# SHIFTING GEAR

## DESIGN, INNOVATION & THE AUSTRALIAN CAR

Artwork labels

# GM HOLDEN LTD, Melbourne

manufacturer

est. 1931

# Holden EFIJY coupe, concept car

2005

mid-mounted 6.0L V8 Roots-type supercharged GM LS2 engine, 480kW 644bhp, 4 speed automatic transmission, rear wheel drive

designed by Richard Ferlazzo and GM Australia Design

Collection of GM Holden Ltd, Melbourne

GMH's 2005 EFIJY concept car was designed by Richard Ferlazzo, who graduated from Industrial Design at RMIT University, Melbourne, in 1982 and began his career as a product and exhibition designer. He worked at Toyota in 1986 and moved two years later to GMH, where he was involved in the design of many Holden vehicles before becoming GMH's head of design. The EFIJY references its Holden roots, recalling the body curves and front of the iconic 1953 FJ Holden in rich 'soprano purple' paintwork.

In true concept tradition, the EFIJY showcases contemporary mechanical, electronic and material components, with state-of-the-art automotive technology throughout and a supercharged 6-litre V8 engine under the bonnet. It rides on an air-suspension system that lowers the car when it is stopped, and also has electronic instrumentation, including a multi-use display screen that disappears into the dashboard. The EFIJY project was a collaboration between almost twenty suppliers, which reduced the impact on GMH's work schedule, but also highlighted the latest in local products and ideas.

**Herbert THOMSON** designer and engineer
Australia 1870–1947

**MARTIN & KING, Armadale, Melbourne** coachbuilder
1888–1955

## Steam car, phaeton

1896–98

twin-cylinder steam engine, 3.75kW 5bhp

Museum Victoria, MelbourneGift of Mrs O. Stening, 1960 ST024990

Herbert Thomson was one of the pioneers of automobile design and production in Australia. Beginning as a manufacturer of small steam engines in suburban Melbourne, in 1896 he began to experiment with steam-driven vehicles and by 1898 he had constructed his first steam-driven six-seat Phaeton; its body, of fiddleback ash and silky oak, was the work of coachbuilders Martin & King. In 1900 Thomson, with his cousin and business partner Edward Holmes, made the 794-kilometre journey from Bathurst to Melbourne in the Phaeton, now fitted with Dunlop pneumatic tyres. They took the old coach route at an average speed of fourteen kilometres per hour.

This was Australia's first interstate motorcar journey and it gained a great deal of publicity; for the first time Australians were alerted to the possibilities of automotive transport. Holmes set up a syndicate to manufacture the cars, and the Thomson Motor Car Company built about twelve steam-driven vehicles, at least two vans for the post office and a fire engine. Their design was heavily influenced by horse-drawn vehicles and it was not until the development of the internal combustion engine that the modern car began to take shape.

This vehicle, known as the 'Pioneer', was restored by W. Buchanan between 1958 and 1960.

**GENERAL MOTORS COMPANY (BUICK), Detroit** manufacturer
United States est. 1903

## Buick Avenir, concept model

2014–15
automotive modelling clay
designed by Warrack Leach, GM Australia Design and GM North America Design teams

Collection of GM Holden Ltd, Melbourne

This model of the Buick Avenir represents one of the stages in the developmental process of automotive design.

When developing new designs, designers make scale models and full-size models from automotive modelling ‘clay’. This material is a synthetic mix that is best described as a high-tech version of plasticine. Designers create many concept sketches as they explore ideas. Then they work with automotive-clay sculptors to develop these models into three dimensions; this can take weeks or months.

For decades, designers around the world have followed this process and it is still current although digital technologies now augment the design process and, in some cases, have eliminated the need to produce clay models for minor components. However, in the case of large, sculptural surfaces such as the exterior of a vehicle, full-size clay models are still an essential tool that allows the designer to visualise the final product. A motor vehicle can be seen as a large and dynamic form of sculpture, albeit with a functional purpose.

With the latest developments in engineering available to all car manufacturers, style has become the greatest differentiator between car brands.

## *1. Design, Innovation and the Australian Car*

Shifting Gear is a celebration of Australian automobile design represented by twenty-three cars, dating from late nineteenth century to the present day. It demonstrates the skill and sophistication of an automobile industry that could design and manufacture a mass-produced car from the ground up, a feat not many countries can boast.

It also shows the variety and complexity of the automobile in the modern industrial design landscape. There are many kinds of cars on display here, including early experiments in limited production; popular marques of the 1970s; one-off sports cars and specials; and dream cars that were never intended for production. Each had a particular function and specific market.

There is no ‘right’ way to design a car, and one reason cars are fascinating as industrial products is their complex and deeply alluring marriage of function and symbolic form, which can induce strong emotional responses in the viewer and consumer.

In many ways the automobile shaped the look and experience of the twentieth century and mediated the public’s response to modernity. As the twenty-first century unfolds, however, it is clear that automobiles will further evolve, taking on different roles as new production technologies emerge and a public born into the digital age demands new forms of mobility.

# RMIT ELECTRIC RACING, Melbourne

designers and manufacturers

est. 2008

# R13e (Formula SAE-A)

2013

rear-mounted Motenergy ME-0913 Brushless DC motors, 60kW 80bhp, independent direct chain drive, development electronic differential transmission, rear wheel drive

Collection of RMIT School of Electrical and Computer Engineering, Melbourne

RMIT Electric Racing formed in 2008 and created the first electric vehicle built for the Formula SAE competition. The competition is organised by the Society of Automotive Engineers International (SAE) and has more than 500 teams and events on every continent. The objective is to design, build and enter an open-wheel race car in the annual competition.

Building on the success of over a decade of RMIT Racing, a small team of interested students and staff produced a simple, completely electric counterpart to the combustion-vehicle competition. Since then, Formula SAE globally has seen rapid growth in the number and competitiveness of electric vehicles. In Australia, RMIT Electric Racing continues to produce successful electric vehicles, often outperforming their combustion rivals.

From seven students in 2008, RMIT Electric Racing now consists of more than fifty dedicated students putting in the extra time and commitment required for the project, in addition to their studies.

