

THE CLASSIC CAR



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THE NEW EIGHT LITRE BENTLEY



Advance Particulars
1931

The Eight-Litre: Bentley's Last is Bentley's Best

by Harvey Johnson

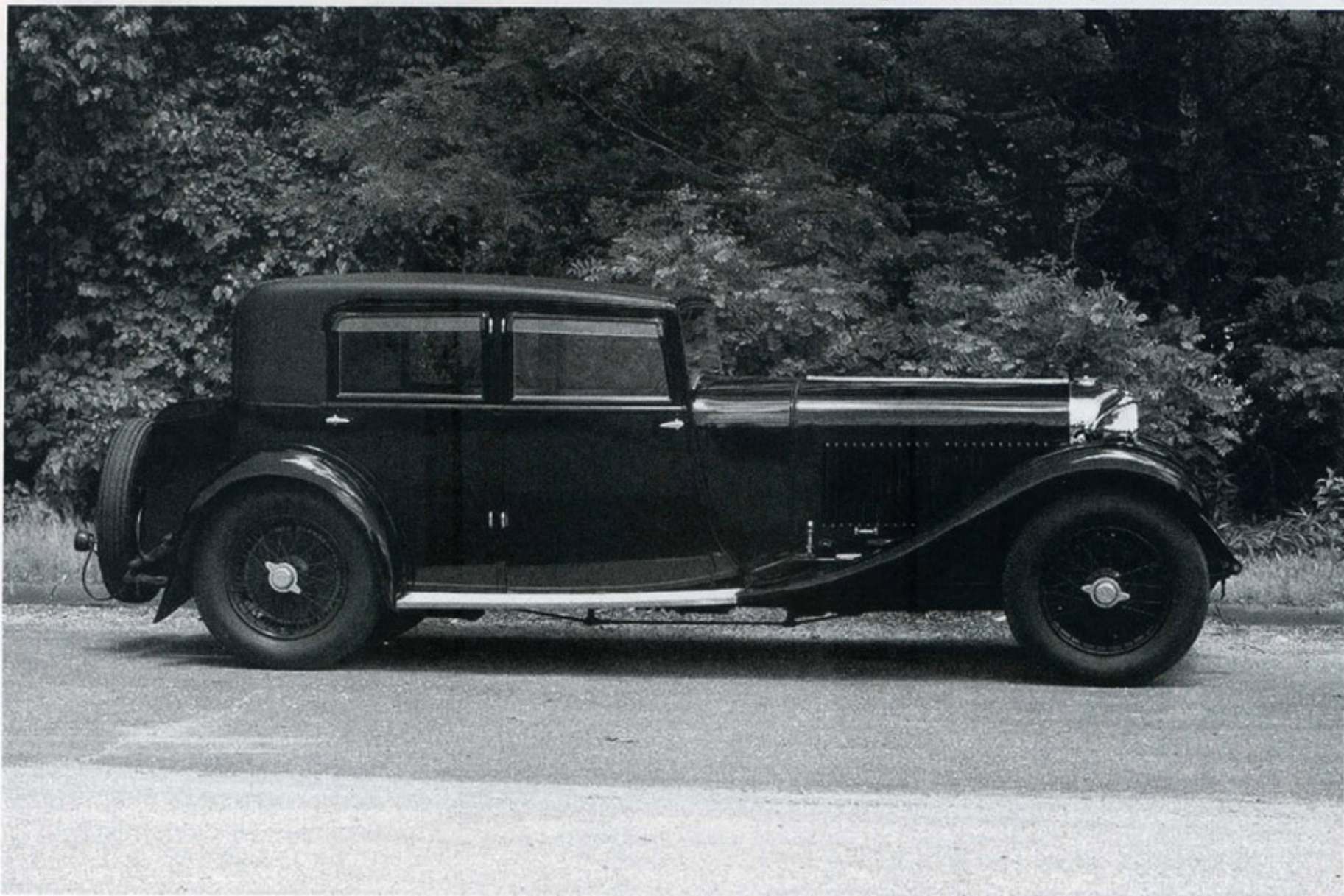
The Eight-Litre Bentley is the car considered by many to be Walter Owen Bentley's masterpiece, as well as one of the finest examples of the thoroughbred motorcar. It followed a succession of Bentley automobiles whose impact on the motoring world is held in high esteem to this day and is all the more amazing considering the twelve short years of the company's existence.

