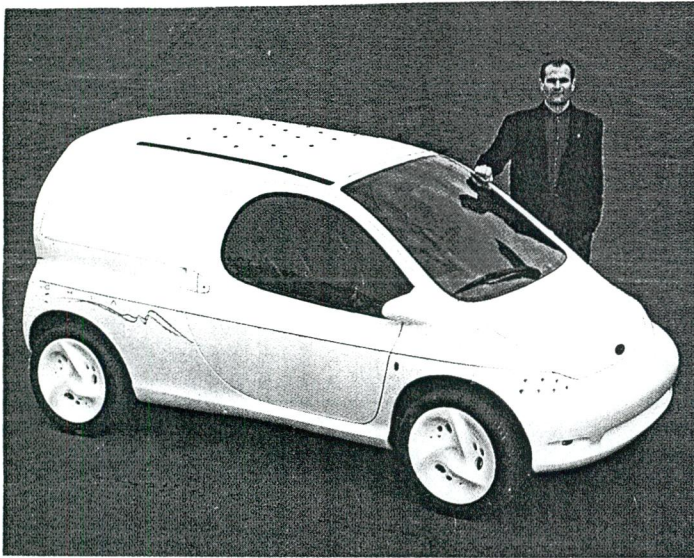


Fig. 5.3 (a) Top left: Zag designer, Claudio Messale
 (b) Top right: Sally Wilson in charge of colours
 (c) Left: Glimpse of Zag's interior
 (d) Right: Zig explores old Barchetta concept

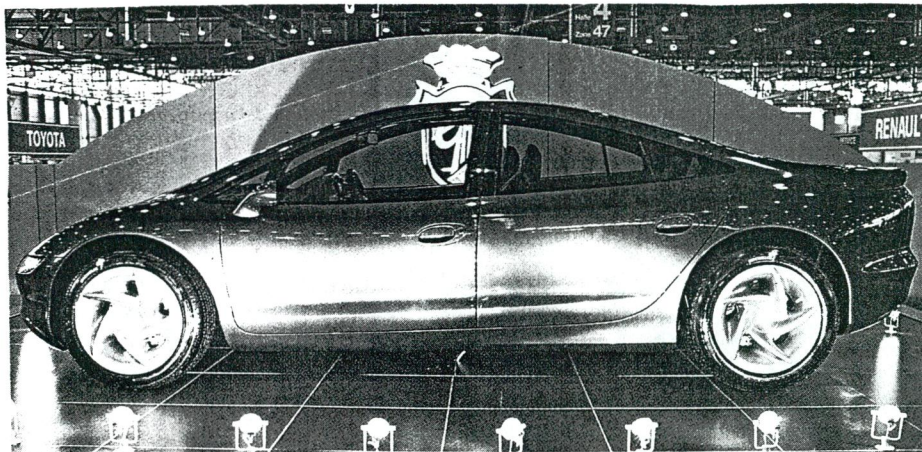


Fig. 5.4 Above: The Ghia Via designed to investigate small engine technology
 Could also house the top secret Orbital engine

CHAPTER 4

SECTION 2: RENAULT

"Renault build a better car", is the company's motto and it is evident in the cars Renault produce for research and development. The company has a simple strategy for concept cars. They plan alternate cars. First a technological showcase and then a car as they describe it, with real passion. The two following examples show the strategy of the research and development department at Renault.

"Megane - A Glimpse of the Future"

Megane, a mobile laboratory and Renault's window of the future, is the shape of the "more to life" car of the 1990's. In this continually evolving experimental car, Renault has brought together many innovations which are still under development, but which, when their reliability has been proved, will be used in production cars to increase safety and comfort.

Some of the car's features are as follows:

- * Intelligently controlled suspension which can switch between any of three suspension settings, from very firm to very soft in 20 milliseconds.
- * Safety tyres which can run flat and whose inflation pressure is constantly checked.
- * Four-wheel steering, affording better manoeuvrability and superior handling.
- * Variable steering assistance.
- * Driver aid systems to inform the driver of traffic conditions, the operation of the car, and allow him to communicate with other vehicles.
- * Anti-sleep surveillance system based on continual monitoring of steering wheel movements.

It almost has an endless list of safety and control systems, and it also has very pure lines with a Cd of 0.21. It is according to Renault, the kind of car everyone should be driving very soon.

On the other side of the coin, Renault have started the search for their own design in the 90's, i.e. looking for a familiarity of form for all their cars. With this study in mind, they stole the show in Paris in 1990 with their Laguna prototype. A study on the sports car for the 90's and beyond, the Laguna uses state-of-the-art construction and materials to search out the shape of a contemporary sports car.

It sits an amazing 38 inches high and puts the two seat cockpit well forward in its 161 inch body. The low slung front is a result of Design Director, Le Quememt's radical approach to open air motoring. There is no windscreen as such, just a six inch lip in the same silver polycarbonate that firemans' helmets use to such strong effect. When the car is closed up, the lip marries up to a sliding silver polycarbonate tonneau to enclose the interior fully.

The tonneau slides back over the engine cover when the Laguna is running, leaving driver and passenger open to the elements. There are visors provided that include what Renault has patented as "cruising stereo". The visors include pick-ups for Laguna's infra-red radio transmitters.

These examples illustrate the direction of Renault's future in car design. The Megane contains comfort and safety systems that Renault plan to incorporate in future cars. The Laguna, which at first inspection would just seem to be a styling exercise with some electronic gadgetry, seems, however, to have features that Renault plans to show in the not too distant future, judging by its patent policy.