# AUTOHORIZON FOUNDATION,
**Melbourne** designer and maker
est. 2009

## FR-1, concept car
2009 designed and manufactured
mid-mounted 6.0L V8 Chevrolet engine, 270kW 362bhp,
6 speed manual transmission, rear wheel drive
a collaboration with GM Holden Design, Victorian
Centre for Advanced Materials Manufacturing, Boeing
Aerostructures Australia and Marand Precision Engineering

Collection of AutoHorizon Foundation, Melbourne

Brian Tanti took a lesson from the American hot rod for the styling of his concept FR-1 (Fund Raiser 1) launched at the 2009 Melbourne Motor Show. Tanti trained as a coachbuilder and is reputed to be one of the world's best. For many years he was responsible for the development of the Fox Museum, Melbourne, and for maintaining and restoring its valuable collection of historic cars. More recently, he founded the not-for-profit AutoHorizon Foundation to support and promote the Australian automotive industry.

One of its first projects was the FR-1 concept car intended to showcase the capacities and skills of the Australian automotive industry. As an example of forward thinking, the FR-1 was built by volunteers with different automotive expertise, under the direction of Tanti. It aimed to demonstrate innovative use of materials and green power plants. Its engine was designed to produce 17 per cent less greenhouse gases, and its use of lightweight materials was also designed to reduce fuel consumption. Indeed, the manufacture of new lightweight materials for the automotive industry is an area of niche production that Tanti believes Australia could successfully develop.

The FR-1 was fundamentally an educational project intended to build links within the tertiary and TAFE sectors, and hence secure the skills and expertise required for the car industry of the future.

# **BOLWELL CAR COMPANY LTD, Seaford and Mordialloc, Victoria** manufacturer

est. 1962

## Nagari Sports Mk8

1970–74 manufactured

front-mounted 5.0L V8 Ford engine, 165kW 220bhp, 4 speed manual transmission, rear wheel drive

designed and engineered by Graeme Bolwell, Campbell Bolwell and Ross McConnell

Collection of Bolwell Car Company, Melbourne

In 1960, the three Bolwell brothers, Winston, Graeme and Campbell, each designed and built a sports car from salvaged parts. Inspired by the experience, Campbell Bolwell started his own business in 1962 with the Bolwell Mk 4, which sold as a kit and was styled along similar lines to the English special Elva. Two further models came in quick succession before the Mk 7 in 1966, an attractive two-seater fastback coupe with European styling. Graeme Bolwell spent the latter half of 1966 in the research and development section of Colin Chapman's Lotus works in England, and the results of his research were displayed in the best-known of all the Bolwells, the Nagari Mk 8, completed in 1969. This car bore stylistic references to both the Lotus Europa and Marcello Gandini's Lamborghini Miura, and combined these with the power of a Ford V8 engine. The combination was a success and the Nagari enjoys iconic status among Australian sports cars.

Bolwell ceased car production for a time and diversified into other areas, but in 1979 returned with the less successful clubman-type Mk 9 Ikara. After a long hiatus, the Mk 10 Bolwell Nagari was launched at the Melbourne Motor Show in 2008, and relaunched in 2014.

**UNKNOWN** maker

## Set of drafting instruments

c. 1910
steel, wood, cotton, graphite
Private collection

This set of instruments was used by Edward Groening, a motor engineer from Caulfield, to draft designs for car bodies produced by Tarrant Motor & Engineering Co. between 1914 and 1922.

***TOOLS OF DESIGN***

# **GM HOLDEN LTD, Woodville, South Australia** publisher

est. 1931

c. 1940

## 1939 in retrospect: Australian coachwork, Holden

Private collection, Victoria

Car styling developed from automotive body building. Holden's were originally carriage builders, but in 1917 they began producing bodies for imported Dodges and Buicks. In 1919 they re-organised and formed Holden's Motor Body Builders, and by 1924 they had one of the world's most advanced production lines at Woodville, South Australia. Taken over by General Motors in 1931, GMH continued to build bodies for all GM products, and their expertise in all aspects of coachbuilding is on display in this volume.

***BODY DESIGN***

**THOMSON MOTOR CAR COMPANY LTD., Armadale, Melbourne** manufacturer
1900–12

**Herbert THOMSON** designer
Australia 1870–1947

## Steam car engine

c. 1901
cast iron, steel, brass

Museum of Applied Arts & Sciences, Sydney
Gift of NRMA, 1938 B752

Herbert Thomson developed this two-cylinder steam engine for his motor vehicles from 1896. A batch of twelve cars, manufactured by the Thomson Motor Car Company Ltd of Armadale, Victoria, between 1901 and 1912 used the Thomson engine. By today's standards it was primitive, but at the time it contained several patented ideas and led the way in locally designed automobile engines.

***PROPULSION***

**Peter Arcadipane** designer
**Northern Fibreglass** fabricator

## Concorde nose cone 1977

fibreglass

Private collection, Melbourne

Customising standard cars with bolt-on styling features was popular in the 1970s, and in 1977 Peter Arcadipane together with Sam Midgley added a fibreglass front, flares and a spoiler to the standard Ford panel van to produce the Concorde, a star of the 1977 Melbourne Motor Show. The distinctive nose cone would later be used by Arcadipane to style Max Rockatansky's 'Interceptor' for George Miller's iconic 1979 film *Mad Max*.

# *AFTERMARKET STYLING*

# Rayner HOFF

born England 1894, arrived Australia 1923, died 1937

# Holden Lion, maquette

c. 1927
plaster

Museum of Applied Arts & Sciences, Sydney
Purchased 1987 87/1

This plaster maquette by Australian sculptor Rayner Hoff was commissioned by General Motors-Holden's. It was used as a model from which small diecast emblems were made and applied as nameplates to Holden's car bodies from 1928 until 1939. From 1948 the design was adopted by Holden's as a trademark, and is still used today. The emblem was inspired by the myth that suggested the invention of the wheel came about when a lion was seen rolling a stone.

***IDENTITY & CHARACTER***

**ELFIN SPORTS CARS COMPANY,**
**Adelaide** manufacturer
est. 1957

## Elfin wheel

1961 designed
magnesium alloy
designed by Garrie Cooper

Elfin Heritage Centre Collection, Melbourne

This wheel is a reproduction of the first Elfin racing wheel designed by Garrie Cooper in 1961 for his Elfin Formula Junior models (which won the 1963 Australian Formula Junior Championship) and subsequently used on his Elfin Mallala sports car. Cooper modelled the wheel as a wooden pattern. Wheels were then sand cast in a magnesium alloy by the Australian Aircraft Corporation in Melbourne. The rough castings were returned to the Adelaide Elfin factory for machining to the condition seen here. Machining magnesium was a highly sensitive process because of the volatility and flammability of the material, but the benefit was that magnesium alloy wheels were thirty per cent lighter than equivalent aluminium wheels.