One can still envision the rumble of the dark-green Bentleys charging across the finish line at Le Mans, winning on no less than five occasions, along with wins at the Brooklands Double Twelve and many others. This was the golden age of motorcar racing and it served as the crucible from which the great Bentley cars were created.

Of the many victories that Bentley cars achieved, the motoring press relished writing about the famous 1927 Le Mans White House crash. It was June 18, 1927 at 9:30 p.m. in the midst of a pouring rain, the Bentley 3-Litre team car driven by Erlanger and Duller could not avoid Old Mother Gun, the 4-1/2-Litre prototype driven by Frank Clement and Lance Callingham that had crashed into a stranded Schneider. Sammy Davis along with Dudley Benjafield driving 3-Litre Old Number 7 slammed into both cars, bending an axle, the chassis and a wheel, and knocking a headlamp off. They feverishly worked to make their car drivable and, with a flashlight serving as the missing lamp, limped valiantly on to victory the next day beating the only remaining rival, the French Aries, albeit at a much reduced speed. A post-victory party at the Savoy Hotel had as honored guest Old Number 7 herself! Of such things are legends born and "legendary" is an appropriate word when applied to the great "Winged B".

Walter Owen Bentley, usually known as "W.O.", was born September 16, 1888 in Hampstead, London the youngest of nine children. Born with an engineer's mind, he was absorbed with things mechanical and would often strip down his bicycle into pieces only to re-assemble it with no difficulty. After completing his formal education at Clifton College at age 16 he persuaded

On these two pages is chassis #YK5113, Vanden Plas saloon on the 144" wheelbase chassis. It was purchased by John A. Player in December 1931.