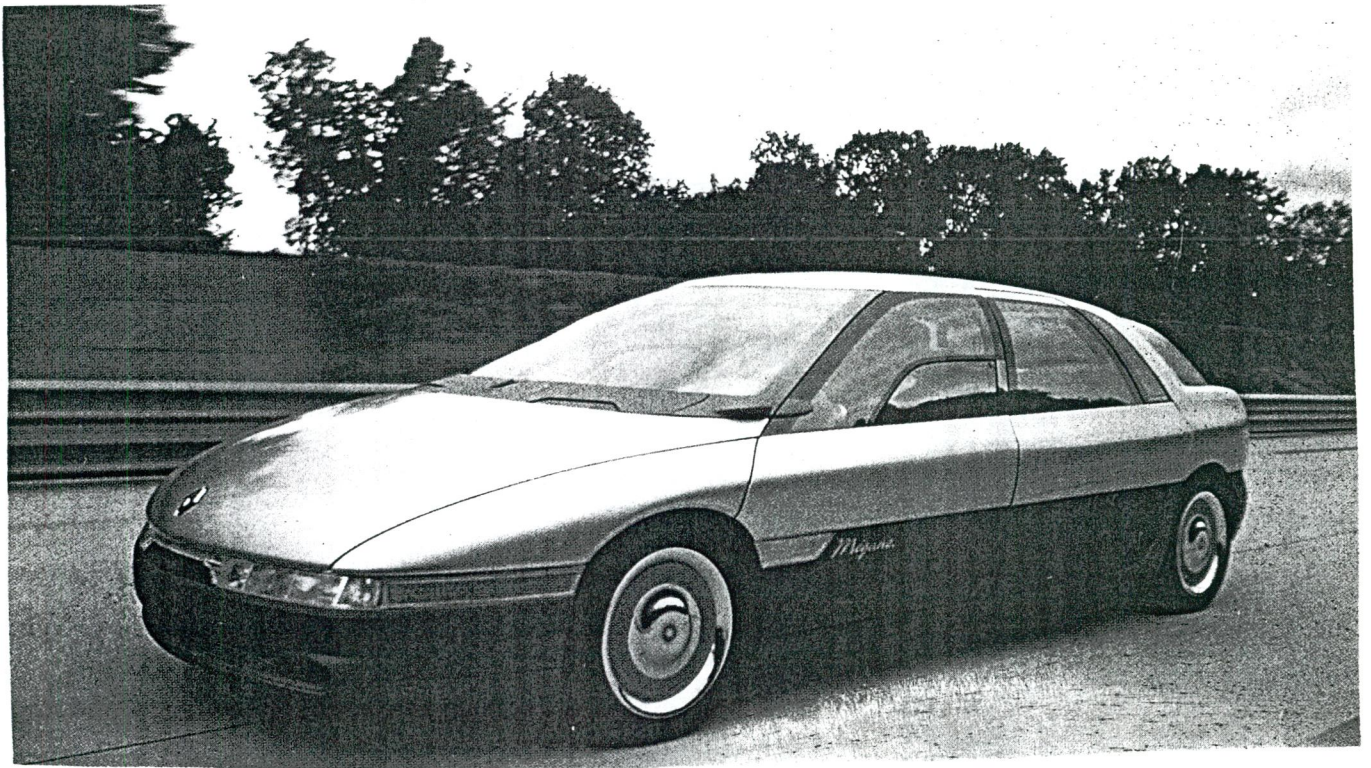


Fig. 5.5

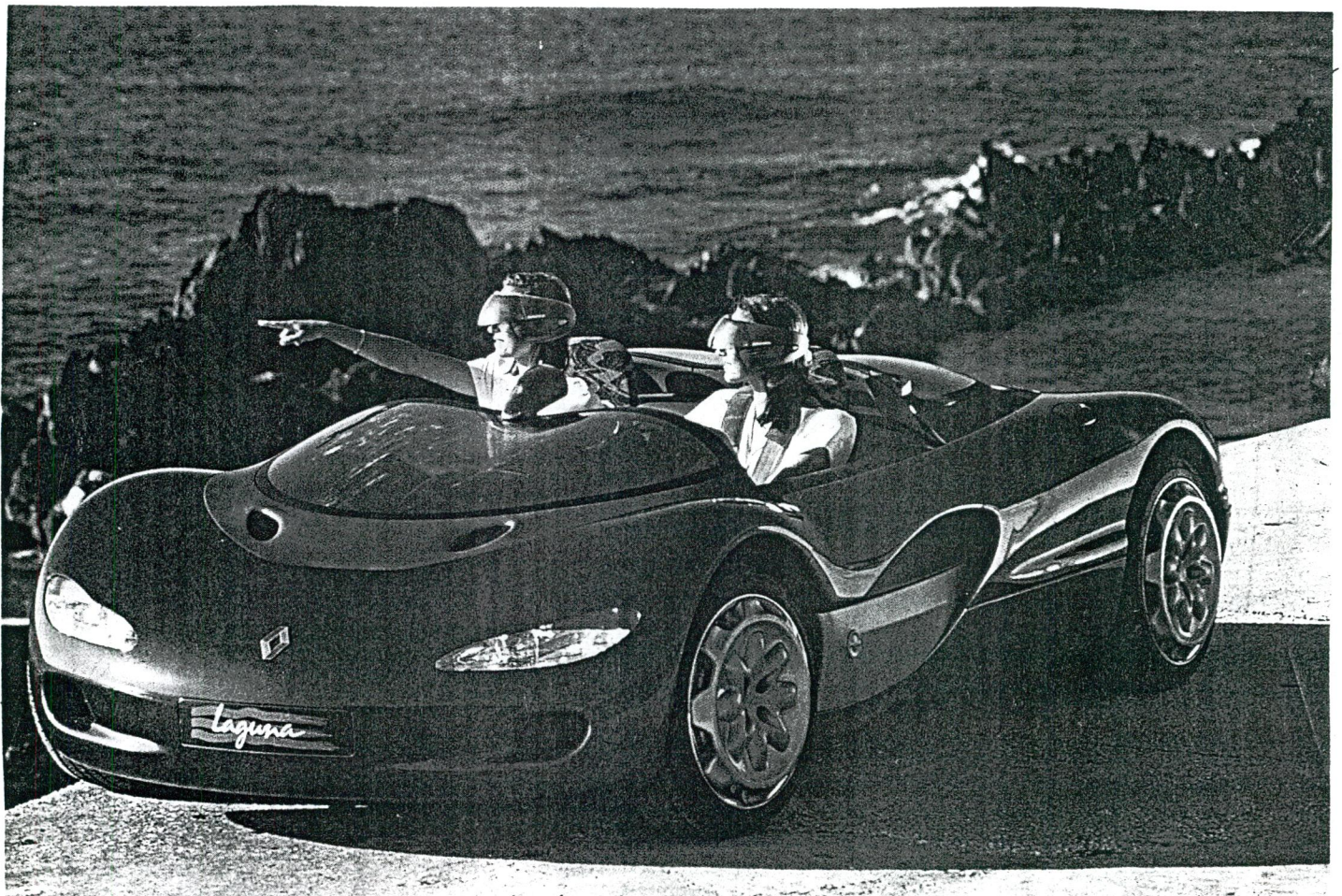


Fig. 5.6 Renault's progression of concept cars, the Megane (top) and the Laguna (above)

CHAPTER 4

SECTION 3: CITROEN, EUROPE'S MOST ADVANCED CAR MANUFACTURER?

Citroen has been called Europe's most advanced car maker, simply because of the technological and design aspects that have always been a strong feature of Citroens of past decades. Citroen is almost the only car manufacturer which have always produced dramatic and dynamic designs, some of which have gone on to become design classics, such as the SM of the 1960's.

Citroen cars are very distinctive and always have been. Technological advances such as hydropneumatic suspension, ergonomic research and futuristic manufacture processes have always been seen in Citroen prototypes, but these features seem to find their way into production models dramatically quicker than other manufacturers advances. The reason for this prompt use of technology must be down to Citroen's attitude to prototype cars. The best illustration of this idea is the Activa concept.

When revealed to the world in 1988, the Citroen Activa was described as a motoring dream come true. The Activa became the world's first true "drive by wire" car. Jet airliners and fighter planes rely on hydraulics controlled by computers sending instructions along wires for every flying manoeuvre so Citroen decided to develop a system to be used in cars.

It is steered by computer-controlled hydraulic pressures that also provide its suspension and anti-roll systems. Activa is a Jaguar size luxury saloon developed to prove how electronic hydraulics are set to revolutionise Citroen cars to come. The on-board computers control everything, and especially the four hydraulic pumps at the wheels, so that when you turn the steering wheel, computers signal wheel and anti-roll pumps to apply pressure to turn the wheels while keeping the car absolutely level.