***WHEELS & MOTION***

## REPCO AUSTRALIA LTD, Melbourne

manufacturer

est. 1922

# Camshaft and cover 1968

aluminium alloy, steel

Private collection, Melbourne

Tuning for speed is an aspect of engine design that Australian Phil Irving understood very well and made a subject of lifelong study. His book *Tuning for Speed: How to Increase the Performance of Motorcycle Engines for Touring, Racing and Competition Work* (1948) spends some time on the camshaft, which comprises a shaft with one or more cams attached to it, and operates the valves of an internal combustion engine. It is one of the many components of racing engines that requires fine tuning. This steel camshaft with its cover was used on one of the late Sir Jack Brabham's 4-litre engines in 1968.

***DESIGN FOR PERFORMANCE***

## *2. Designing the Australian car*

The first fifty years of the automobile industry in Australia witnessed two of the great revolutions that defined the twentieth century: automobile design and manufacture, and personal mobility. The first led to a successful, highly skilled, multifaceted industry that could design and build cars from the ground up; the second to the development of modern urban life as we know it today.

Herbert Thomson's steam car was a true 'horseless carriage', featuring an external engine on a pre-existing carriage type – the Pheaton. Fifty years later, Laurence Hartnett's Tasman sedan was a recognisably designed industrial product. Together with the Tarrant, Ford Coupe Utility and General Motors-Holden's (GMH's) 'all-enclosed coupe', these vehicles chart the key stages in the early history of Australian automobile design.

As mass-produced cars of Ford, GMH and others replaced limited production vehicles, cars became affordable to the average Australian. Australians now commuted to work by car from remote suburbs and embarked on family holidays supported by a growing travel industry of which the Royal Automobile Club of Victoria was a pioneer. Internal tourism boomed as, armed with RACV maps, motel and hotel guides and road assistance, Australians took to the roads and explored.

# **TARRANT MOTOR & ENGINEERING COMPANY, Melbourne** manufacturer
1899–1907

## Two-seater roadster
1906 manufactured
3.5L 4 cylinder SV Benz engine, 10–11kW 14–16bhp, 3 speed manual transmission, rear wheel drive
designed by Harley Tarrant

Collection of RACV, Melbourne

Engineer and surveyor Harley Tarrant recognised the potential of the automobile as soon as news of its invention reached Australia, and publicised its benefits in the cycling monthly Austral Wheel. In 1899 he established Tarrant Motor & Engineering Co. with bicycle manufacturer Howard Lewis, and built the earliest Australian-made, petrol-driven lightweight motorcar, with a six-horsepower Benz engine. The 1903 model, following the style of the Scottish Argyll motorcar, was almost entirely locally made, including the engine, and was the prototype for several models that followed. Tarrant used local body builders for his coachwork, but eventually established the Melbourne Motor Body Works, which became a major industrial concern. This was prescient, as Tarrant could not compete against foreign imports such as Ford, the franchise for which he acquired in 1907 when he ceased production of the Tarrant.

Tarrant was a founding member of RACV and councillor from 1906 to 1910, first commanding officer of the Victorian branch of the Australian Volunteer Automobile Corps and from September 1914, with the rank of colonel, in charge of Commonwealth military motor transport.

This two-seater roadster is the last surviving Tarrant car, built in 1906 and restored in 1960 by Tarrant's daughter, Doreen Holmes, and grandsons, Kenneth Holmes and Peter Holmes.

**TARRANT MOTOR & ENGINEERING COMPANY, Melbourne** manufacturer
1899–1907

# Automobile engine

c. 1904

cast iron, cast aluminium, cast brass, copper, steel, cork, synthetic polymer paint, terracotta coating, plastic and absorbent crystal dehydrator plugs

Following the success of the 8-horsepower Tarrant two-cylinder engine in 1904, Tarrant enlarged the design to four cylinders. Both engines were produced at the same time with the four-cylinder engine going into the larger Tarrant chassis. The 14–16 horsepower engine had four cylinders of 92 mm by 120 mm bore and stroke, which provided 14 horsepower at 1000 revolutions per minute.

The valves were mechanically operated on opposites sides of the separately cast cylinders that had a separate water jacket. The camshaft also drove the water pump and the hi-tension Simms-Bosch magneto.

The first four-cylinder was sold to Mr McPherson of Paika Station, near Balranald, New South Wales, and was considered at the time to be the best example of automobile construction in Australia. It was built for rugged conditions with 91-centimetre wheels and solid rubber tyres. The four-cylinder engine was able to propel the six-seater car at 45 kilometres per hour.

An early four-cylinder was sold to a Mr Jack Wallace, who had a special Brougham body fitted. Sir Russell Grimwade, a close friend of Harley Tarrant and a pioneering motorist, also purchased a four-cylinder and competed in numerous trials. He took it on the 1906 Dunlop six-day reliability trial over 1000 miles, winning the ‘large car’ class and achieving the highest average speed of 42 kilometres per hour.

## GENERAL MOTORS COMPANY, Detroit

manufacturer

United States est. 1908

## GM HOLDEN LTD, Adelaide

coachbuilder

est. 1931

# Pontiac all-enclosed coupe (Silver Streak)

1938

front-mounted 3.6L straight 6 Pontiac engine, 63kW 85bhp, 3 speed manual transmission, rear wheel drive

body designed Hartley Chaplin and Tom Wylie

Collection of Violet Cecil, Melbourne

The Depression cut a swathe through Australia's flourishing coachbuilding industry and Adelaide-based Holden's, one of the largest concerns in the southern hemisphere, was bought out by General Motors in 1931 to create General Motors-Holden's (GMH). Although there was little opportunity for local design input at this stage, English-born Laurence Hartnett, who was appointed General Manager of GMH in 1934, began an ambitious campaign to design an Australian car. Bodies were initially copied from plans sent from overseas, but the technical expertise at the plant at Woodville, South Australia, was such that by 1936 it could initiate designs of its own.

One of these, produced for GM Chevrolet, Pontiac, Oldsmobile, Buick and Vauxhall chassis, was the 'all-enclosed coupe' or 'Sloper' as it became known. It was the first locally designed, streamlined automobile produced in Australia. Streamlining absorbed influences from the theory of aerodynamics and was a major development in styling the modern car, producing the long curved silhouette, rounded front, tapering rear and smooth body characteristic of the period. The car's interior was cleverly designed to maximise luggage room, with a rear-folding seat and access to the boot: a proto-hatchback.