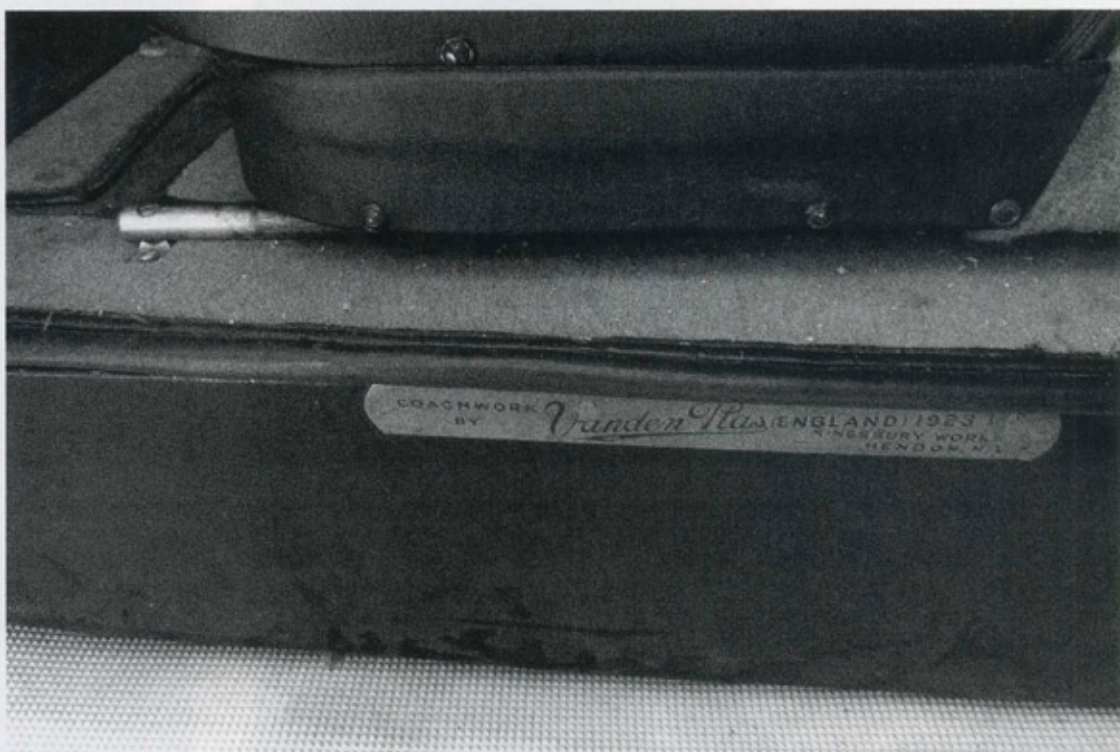
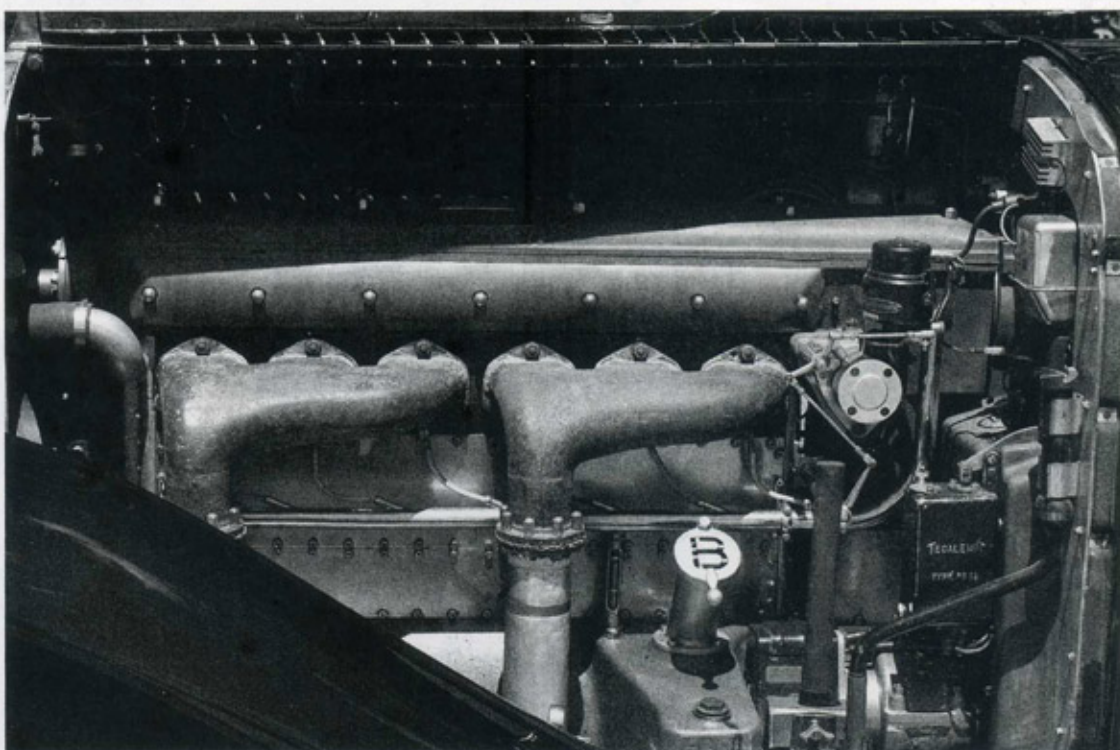
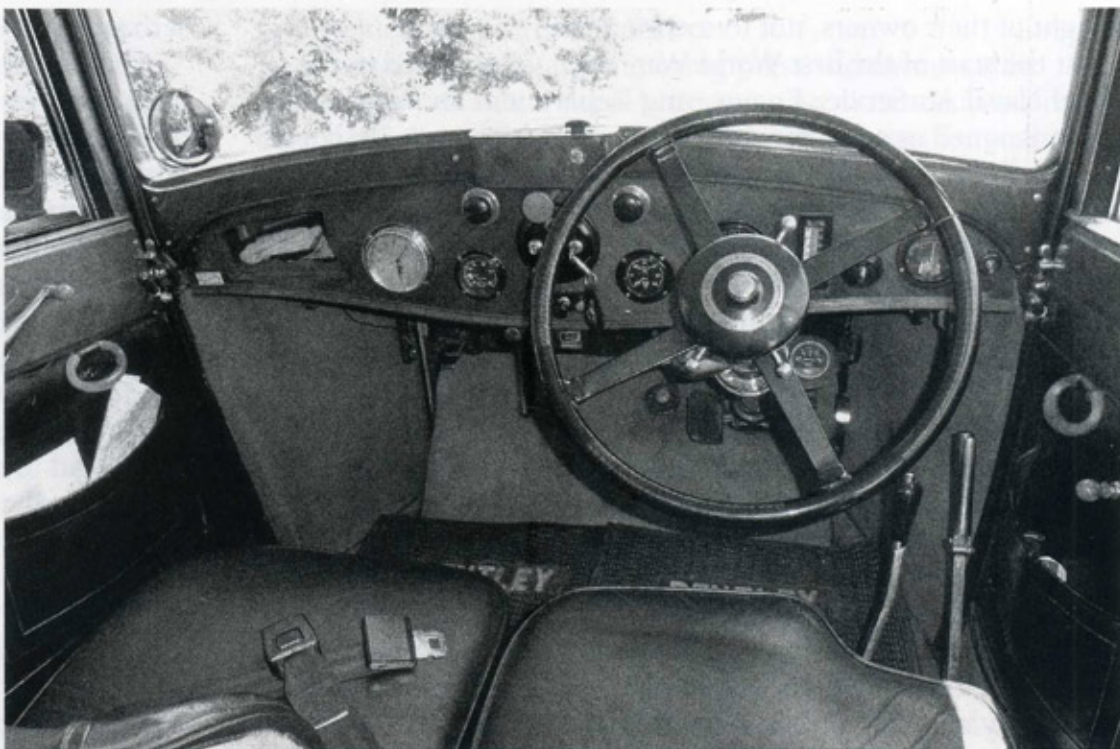
his father to pay the £75 enrollment fee for a five-year premier apprenticeship with the Great Northern Railway Doncaster shops. This program involved the very best training available and he learned hands-on engineering and theoretical skills that would stand him in great stead later on. Prior to this he spent a brief period at Kings College London studying engineering. He knew that practical experience coupled with theory was mandatory for mastery of engineering.