All four wheels turn in a finely balanced way with the computerised systems responding to any movements in tune. When cornering, there is

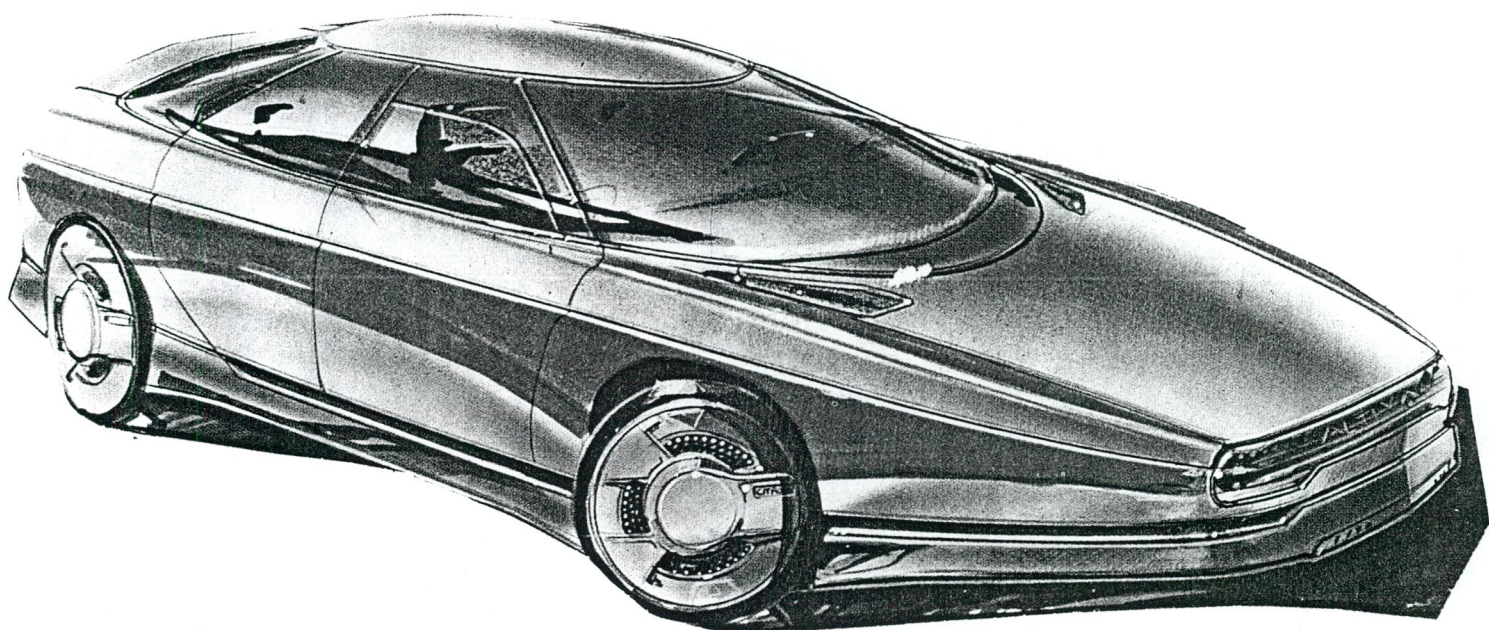


Fig. 5.7 (a)
Early sketch of the Active

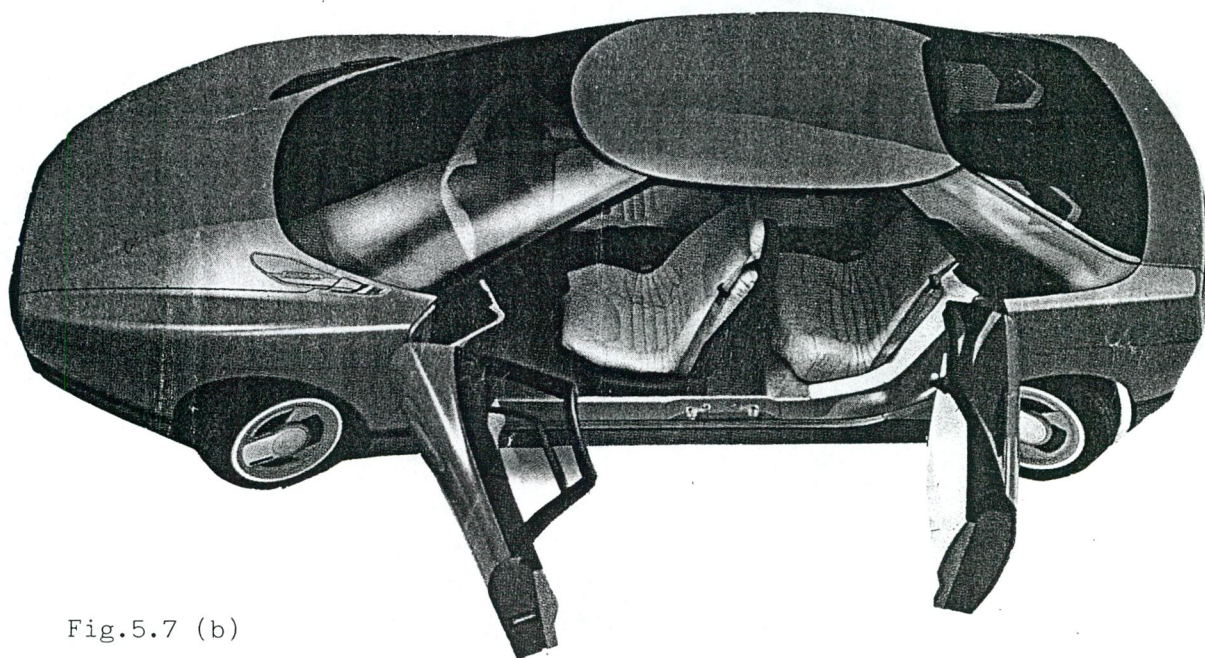


Fig.5.7 (b)

Above: Running prototype of the Active, "Without central pillar getting in and out is so much easier".

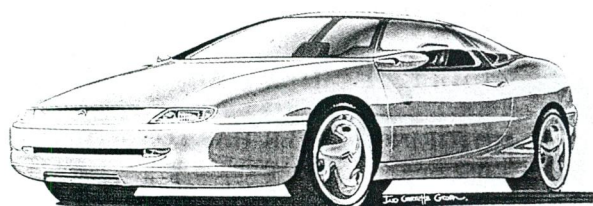


Fig. 5.7 (c) Development of Active concept
towards Active 2

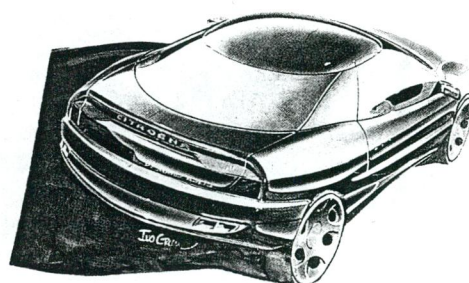


Fig. 5.7 (d)

no pitch. The car glides round the sharpest turns totally upright. Result: uncannily smooth, near silent travel that is only two to three years away, according to Citroen.

Other features, all computerised, include: car navigation to guide you anywhere in Europe, head up display, safe distance radar, anti-lock-anti-skid brakes and self diagnosis. (A computer tells you when a component requires attention or repair).

Not only does Activa have a computerised telephone but also a push button automatic restaurant reservation and ticket booking system that is operating in Paris now - plus keyless locks and a composite kevlar body with no door pillars, making getting in and out so easy.