# HARTNETT MOTOR COMPANY LTD, **Melbourne** manufacturer
1949–56

## Tasman sedan, prototype
1949
flat twin-cylinder horizontally-opposed engine, 14kW 19bhp, 4 speed manual transmission, front wheel drive
designed and engineered by Laurence Hartnett

After leaving GMH in 1947, Sir Laurence Hartnett pursued the design and production of his own small family car based on a prototype two-door sedan by French designer Jean Grégoire, which had been unsuccessfully developed in England as the Kendall. Hartnett shipped the prototype Grégoire to Australia and, having virtually obtained support from both the Commonwealth and Victorian governments, set up production in Frankston, sourcing the chassis and most of the mechanicals from England and France, but engaging Commonwealth Engineering to produce the panels. He also engaged March and Furey, a young industrial design practice, to illustrate the proposed Hartnett range comprising sedan, tourer, roadster, utility and panel van. When the panels failed to materialise and government support was withdrawn, the project came to a halt, although not before approximately 135 cars – hardtop Tasman and softtop Pacific tourer models – were built with hand-beaten panels assembled on the imported chassis.

This two-door Hartnett sedan is a prototype of the ‘Tasman’ hardtop version, manufactured in 1949–50, and was owned by Sir Laurence Hartnett until his death in 1986. The vehicle was restored prior to its acquisition by Museum Victoria, and it is unclear how much of the car is in its original condition.

# **FORD AUSTRALIA LTD, Geelong, Victoria** manufacturer

est. 1925

## Ford coupe utility 302

1933 designed, 1934 manufactured
front-mounted 3.6L V8 Ford engine, 56kW 75bhp, 3 speed manual transmission, rear wheel drive
designed by Lewis Bandt

Collection of Peter Emmett and Geoffrey Emmett, Melbourne

In the early 1930s, as the country recovered from the Depression, management at Ford gave young draftsman Lewis Bandt the brief that would create local automotive history. Bandt was apprenticed in 1924 as a fourteen-year-old to Duncan & Fraser in Adelaide, where for three years he drew up special car bodies for customers. On moving to Melbourne in 1927 he was employed by Melbourne Motor Body Works, but by December 1929 was at Ford in Geelong working as a draftsman – probably on the improved Model A introduced in 1928 with a range of body types designed to compete with the dominant General Motors-Holden's.

The challenge facing Bandt was to design for what was in fact a hybrid vehicle, one where the back tray was seamlessly unified with the cab front. Bandt's design, with its clean silhouette, blended the tray sides into the coupe body, the side panels being pressed in one piece. Both the body and suspension were strengthened with extra bracing. Although initial production of the 1934 model was small, by the end of the decade the Ford ute, with the new Ford V8 engine, had made its way into Australian culture.

This vehicle, found under a peppercorn tree in Gippsland in the 1980s, is untouched by the restorer's hand.

## *3. Racing into history*

Australians were early motorsport enthusiasts and embraced car racing in all its forms: track, hill climb, road and endurance. At first modified and stripped-down imported production cars were raced, although local products such as the Tarrant also took to the track. After the First World War, the Bugatti and Austin 7 were popular, but locally designed machines, one-off specials, began to compete with the imports, some with great success. Indeed, it has been said that in no country has the special been developed to such a degree as in Australia.

The special can take numerous forms and we can trace the origins of Australian open-wheel racing cars to the Chamberlain and the Maybach specials, which were the progenitors of the Repco Brabham BT19, Australia's most famous racing car. Garrie Cooper's Elfin marque, established in Adelaide in the late 1950s, showed just how successful locally designed racing cars of all types could be.

The most popular form of special, however, was the sports car. Paul England's Ausca and Lou Molina's Monza, both fitted with the Phil Irving–designed Repco Hi-Power head, were among the most glamorous and successful in the postwar years. The later Bolwell Nagari and Purvis Eureka, on the other hand, were not intended for the race track; they were limited-production stylish sports cars designed for young urbanites.

**H. Charles DEAN** designer and maker
Australia 1914–85

# Maybach Special Mk1

1946

front-mounted 4.2L straight 6 cylinder naturally-aspirated SOHC dry sump Maybach engine, 238kW 320bhp, 4 speed manual transmission, rear wheel drive

Private collection, Melbourne

The Maybach Special Mk 1 was built by Charles Dean in 1946, around a Maybach 4.2-litre engine taken from a war-surplus German light tank. Dean had established Replex (Replacement Electronics) after the war, and when he sold it to Repco in 1946 he stayed on as a manager. It was under their aegis that he developed the Maybach, a two-seat open wheeler with a tubular steel frame, a front end from a 1938 Studebaker and a Lancia rear end. The Maybach motor was fitted to a 525 Fiat gearbox. Its first test, without a body, was at the Rob Roy Hill Climb in 1947 where it caused a bit of a stir, but for the 1948 Australian Grand Prix at Point Cook, Repco's Frank Hallam clothed the chassis in a body constructed from steel sections of aircraft belly tanks. Dean raced the Maybach at hill climbs and speed trials throughout 1948 and 1949 with considerable success.

After further modification, Stan Jones took the Maybach to second place in the 1952 Australian Grand Prix and went on to win the 1954 New Zealand Grand Prix. At this time it was thought to be the most potent racing car in Australia, capable of well over 225 kilometres per hour.

# Alan ‘Bob’ CHAMBERLAIN

designer and maker

Australia 1908–92

# Chamberlain Special

1928–29 manufactured, 1935 engine refit

front-mounted 1.0L 4 cylinder Roots-type supercharged opposed-piston two-stroke engine, 74kW 100bhp, 3 speed manual transmission, front wheel drive

Private collection

In 1929, twenty-one-year-old Alan Hawker ‘Bob’ Chamberlain joined forces with his friend Eric Price to build an open-wheel racing car powered by a Daytona Indian motorcycle engine. Chamberlain started racing as a boy in a stripped down Citroën, but it was so slow he decided to build his own car. The result was a highly innovative racer with front-wheel drive, inboard front brake, four-wheel independent suspension and few standard parts. Everything except the wheels was designed by Chamberlain; it was a true special. The chassis and body frame was a single unit of welded steel tubing, and its alloy body was built by H. C. Dusting of Kew, fabricators of motorcycle sidecars.

Known as the ‘Beetle’, the Chamberlain Special had its first outing in a hill climb in 1930, and won its class. In 1935, Chamberlain handed the car over to his brother, Howard ‘Bill’ Chamberlain, who installed a modified racing engine. After the war the car was taken in hand by the Chamberlains’ cousin Harry ‘Jimmy’ Hawker, and he raced it through 1947 and 1948 at various sprint events, the engine giving off its recognisable ‘ear-splitting exhaust note’. The supercharged, two-stroke engine that powered the Chamberlain Special has been removed from the car, as it is currently undergoing a full mechanical rebuild.

# AUSTIN MOTOR COMPANY LTD, **Longbridge** manufacturer
England 1905–52

# JAMES FLOOD PTY LTD, Melbourne coachbuilder
1907– 1970s

## Austin 7 Ace
1933
front-mounted 0.75L 4 cylinder engine, 10kW 13.5bhp, 4 speed manual transmission, rear wheel drive

Private collection

In 1928 a group of RACV members formed the Victorian Light Car Club, and in 1928 they organised the 100 Miles Road Race on Phillip Island – now recognised as the first Australian Grand Prix. Adelaide-born Arthur Waite won in an Austin 7 sent from England by his father-in-law, Sir Herbert Austin, who had gained engineering experience as a young man in Melbourne in the 1880s and 1890s. On his return to England in 1893, Austin joined forces with Frederick Wolseley, inventor of the first commercially successful sheep-shearing machinery, to build the Wolseley car, which went into production in 1901. Austin then established his own marque in 1905, and in 1922 the Austin 7, or 'Baby Austin' was launched.

James Flood, one of Melbourne's most prominent coachbuilders, built the body of this sports model Austin 7 Ace, probably at his St Kilda Road works. Flood, an English-trained coachbuilder, had worked for Tarrant's, where he designed the first fully enclosed Australian-built body fitted to a De Dion chassis. Flood established his own body shop in 1907, and his highly successful motor body building company catered to the high end of the market, producing bodies for Bugatti, Mercedes, Daimler and others.

This vehicle was once owned by the prominent photographer Helmut Newton when he was living in Melbourne.

# ELFIN SPORTS CARS COMPANY,
**Adelaide** manufacturer
est. 1957

# Elfin Streamliner
1961
front-mounted 1.1L 4 cylinder Coventry Climax engine, 82kW 110bhp, 4 speed manual transmission, rear wheel drive
designed and engineered by Garrie Cooper

Elfin Heritage Centre Collection, Melbourne

Garrie Cooper founded Elfin Sports Cars at his father's motor body business in suburban Adelaide in the late 1950s. He was to become one of the most successful sports- and racing-car makers in Australia, building twenty-seven different models and a total of 248 cars before his untimely death in 1982 at the age of forty-seven. Cooper raced himself, but in the 1960s and 1970s his cars were extremely successful with other drivers, such as John McCormack, Frank Matich and Larry Perkins. In all, Elfins won twenty-nine national championships and major titles. In 1968, Cooper won the Formula Libre Singapore Grand Prix in his Cooper Ford. Had he been born in England there may well have been an Elfin Grand Prix team.

Cooper produced his first model, the Elfin Streamliner, in 1959 as a two-seater, front-engined sports car with enveloping aluminium alloy bodywork inspired by Colin Chapman's Lotus Eleven. In the 1950s and 1960s, Australian special builders generally took their design cues from the British industry, which adapted styling advances made in Italy for its own postwar market. In 1961, Cooper produced the Elfin FJ (Formula Junior) and thereafter built a series of single-seat racing cars and sports racing cars covering most types and classes.

**Lou MOLINA** designer and maker
Australia 1920–2002

**Silvio MASSOLA** designer and maker
active in Australia 1950s

**Brian BURNETT** coachbuilder
active in Australia 1950s

# Molina Monza Special

1950s

front-mounted 2.1L straight 6 cylinder Roots-type supercharged Holden Grey engine with Repco Hi-Power head, 171kW 230bhp, 4 speed manual transmission, rear wheel drive

Private collection

Lou Molina's Monza is one of the most beautiful specials built in Australia and with its Repco Hi-Power head, it was one of the most powerful. Its low reinforced aluminium body of welded construction was styled by Brian Burnett, with its characteristic side contours developed for air cooling over the brakes and exhaust pipes. The car made a vivid impression in the pits. Burnett's design was unusually original for an Australian special and highly crafted; he apparently never made drawings of his designs but worked everything out in his head prior to execution. The Monza made its competition debut at the Rob Roy Hill Climb in May 1957, and first raced at the Fishermans Bend track in 1958; its first win with Molina driving was at Phillip Island in 1959.

Lou Molina was a member of one of Melbourne's prominent Italian restaurateur families and at this time operated the Imperial Hotel with his brother Joe. Molina was an enthusiastic racing driver and his Monza was one of the Australian specials to make a brief appearance in Stanley Kramer's 1959 film On the Beach. The film's race scene features Austin Miller's special, Bill Leach's Holden special, Molina's Monza and Stan Jones's Aston Martin.

**Paul ENGLAND** designer and maker
Australia 1929–2014
**Bill HICKEY** designer and maker
active in Australia 1950s

# Ausca sports racer

1955
front-mounted 2.1L straight 6 cylinder Holden Grey engine with Repco Hi-Power head, 111kW 150bhp, 4 speed manual transmission, rear wheel drive

Private collection, Melbourne

Some thought that Paul England's Holden special, known as the Ausca, was the 'prettiest car in the country'. Its one-piece, lightweight, fibreglass body, designed by England and Bill Hickey and based on the A6GCS Maserati, could be removed from the chassis by two men, providing easy access to the engine. The Ausca's power came from its Holden engine fitted with the Repco Hi-Power head designed by Phil Irving, his first assignment after joining Repco in 1954. England was a fellow employee at Repco, and the Ausca was built in the factory.

The Ausca first appeared in naked chassis form in late 1955 and scored successes in hill climbs at Templestowe and Rob Roy. Its first appearance as a whole car was at Fishermans Bend in 1956. This turned out to be a busy year for the Ausca, which fared well at a number of tracks, including the Bathurst 100 against Ferrari, Maserati and Jaguar opposition.

The Ausca went on to have a distinguished racing career before England crashed it at Phillip Island in 1958, breaking his legs and wrecking the car. He sold the rebuilt car in 1960 and after a varied career it was restored to its original specifications in a number of campaigns through the 1980s and 1990s.