Activa 2 is the follow up and was given a public viewing last year in Paris. Like all second generation Citroen concept cars, the focus has narrowed for Activa 2 which now presents only those innovations which Citroen believes can be incorporated in its next generation of production cars. Notable among these is the fully active suspension.

Citroen opted to abandon Activa 1's rectangular steering wheel, also the Activa 2 is made from steel. It is also a sports or coupe version of Activa 1. But the unusual push-button activation for the four-speed automatic transmission remains. Above it on the centre console, a colour display screen and buttons offer access to four separate channels controlling air conditioning, in-car entertainment, carphone and navigation systems.

It was described as a tragedy by several car magazines that Citroen had no plans to put the Activa into production. Citroen explained that it plans to keep the standard of its existing models as high as possible and that the Activa or something similar may go into production some day, but that its features were going to be used in production models of the future.

The Activa and Activa 2 show Citroen's commitment to remaining one of Europe's most advanced car manufacturers. Citroen first product a prototype which would be about 20 years ahead of its time and, as research would continue, they would eventually end up with a

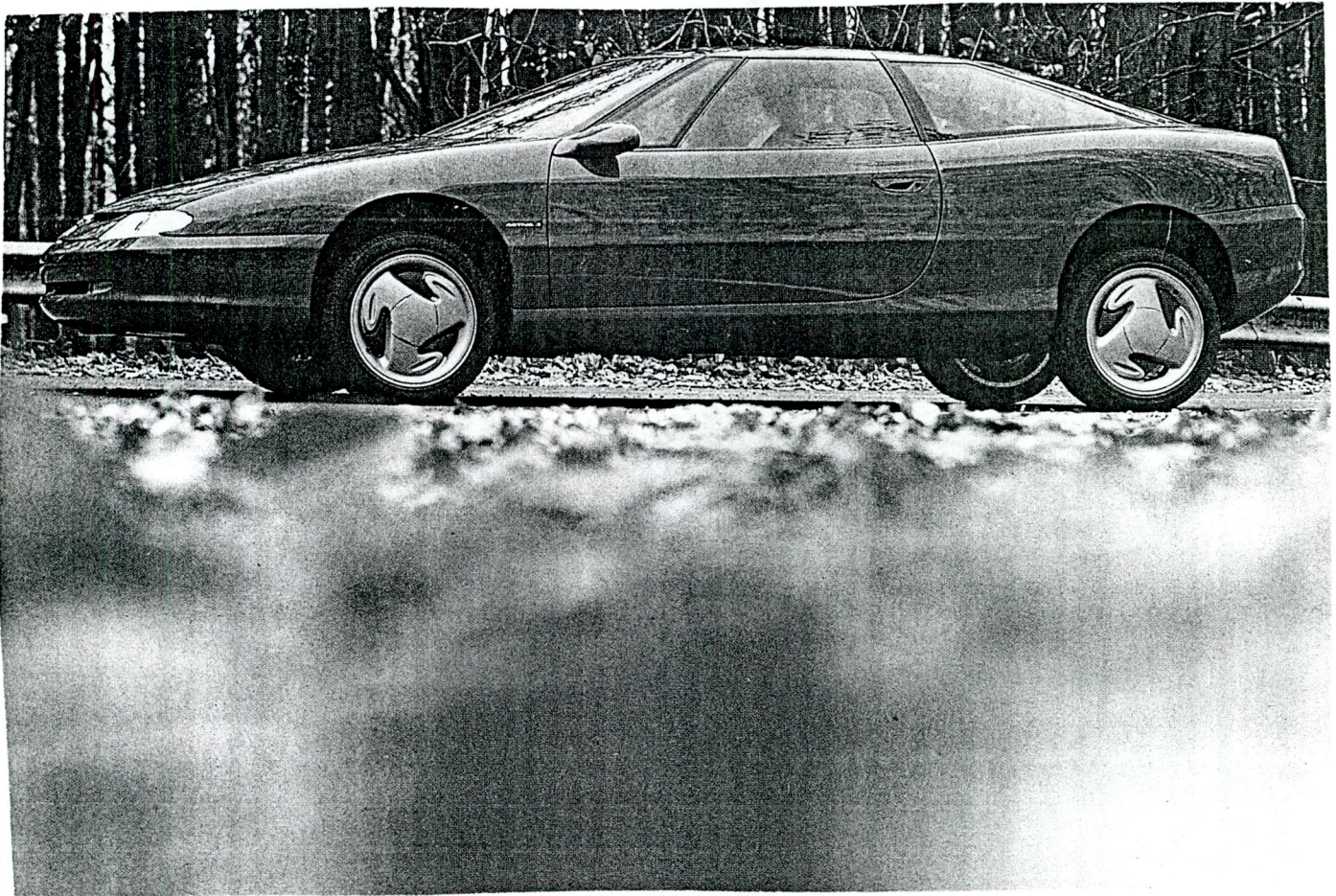


Fig. 5.8 Activa's successor the Activa 2

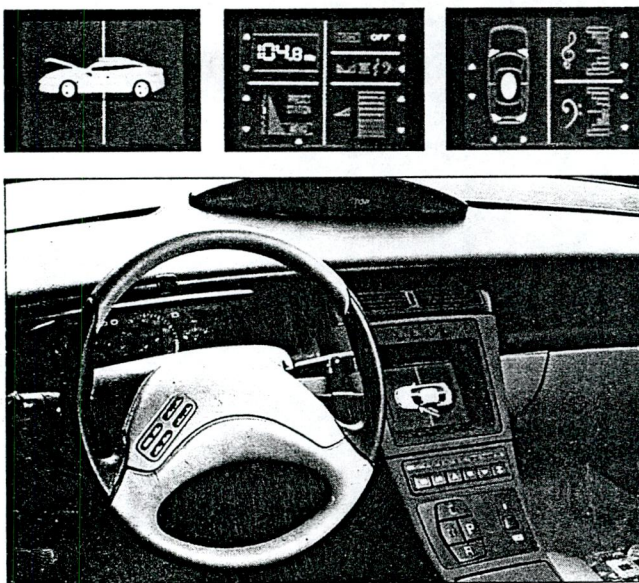


Fig. 5.9
Left: Ergonomics are good in dash layout. Top three figs. show the car monitoring system.

It has been described as a shame that Citroën had no plans to produce Activa 2 but Citroën hint it may produce a coupe similar in "about ten years or so".

contemporary car which would be suitable for production. The Activa realised all the latest advancements Citroen are developing for the future of the car, the Activa 2 took the advancements which could be incorporated into production cars in three or four years' time. The fact that they do not plan to produce the Activa 2 is not relevant, their explanation is that they intend to keep current production models at a very high standard so they cannot afford to invest into a niche market at present. The innovative features, however, will be incorporated into future production models, according to Citroen.

CHAPTER 5

PRODUCING PROTOTYPES

Although the likes of Ford, Renault and Citroen have all developed and shown prototypes at major shows, some companies like BMW, Alfa Romeo and Volvo have publicly rejected the whole idea of concept cars, even if the occasional 'concept-like' car does slip out of their design shops. BMW's Z1 sports car has futuristic looks and uses state-of-the-art composite plastics and technology. Alfa Romeo's SZ 100 has extremely radical looks and is described as a new brutalist sports machine. Volvo's 480 Series, broke the mould for Volvo as it is totally unlike anything they have ever done before.