# **PURVIS CARS LTD, Dandenong, Victoria** manufacturer

1974–91

## Eureka F4

1976

rear-mounted 1.6L VW engine, 48kW 65bhp, 4 speed manual transmission, rear wheel drive

designed by Allan Purvis

Collection of Jeff Thompson, Adelaide

The Bolwell factory was a magnet for teenager Allan Purvis, who would ride his bicycle from Dandenong to Seaford to check out the latest models. Purvis grew up in Dandenong, where his father's engineering works was located, and after attending Dandenong Technical School he undertook a Diploma of Advertising at Caulfield Institute.

While he was to spend his professional life in advertising, Purvis wanted to build inexpensive cars, and obtained the rights to the British-based Nova when in London in 1973. The Nova was a kit car styled after the Ford GT40, incorporating a Volkswagen Beetle chassis, fibreglass body and a Volkswagen engine. Purvis imported a body and from this basis developed three models styled 'Eureka': the Sports, PL30 and F4.

While the Sports, unveiled at the 1974 Melbourne Motor Show, kept closely to its English roots, the following models saw considerable modification from the Nova prototype: the angle of the windscreen was raised, the body height increased significantly to allow for taller Australian drivers, and the styling became more aerodynamic. In addition, the F4 had the option of a quieter and more powerful Ford Cortina engine. As the coupe body had no doors, access was through a manually operated one-piece canopy, later replaced by a power-operated canopy.

**REPCO AUSTRALIA LTD, Melbourne**
manufacturer
est. 1922
**Repco Brabham** designer
Australia 1903–92

# Repco Brabham 850 cui 3.0L V8 racing engine

1968
aluminium alloy, steel, copper, brass, plastic, rubber, enamel paint

Private collection, Melbourne

This engine was built by Repco Brabham in Melbourne as a prototype for use in Sir Jack Brabham's Formula One car in 1968. Brabham had already won his third world title in 1966 using the Phil Irving–designed Repco Brabham 620-series engine, and Denny Hulme won the title in 1967 using a mixture of Repco Brabham engines, all of which had a single camshaft per bank; Brabham came second that year.

The quad-cam 800-series engines, in 2.5- and 3-litre capacity, had been made by Repco Brabham for subsequent Tasman and Formula One cars, while 700-series blocks were used for the 4.2- and 5-litre, quad-cam engines. Most of the design work on these later blocks was by Norm Wilson, while John Judd was responsible for the heads.

# MOTOR RACING DEVELOPMENTS (BRABHAM), Milton Keynes

manufacturer

England 1960–78

## Repco Brabham BT19

1966

mid-mounted 3L V8 Repco 620 engine, 231kW 310bhp, 5 speed manual transmission, rear wheel drive

designed and engineered by Sir Jack Brabham, Phil Irving and Ron Tauranac

Collection of Repco Australia, Melbourne

Sir Jack Brabham started out racing midget cars in New South Wales, and won four Australian speedcar championships between 1947 and 1953. He then switched to road racing and competed successfully in Australia and New Zealand until 1955, when he relocated to England and joined the Cooper Car Company's racing team with whom he won the World Championship titles in 1959 and 1960.

In 1961 Brabham established Motor Racing Developments (MRD) with Ron Tauranac, a brilliant racing car designer whom he had known in Sydney. Working initially from a factory provided by Repco, MRD marketed their cars as 'Repco Brabhams' in recognition of Repco's longstanding support.

The BT19 was initially conceived in 1965 for a 1.5-litre Coventry Climax engine, but never raced in this form. For the 1966 Formula One season the Fédération Internationale de l'Automobile (FIA) doubled the limit on engine capacity to three litres, and in response Repco developed a new V8 engine, the Phil Irving–designed RB620 which, fitted to the modified BT19 chassis, propelled Brabham to his third World Championship in 1966. It was the first car bearing its driver's name to win a World Championship race. The BT19 was not raced in serious competition after 1967. Brabham retired and moved back to Australia at the end of 1970. In 2014 the Brabham BT19 was awarded the prestigious Engineering Heritage Award by the Institution of Mechanical Engineers.

**UNKNOWN** maker

# Osborne Lemonade trophy

1948–49
silver, plastic

Collection of Lady Brabham, Gold Coast, Queensland

Sir Jack Brabham started midget racing on dirt tracks in 1948. Among his many speedway awards was the Osborne Trophy for the highest point score in the New South Wales State Championship in the 1948–49 season. In effect, this was Brabham's first title.

**UNKNOWN** maker

# Redex trophy

1954
silver, plastic

Collection of Lady Brabham, Gold Coast, Queensland

Brabham bought a Cooper Bristol in 1953 and raced it at Gnoo Blas circuit near Orange, New South Wales, easily winning the race and taking out the RedeX Orange Trophy. He also competed in the Round Australia Redex Trial in 1954.

**UNKNOWN** maker

# Rob Roy trophy

1951
silver

Collection of Lady Brabham, Gold Coast, Queensland

At the Rob Roy meeting at Smith's Gully, Victoria, on 26 November 1951, Brabham achieved the fastest time and was winner of the Australian Hill Climb Championship, driving the 'twin special speedcar' with a time of 27.24 seconds.

**UNKNOWN** maker

# RAC British Grand Prix, trophy

1959
silver, wood
presented by the Aintree Automobile Racing Co. Ltd

Collection of Lady Brabham, Gold Coast, Queensland

This race was won by Sir Jack Brabham in the works Cooper T51. His teammate Bruce McLaren came third, also in a works Cooper T45, and Stirling Moss came second in a P25 BRM. McLaren and Moss staged an epic battle for second place, with Moss just managing to hold on. Brabham started from pole position.

**UNKNOWN, Europe** maker

# XVII Monaco Grand Prix, trophy
## *XVII Grand Prix Automobile de Monaco, coupe*

1959
gold-plated metal, wood
presented by the Sovereign Prince and Princess of Monaco

Collection of Lady Brabham, Gold Coast, Queensland

Held at the famous Monte Carlo street circuit on 10 May 1959, this race was won by Sir Jack Brabham in his Cooper T51-Climax, beating Tony Brooks's Ferrari by 20 seconds. This was Brabham's and Cooper's first victory in a World Championship Formula One event. Brabham was awarded the trophy by Prince Rainier and Princess Grace of Monaco.

**UNKNOWN, Europe** maker

# German Grand Prix, trophy
## *Grosser Preis von Deutschland*

1966
silver

Collection of Lady Brabham, Gold Coast, Queensland

The German Grand Prix was the fourth of the Formula One Championship races run in 1966 and the fourth consecutive race won by Sir Jack Brabham in his Repco-powered Repco Brabham BT19. It was run in appalling wet conditions over a 23-kilometre course with so many corners that it was virtually impossible to ‘learn’ the quickest way around. However, Brabham won this race in commanding style, thus virtually clinching his third World Championship.

**UNKNOWN** maker

# Silverstone Cup

1966
silver, bakelite

Collection of Lady Brabham, Gold Coast, Queensland

In May 1966 at the Silverstone Circuit in England, Brabham won the non-championship Formula One race, which was the first race in England with the new 3-litre Formula. Brabham was using the Repco Brabham 620 V8 racing engine for only the second time, and he won the race from John Surtees in a Ferrari. Brabham took pole position and fastest lap.

## *4. Bathurst: A proving ground for Australian design and performance engineering*

From the late 1960s until the early 1970s, General Motors-Holden's, Ford Australia and Chrysler Australia each contributed significant resources towards designing and developing high-performance variants of their saloon cars. The resulting research and development led to design, mechanical and handling improvements, many of which were carried through to the companies' passenger vehicles. These so-called 'muscle cars' also acted as seductive marketing tools, particularly for male consumers.

In Australia, the evolution of the high-performance production car involved demonstrating potency and substantiating claims of mechanical integrity and dependability. Few races in the world have a reputation for being as demanding on vehicles, or as important in determining production cars' handling and reliability, as the annual race at the Mount Panorama circuit near Bathurst, New South Wales. The race began in 1960 as an 800-kilometre durability race that, until 1962, was held at the Phillip Island Grand Prix circuit in Victoria. Initially, the competition was limited to unmodified production saloons built or assembled in Australia, but since transferring to Mount Panorama in 1963 it has served as a proving ground for high-performance vehicles and provided significant marketing opportunities for vehicle manufacturers.

## *The 1972 supercar scare*

In July 1968, General Motors-Holden's announced the release of their bold new sports coupe – the HK Monaro. This marked the beginning of a short-lived but golden era in high-performance production car design and motorsport in Australia. Twelve months after the Monaro appeared in showrooms and on the track, Ford released the first of its higher performance versions of the GT Falcon – the XW GTHO – and, after an incredibly short development period, Chrysler launched the amazing Charger coupe – the VH S29 – in August 1971.

In an unexpected turn of events, in June 1972, the manufacture of high-performance production vehicles by Australian car makers came to an abrupt halt. One day after a newspaper article by Sydney's Sun-Herald motoring editor, Evan Green, titled '160 MPH "super cars" soon: minister horrified' was published, a political and public storm erupted that prompted the Confederation of Australian Motor Sport to announce new regulations that would discontinue series production car racing in Australia. Within one week, manufacturers had suspended high-performance vehicle production altogether. This moment, known as the 'supercar scare', coincided with Ford Australia's release of the much-anticipated XA GTHO Phase IV Falcon.

# GM HOLDEN LTD, Melbourne

manufacturer

est. 1931

# HQ Holden Monaro GTS, coupe

1971–74 manufactured

front-mounted 4.1L V8 Holden engine, 138kW 185bhp, 4 speed manual transmission, rear wheel drive

designed by Leo Pruneau, Joe Schemansky, John Schinella, Phillip Zmood and GM Australia Design

Private collection

In 1964, at GMH's newly opened Fishermans Bend Technical Centre in Melbourne, work began on one of Australia's great automobiles – the Holden Monaro. The original design team comprised of a number of stylists from the United States, including John Schinella and Joe Schemansky, both seconded from Pontiac. In early 1965, young Australian designer Phillip Zmood joined the team; he was to play an important role in the design of the Monaro, and even more so in future GMH vehicles, particularly the HQ Monaro and Holden Torana.

After the success of the HK through HG series (1968–71), the HQ range was released in July 1971. It is considered Holden's first redesign of a vehicle since the 215 Holden in 1948. The HQ Monaro was available as a two-door coupe and, from 1973, as a four-door sedan. The HQ series was available with a range of power plant options, including the newly developed 173-cublic-inch and 202-cubic-inch, six-cylinder engines (based on Holden's highly successful 186-cublic-inch 'red motor'); the Australian-built, 253-cubic-inch or 308-cubic-inch V8s; and the American Chevrolet 350-cubic-inch V8. The Monaro coupe GTS was only available with a V8 engine – the 253 as standard and the 308 as an option.

**FORD AUSTRALIA LTD, Geelong, Victoria** manufacturer
est. 1925

# XA Ford Falcon GT (RPO83), coupe

1973 manufactured
front-mounted 5.8L V8 Cleveland engine, 283kW 380bhp,
4 speed manual transmission, rear wheel drive
designed by Allan Jackson, Brian Rossi and Jack Telnack

Collection of Les Dole, Gippsland, Victoria

In March 1972, Ford Australia released the XA Falcon, generally acknowledged as the first wholly Australian Ford, in sedan and hardtop coupe versions. It was a uniquely Australian vehicle and Ford Australia's most popular Falcon up until that point, with sales of 129,473.

Following the success of the high-performance GTHO variants (Phases I–III), Ford Australia proposed an XA GTHO Phase IV, due for release in mid 1972. In one of the most infamous, anticlimactic events in Australian motorsport history, the XA Phase IV, described in a Ford dealer bulletin as 'the fastest four-door car in the world's history', never made it into full production. The project was scrapped after the 'supercar scare' in June 1972. In total only one XA Phase IV GTHO (and three racing versions) of an intended 200 came off the production line.

When Ford abandoned the GTHO Phase IV, production was well underway on its specially designed mechanical parts and other performance components, and many of these were used in GT specials. These vehicles were called RPO83 (regular production option) models. In total, 259 were assembled, including 129 sedans and 130 coupes. Other than the four GTHO Phase IV vehicles, this GT coupe is the only car known to have come off the Ford production line with a Phase IV engine.

# CHRYSLER AUSTRALIA LTD, Adelaide

manufacturer

1951–80

# VH Valiant Charger R/T E49, coupe

1971–73 manufactured

front-mounted 4.3L straight 6 cylinder Chrysler engine, 225kW 302bhp, 4 speed manual transmission, rear wheel drive

designed by Dean Bond, Tom Campbell, Bill Chinnick, Bob Hubbach and Brian Smyth

Private collection

The Valiant Charger, referred to as the ‘VH 29’ project, was designed by a team that included Chrysler Australia’s senior stylist Brian Smyth, and senior modeller Bill Chinnick, along with American colleagues Hal Pilkey, Peter Perry, Maurie Baldwin and principal exterior styling designer Bob Hubbach. The VH series (1971–73) is considered the first Australian designed Valiant.