As BMW's spokesman, Axel Engel says,

"We don't do concept cars in the form you might expect. What we do is have prototypes, that are produced not for show reasons, but for research reasons; cars that will improve the car in the future. We had one design study that went on show, that was the Z1 but that was the only one, and it went into production".

(Z1 Plus Some, 1990, p.26).

In recent years, we have seen more and more prototypes on the big manufacturers motor show stands. Mostly they have been idea cars but some - like the three aforementioned - have turned into production designs or at the very least influence these designs. Ford, for example, saw enough promise in public reaction to its Probe III of 1980 to use its shape and much of its detail styling features in the Sierra - quite a contemporary and radical design when it was launched in 1983.

It would be very wrong, however, to assume that every prototype was a slightly disguised production car to come. These days, prototypes are there for their technology as much as for their shape and styling. These three examples are exceptions in prototype design. It was, however, important to mention them as it shows that concept cars can and do become actual production cars.

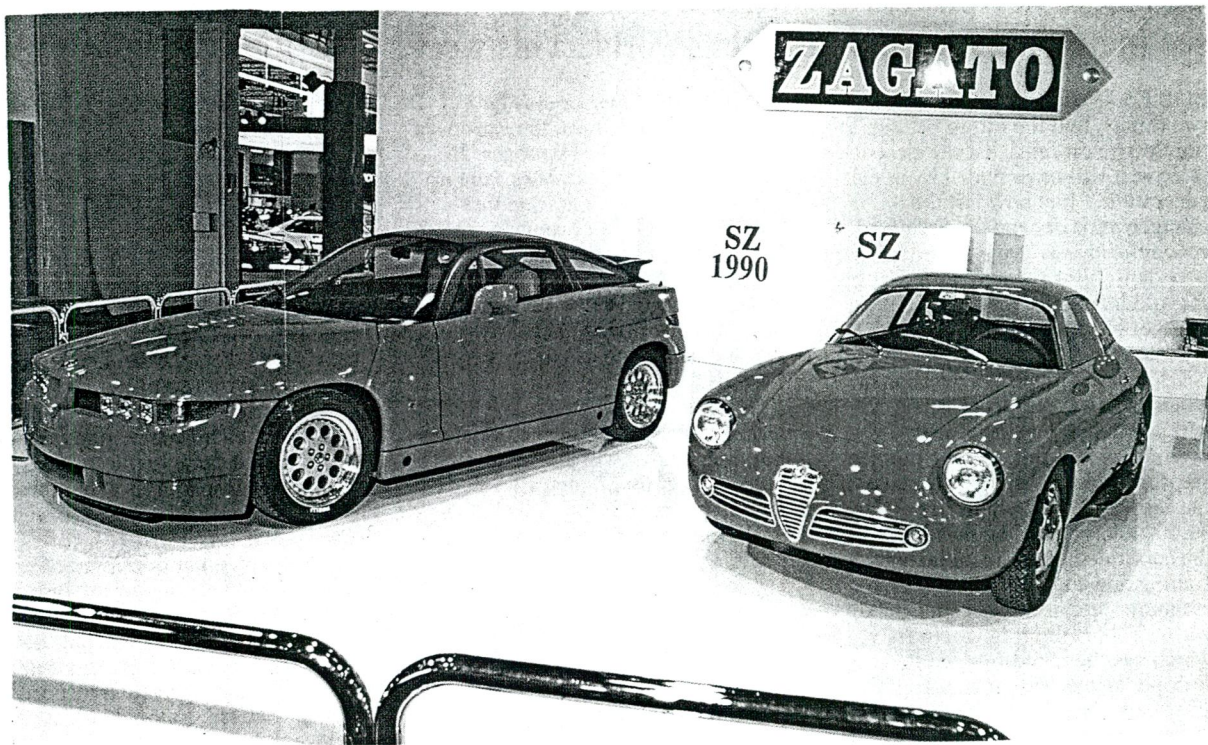


Fig. 6.1 Above: Alfa Romeo's "New Brutalist" SZ 100 (left), Sz of 60's (right)



Fig. 6.2 Above: BMW Z1, a marriage of contemporary styling, and technology



Fig. 6.3 Volvo 480: "Unlike any other Volvo"



Fig. 6.4 Ford's Probe III directly influenced Sierra

PROTOTYPE BUILDING

Prototype building has come a long way from the bad days of the 1970's when some of the most beautiful of showstopping specials had bodies made of chicken wire and plaster.

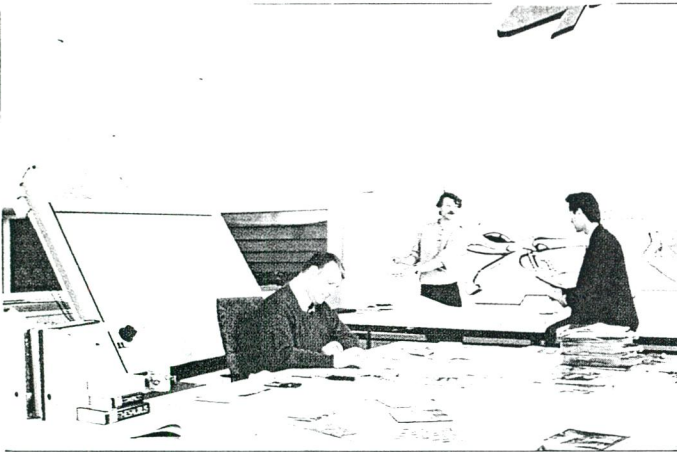
No company of stature would dare do that today. Technology rules. They show the public their most advanced ideas for driver comfort and information so the car must look the part. It must convince the public, by its appearance, that it could do all that is claimed by the company. This is why most prototypes these days are runners, (actual working cars). To show that these prototypes are special, they are usually the centrepiece of an animated display and are not accessible to the public, as it is the only one of its kind and usually worth several millions pounds.

How is a prototype made? Whether it is a small design studio or a major car manufacturer, the process is much the same. Prototypes are designed and built by small groups of highly skilled enthusiasts, often working under great pressure to get it finished for public display at the various big motor extravaganzas each year. The big company cannot commit its whole design and prototype engineering departments to a one-off project; it calls together some of its best young people, tells them what is required and gives them what amounts to a corner to work in. This gives the young blood of the company a chance to prove themselves so these projects are always approached with great enthusiasm. As the designers are relatively young, they still have the freshness to come up with ideas that experience might temper. In colleges, the students of automotive design are encouraged to be as radical and creative as possible and these influences usually carry through to their early careers.