At the time of its release in 1972, the VH Charger E49 was the fastest accelerating car in Australia – a title it held for the next twenty-seven years. Able to reach 100 kilometres per hour in only 6.1 seconds, it has indeed been claimed that the Charger was the fastest accelerating five-seat production car in the world at the time.

The E49 came with alloy wheels, designed by Adelaide manufacturer ROH, as a standard feature, and a big tank option that enabled more fuel to be carried for the purpose of long-distance track racing. The defining feature of the car, however, was the Hemi sixpack engine. With a high-overlap camshaft, enlarged valves, tuned-length extractors and fuel supplied by three specially engineered twin-barrel Weber carburettors, the Hemi sixpack produced 302 brake horsepower, making it the most powerful production engine of its time.

# CHRYSLER AUSTRALIA LTD, Adelaide

manufacturer

1951–80

# Hemi six 245 cui engine

1970–81

cast iron, steel, copper, brass, plastic, rubber, aluminium, enamel paint

Private collection

The Hemi six engine was Australian engineered and designed, based on an American Chrysler inline six – the D-engine – that had been in development in the United States since 1966, but shelved due to high production costs. The Hemi six was produced as an overhead valve engine and took its name from the internal shape of its combustion chambers. It was available as 215-, 245- and 265-cubic-inch displacements.

# GM HOLDEN LTD, Melbourne

manufacturer

est. 1931

# Holden (Red) straight six engine

1963–1984

cast iron, steel, copper, brass, plastic, rubber, aluminium alloy, enamel paint

Collection of GM Holden Ltd, Melbourne

The Holden ‘Red’ six-cylinder engine was released for the EH series on 26 August 1963 in two capacities: 149 cubic inch (95 brake horsepower) and 179 cubic inch (115 brake horsepower). Engine designer Fred James headed the small team that developed the locally manufactured engine, which was painted red and reflected the design of the prevailing Chevrolet six-cylinder engine.

The ‘Red’ engine saw several capacity increases, and when fitted to the Torana XU-1 proved a six-cylinder (190+ brake horsepower – Holden never released the actual XU-1 power figures) could defeat the mighty Ford V8. In its ultimate form, in June 1984, the engine was electronically fuel-injected and developed 106 kilowatts at 4400 revolutions per minute.

## *5. Designing for the future*

The concept car, pioneered by Harley Earl's 1938 Buick Y-Job for General Motors, is designed to gauge public response to new, often innovative designs and technologies, and is not intended for production. The first local concept car designed by a major company was Charles Dean's 1959 Repco Record, a road-going sports coupe that trialled Repco components and design capacity. It was not until the late 1960s, however, that the major companies followed suit with General Motors-Holden's (GMH's) dazzling Holden Hurricane and stylish Torana GTR-X.

While the original strategy behind the concept car was to project forward to future styling and engineering possibilities, by the 1990s concept cars had begun to take a retro turn inspired by Thomas Gale's 1993 Plymouth Prowler for Chrysler. Brian Tanti took a lesson from the American hot rod for the styling of his concept FR-1 (Fund Raiser 1), while Richard Ferlazzo's 2005 Efijy for GMH combined references to past Buick designs and the iconic FJ Holden. In 2007, the Efijy was judged best concept car of the year in America, an achievement equalled in 2015 when GMH's Buick Avenir concept, which was deeply indebted to Buick's design traditions, took out the same award at the North American International Motor Show.

# GM HOLDEN LTD, Melbourne

manufacturer

est. 1931

## Holden Hurricane coupe, concept car

1969 designed and manufactured, 2011 restored

mid-mounted high-compression 4.2L V8 Holden engine, 193kW 259bhp, 4 speed manual transmission, rear wheel drive

designed by Don DaHarsh, Jack Hutson, Joe Schemansky, Ed Taylor and GM Australia Design

Collection of GM Holden Ltd, Melbourne

A wedge-shaped, two-passenger, mid-engined V8 sports car, the Holden Hurricane is 995 millimetres tall with a fibreglass body finished in an experimental metallic orange paint. It was launched in 1969.

The body consists of three parts that open out like a piece of kinetic sculpture: the canopy, which tilts up and forward over the front wheels to allow passenger access; the engine hood, which pivots up and back over the rear wheels; and the body shell. The cockpit-type passenger compartment has individual form-fitting seats, with fixed headrests and self-adjusting safety belts. It boasts a plethora of advanced gadgetry: closed-circuit television for rear vision, an early version of GPS, digital instrument displays and an aerodynamically advanced exterior.

Conceived as a research vehicle to test future trends, the Hurricane was the first collaborative product of the GMH Research and Development section and the Advanced Styling Group at the new Fisherman's Bend Technical Centre, which opened in 1964.

Restoration of the Hurricane to original design specifications began in 2006 and was finished in 2011, when it went on display at Motorclassica in Melbourne.

# GM HOLDEN LTD, Melbourne

manufacturer

est. 1931

# Holden GTR-X Torana coupe, concept car

1970

front-mounted 3.0L straight 6 cylinder Holden engine, 101kW 160bhp, 4 speed manual transmission,  rear wheel drive

designed by Don DaHarsh, Phillip Zmood and GM Australia Design

Collection of GM Holden Ltd, Melbourne

Unlike the Hurricane, GMH's Torana GTR-X could have gone into production. It is a stylish sports coupe that still grabs attention. In terms of design, it combines ideas and elements from a number of other cars, but does so in a convincing and coherent manner. The origins of its design lie in both GM Germany's Opel 1.9 coupe and the American Stingray Corvette, but these are overlaid with European and Japanese elements. As Chris de Fraga, motoring journalist for Melbourne newspaper *The Age,* noted at the time of its release, we can recognise the nose of the Plus 2 Elan Lotus, the windshield of the Lamborghini Miura, the seats of the 240Z Datsun, the side-window styling from the Datsun 240Z or the Toyota 2000GT, and the 'hatchback' lift-up rear window of numerous fast-back coupes.

What has resulted is a successful and surprisingly restrained design, with its long, sleek hood and low wedge-shaped grille. Its streamlined exterior has concealed headlights, sharp windshield rake, recessed parking and turning lights and flush petrol-filler access and door handles. In addition, front and rear bumpers are absorbed into the contours of the body. The whole package is defined by the black and orange stripe running parallel to the rocker panel.