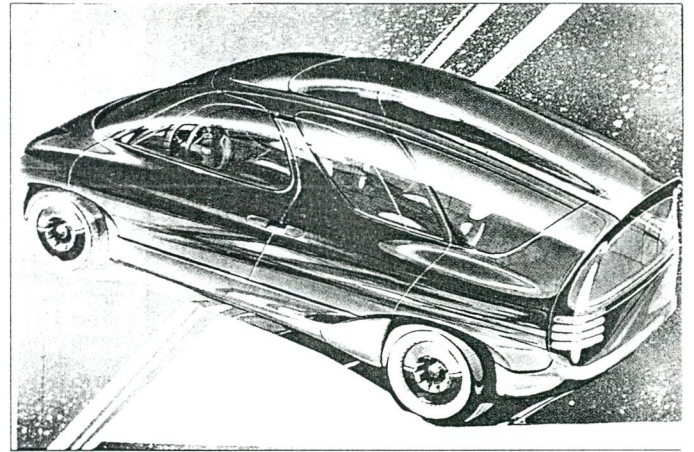
Because of their enthusiasm, ideas come quickly. The generation of ideas, sketches and proposals pose no real problems. Most prototypes use existing mechanical parts like: engines, gearboxes and suspension units. When initial design ideas have been chosen, development work on detailing and the interior begins. Various mockups and test rigs

Fig. 6.5 (a) to (h)

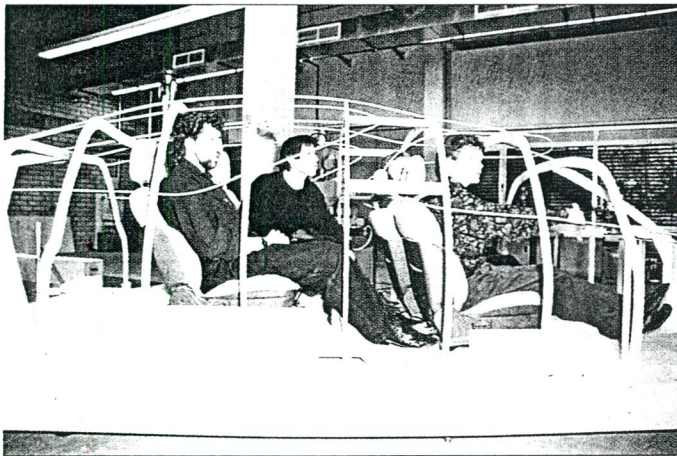
From idea to prototype: the development of a concept car



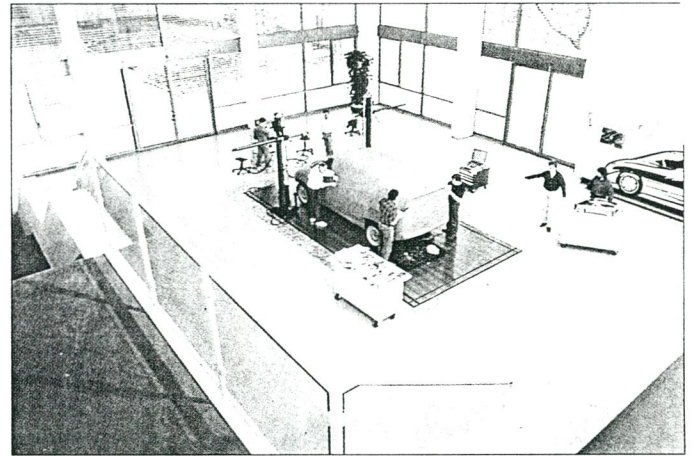
The design team at work



Initial design ideas



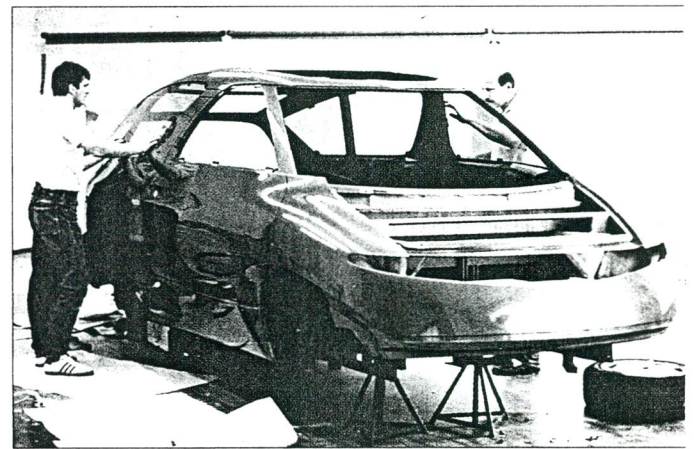
The development team try the seating buck in preparation for building the clay model



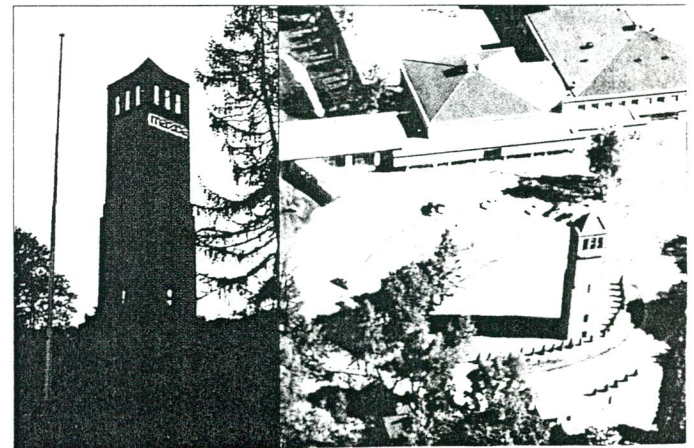
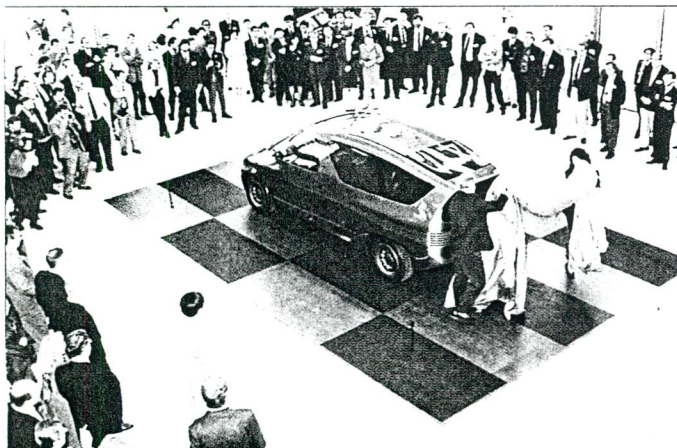
1:16 clay model in one of the three model rooms



Colour and trim being chosen



Building the final model in fibre glass



examine things like seating set ups and layouts of controls. When the design has been finalised, a scale model made in clay is produced to realise the size and shape of the proposal. After the full scale model has been passed, the clay buck is then used to mould the various panels used in the prototype. The materials chosen are usually composite plastics, as they are quicker and cheaper to produce than steel pressings. While the car is being assembled, colour and trim are chosen to enhance the overall effect. Finally, additional features such as electronic systems to control, advise and aid the driver may be incorporated.

The final stage of the presentation is how the car will be seen at the motor show. Usually, the cars are placed in an elaborately built stand at the centre of the company's space to promote it.

In recent years, the competition to steal the limelight at motor shows has heightened to incredible proportions with some companies displaying more than one prototype, in the hope that they can win public approval. It has, however, proved more difficult than anticipated. The design specialists are a hard act to follow and since the manufacturers have realised the potential worth of prototypes, millions of pounds are pumped into research and development every year. A good example of this kind of investment, in recent times, has been seen in Japan; they are now trying to take on the world of car design at every level.

CHAPTER 6

THE EMERGENCE OF NEW BLOOD

Japanese car design has had a reputation of mundanity and blandness. The "as long as it gets you from A to B" philosophy was in definite evidence in Japan. Most of the Japanese manufacturers had concentrated on small car design and with these they infiltrated the world's car industry. In recent years, however, Japanese design has turned full circle due to massive investment in research and development and they are now competing at every level of car design. The suggestion of a Japanese supercar about 20 years ago would have put many a smile on European manufacturers' faces, but the Japanese have succeeded in wiping that smile and turning it into a worried frown.

The Honda NSX is a graphic example in production. Another example, although only a prototype, is the Mitsubishi HSR II, a running test laboratory which, by actively controlling the air which flows around the exterior of the body shell, provides previous unattainable degrees of stability, cornering and braking performance.

The HSR II also features a system which actually alters its body shape according to its running status, the body is fitted with various wings, spoilers, canards, flaperons and venturi flaps to provide optimum control according to whether the vehicle is moving in a straight line, cornering or braking.

The HSR II in addition has a system on board called OCS II, (Onboard Cybernetic System Generation II). The system aids the driver in that it has an auto driver function, (similar to an auto pilot system in aircraft), and a service function which presents the driver with endless amounts of information relating to the interior and exterior of the vehicle.

When shown around the world this car shocked and stunned many people with the level of electronics used in the car. The critics commented that the endless list of electronic gadgetry was just to cover up bland

styling. Whether it is or not is a matter of personal opinion but one thing is certain, the Japanese have worried a lot of manufacturers in Europe.

Another example of Japanese design is by Suzuki. Suzuki had always been famous for its motorcycles, but then slowly it began to edge into the car market, with tiny mini rivals, but all that is changing at Suzuki. In Birmingham in 1990, Suzuki revealed its largest car to date, named Constellation.

Constellation is a complete multi-purpose vehicle that anticipates the design of future cars, estate cars and hatchbacks. It is a sports hatchback when in city streets and a versatile compact cross country vehicle with wide ranging versatility in many varied driving environments.

Commenting on the concept of the Suzuki Constellation and its advanced and sophisticated specification, aerodynamic styling and compact dimensions, John Norman, Chief Executive of Suzuki G.B., says the vehicle provides an exceptional and exciting indication of how Suzuki's technical expertise, product strategy and entrepreneurial design ability will lead the company into the 21st Century.
('Unique Concept', 1991, p.35).

Features on the Constellation include dual thread tyres for on and off road facility, navigation systems, TV/VTR and telephone/Fax and CCTV cameras for monitoring rear views.

"When the Japanese design something they don't do it by half", Giorgetto Giugiaro once said. "And the example that springs to mind is the Toyota 4500 GT"

Described as one of the ugliest prototypes ever made, (which in itself is a huge statement), Toyota remain unmoved by the conflicting opinions.

Toyota made a total of seven 4500 GT cars, five of which were runners and each valued at flmillion, which seems a substantial investment in what seems to be a handful of concept cars. The technology, however, can be readily incorporated into a production car, according to Toyota.

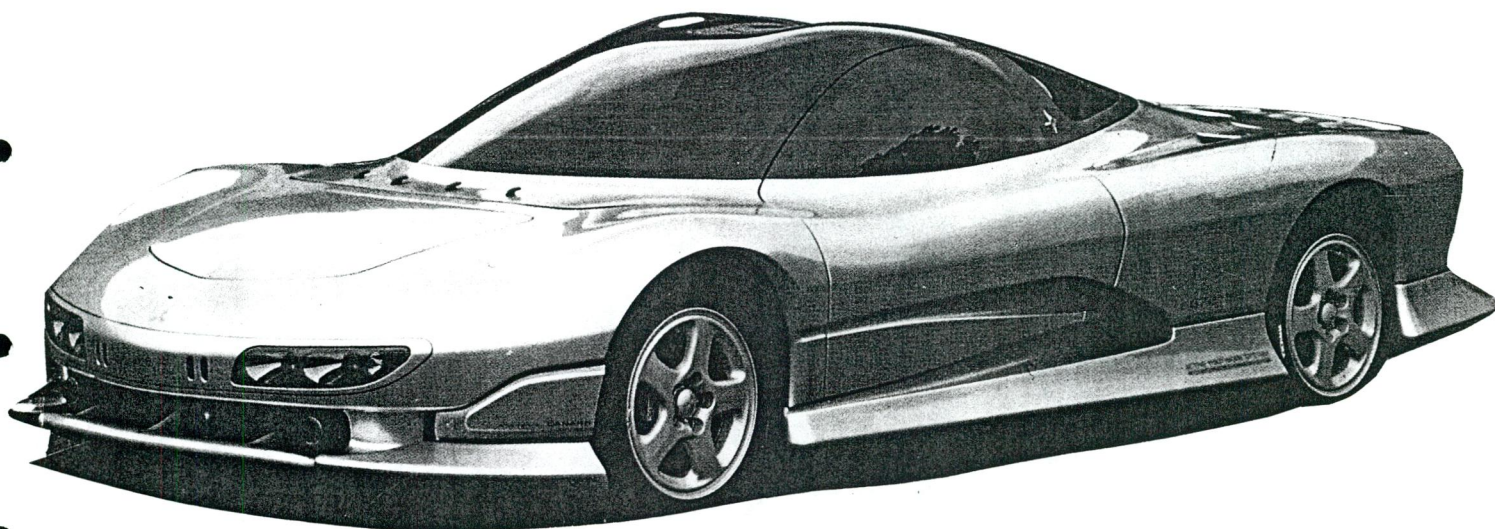


Fig. 7.1 Above: Mitsuibishi HSR II. Could it be America of the 50's all over again?



Fig. 7.2 Suzuki Constellation

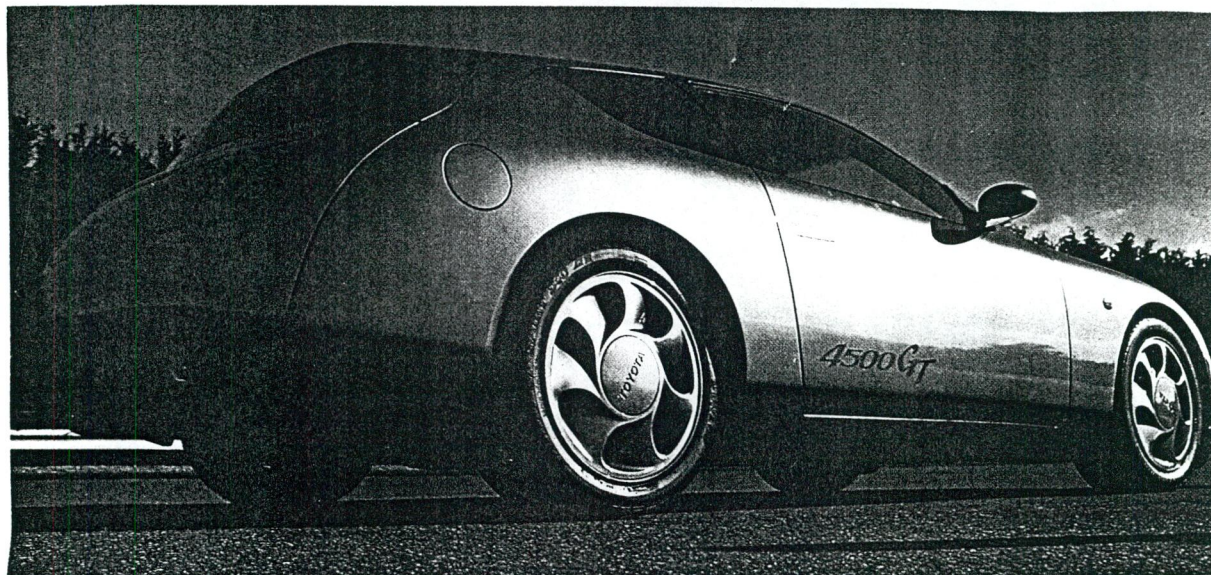


Fig. 7.3 Toyota 4500 GT: Was heavily criticized when shown in public.

Above all else though, it is the shape and styling of the 4500GT which puts it on the map. If you think this low-slung aero creation looks like nothing else on earth, stylist Akahira will smile. For that, believe it or not, was precisely the effect he wanted to achieve when he designed it.

"Essentially, I wanted to come up with something that nobody had ever seen before", says Akahira.

Many critics agreed and some even hoped they would never see anything like it again. ('Rough Diamond' 1989, p.54).

These three examples of Japanese prototype design show the level of Japanese design at the moment. They go for complete solutions, some would describe them as extreme. Concept cars, however, are meant to be extreme, exploring all options and possibilities. To this end, Japanese design has that much right. The question that remains is could these extreme examples of Japanese prototype design put Japan into the same position America was in the 50's. Extreme kinds of concept cars could ruin the budding car industry in Japan if they were thoughtlessly released as production cars.

CONCLUSION

As illustrated by the examples of prototypes used in this the text, prototype cars are no longer the dreamy concepts they used to be. In the past when it was sufficient to show merely a mock up made of plaster or clay, these examples were simply examples used only for publicity, as they did not address problems such as materials, technology or manufacture. Today, however, there is a completely different standard. To even impress slightly, the car must address aspects of design and manufacture. To become a classic prototype it must be a runner and it must represent development in all aspects of future car design, i.e. the elements of technology, build, materials, safety and style. The opening examples penned by Giugiaro - the Aztec, Aspid and Asgard, represented a philosophy of future design which was praised highly when revealed to the public. The idea of common componentry, with different outer shells, worked very well, so well in fact, that the Aztec went into limited production in Japan last year. These examples, therefore, were the result of serious research and do give us a vision to the future role of the car.

When Giugiaro unveiled the Kensington, the reaction was mixed. Giugiaro's main reason for tackling a Jaguar was for personal satisfaction, although it did attract a number of lucrative clients. The Jaguar Kensington did, however, impress a lot of people who believe Jaguar should be producing models as radical as that. Therefore, it could affect Jaguar's thinking and could influence future models. The fact remains though that the Kensington was basically an advertising tool as Giugiaro said he wanted to show what he could do with a high class saloon.

The Bugatti ID 90 is similar to the Kensington in that it was conceived and built under total freedom. It was a powerful advertising tool for Ital Design because it attracted a contract from BMW, who are currently working with Giugiaro to replace the M1 and first pictures of the car show lines similar to that of the ID 90. Thus this example shows both sides of the argument, it attracted a client to sign a contract and it also seems to be influencing the car they intend to produce.

In Pininfarina, there is a contrast to the Giugiaro way of thinking. The projects they have set themselves and the prototypes they have produced have all been done with serious research and development in mind. The HIT car based on Lancia mechanicals was an in-depth study of new materials and technology. Fiat were so interested in that project that they have commissioned Pininfarina to design a coupe very similar to HIT, to be released in 1993.

The Mythos, although just a styling exercise also contained depth in the fact that they were exploring the Barchetta concept and with the Mythos, put forward ideas about form following function. Because of Ferrari's relationship with Pininfarina, there is no doubt it will affect Ferraris of the future. Examples of this influence were three concepts Pininfarina did in the late 60's and they influenced Ferraris of the 70's and 80's. The CNR E2 was Pininfarina's continuing research into aerodynamic. This car justified its existence because it had a very low drag factor but did not have extremely bland looks like previous examples shown.

When taking an example of prototypes from I.A.D., the Venus was deemed the most suitable. I.A.D. were not recognised as well as they wished until they completed and exhibited the Venus project. The main reason for the Venus was promotion. I.A.D. realised a long time ago that just one stunning showcase could elevate them to leaders in automotive design. The Venus did just this. I.A.D. are now recognised worldwide and are no longer living in Italian shadows, they are now on a par with their Italian counterparts.

The examples of manufacturers' prototypes illustrate their commitment to developing and manufacturing better cars for the future. The Zig and Zag project from Ford is a graphic example. They are working on developing the Orbital engine for production and so with Zig and Zag they were able to gauge initial reaction on the small car theme. They also picked up on Giugiaro's theme of common componentry, and see it as the key to the success of the production of small cars. Due to the popular reception of the Zig and Zag concepts, they are continuing research and development of the Orbital engine for small car production.

Renault's strategy on prototypes is reflected in the two examples chosen, the Megane being a test bed for new innovations and technologies, the Laguna a study of shape, materials and style. Both though, have future roles in Renault's production cars of the future as they each have features that Renault say will be incorporated to future production models.

Citroen's line of thinking towards prototype design is different to that of Renault because they continue to develop the prototype until it could be a production car. This does not necessarily mean it will become one but features or innovations that the car carries can then be readily incorporated to existing production models. The Activa and Activa 2 concepts illustrate this point very well. The Activa was a car for the 21st Century and it incorporated features and innovations which could be in a car in twenty years' time. Further development and research in the Activa 2 showed certain innovative features which could be incorporated in today's car. This kind of research is for the future of car design.

Even though some companies, such as BMW, Alfa Romeo and Volvo, do not show prototypes, the fact that they have released concept-like cars is important. It shows that prototypes are not just dreams for the future but can be immediately produced. The Ital design, Aztec, and Pininfarina HIT are another two good examples.

Japanese prototype design at the moment is in its infancy and because of this, they are effectively imitating their European counterparts and trying to win with their extreme examples. The Japanese story could end up like America of the 60's. At the moment, the Japanese are trying to redefine the car, (like the Americans also tried), and are not recognising the need to approach prototype design with future production in mind, (like Renault and Citroen). It is simply a time when Japanese design could flourish or fail.

When considering all these examples, it is apparent that the purpose of concept cars is to advertise the skills and forward thinking of a manufacturer or design studio.

The car makers, increasingly, like to promote theirs as technology demonstrators showing that their engineers and designs can offer all the latest technical developments - even if they haven't yet managed to incorporate them into the models they sell. The companies with the most of prove don't sell to the public at all. Design consultancy is high business. Even car firms with elaborate in-house design departments depend on ideas for new models from outside studios such as Ital Design, Pininfarina and I.A.D.

These design freelancers use concept cars to demonstrate to the motor industry that they have a constant stream of ideas. Because the better ones represent new ways of shaping and building, they are bound to be controversial. These ideas also promote and advertise the consultancy like the Venus concept from I.A.D.

Therefore, concept cars have a dual role, they reveal innovations for the future of car design but they are also a very clever advertising tool.

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