"Far too many young men enter engineering with far too little practical experience. Logarithms etc. are all very well, but there is no substitute for working on the job, up to your elbows in grease, dressed in overalls rather than a blue suit. It is my belief that you must be engrossed in the machine, developing almost an obsession for it, and use your hands as well as your head in order to get to know what it is all about."

He would have preferred to stay at Doncaster but the wages were somewhat less than his aspirations. Better jobs required seniority and he wanted a motorcycle, money in his pocket and some enjoyment in life—nothing too unusual for a 22-year old starting out on his own. In 1908 his interest turned to the internal-combustion engine and he bought his first motorcycle, a 3-horsepower belt-driven Quadrant.

W.O.'s brothers Horace and Arthur were also two-wheeled-power advocates. Arthur won the London Edinburgh event and W.O. won gold medals twice in trial events. He would get up early before any speed traps were in evidence and do a bit of "throttle twisting". He and his brother entered the London-to-Edinburgh trial winning a gold medal. He entered many other events including the Isle of Man Tourist Trophy race, twice.

By 1913 he and his brother established a dealership on Hanover Street in London to import the Doriet, Flandrin et Parent (D.F.P.), a sporty little French car that sold well in England, but then it had virtually no competition. W.O. invested £2,000 of his own money for this venture. During one of his visits to the French factory, W.O. spotted a small alloy paperweight in the shape of a piston, a salesman's gift to customers. This gave him an idea: Why not make pistons from aluminum alloy? People in the engineering field considered it unsuitable for a high-stress, high-temperature environment like an automobile engine. Bentley persisted and an experiment with various foundry castings resulted in an 88%-aluminum 12%-copper alloy that dissipated heat more effectively and was also lighter, thereby reducing the reciprocating mass. He kept this a secret since he was modifying the DFP cars for competition, using his aluminum pistons and beating most of the competitors. By then quite a number of high-performance D.F.P. cars were on the road to the



delight of their owners, not to mention D.F.P.

At the start of the first World War, W.O. volunteered in the Royal Naval Air Service Engineering Department and was commissioned as a Lieutenant. He provided his piston design to the Royal Navy who had several manufacturers use it in aero engines being built for its use. Employed as a troubleshooter, he visited various air squadrons to resolve engine problems they were experiencing. Many of the engines were short-lived, some resulting in crashes. One in particular was the French Clerget air-cooled rotary made under licence by Gwynnes in Chiswick. The engine was much modified under W.O.'s direction.

By 1916 he was given work at the Humber factory along with the resources to design and build an entirely new rotary engine of his own design. When fully developed, it was a great success, favored for reliability and power when mounted in the Naval version of the famous Sopwith Camel. It was titled the Bentley Rotary No. 1, or simply BR1. A larger more-powerful version, the BR2 followed. The War ended and while many were in use for years to come, the ordered quantity of 7,300 engines resulted in delivery of only 3,700. For his great contributions W.O. was awarded a grant of £8,000 sterling and an MBE. (*Most Excellent Order of the British Empire, an award initiated in 1917 for meritorious service by civilians to the Crown in time of war.*)

W.O. did not want to get back into the dealership business; the creative instinct was too strong and he was driven to produce his own car. He said that his greatest influence and inspiration to do this sprang from his work with the D.F.P. cars and his work on

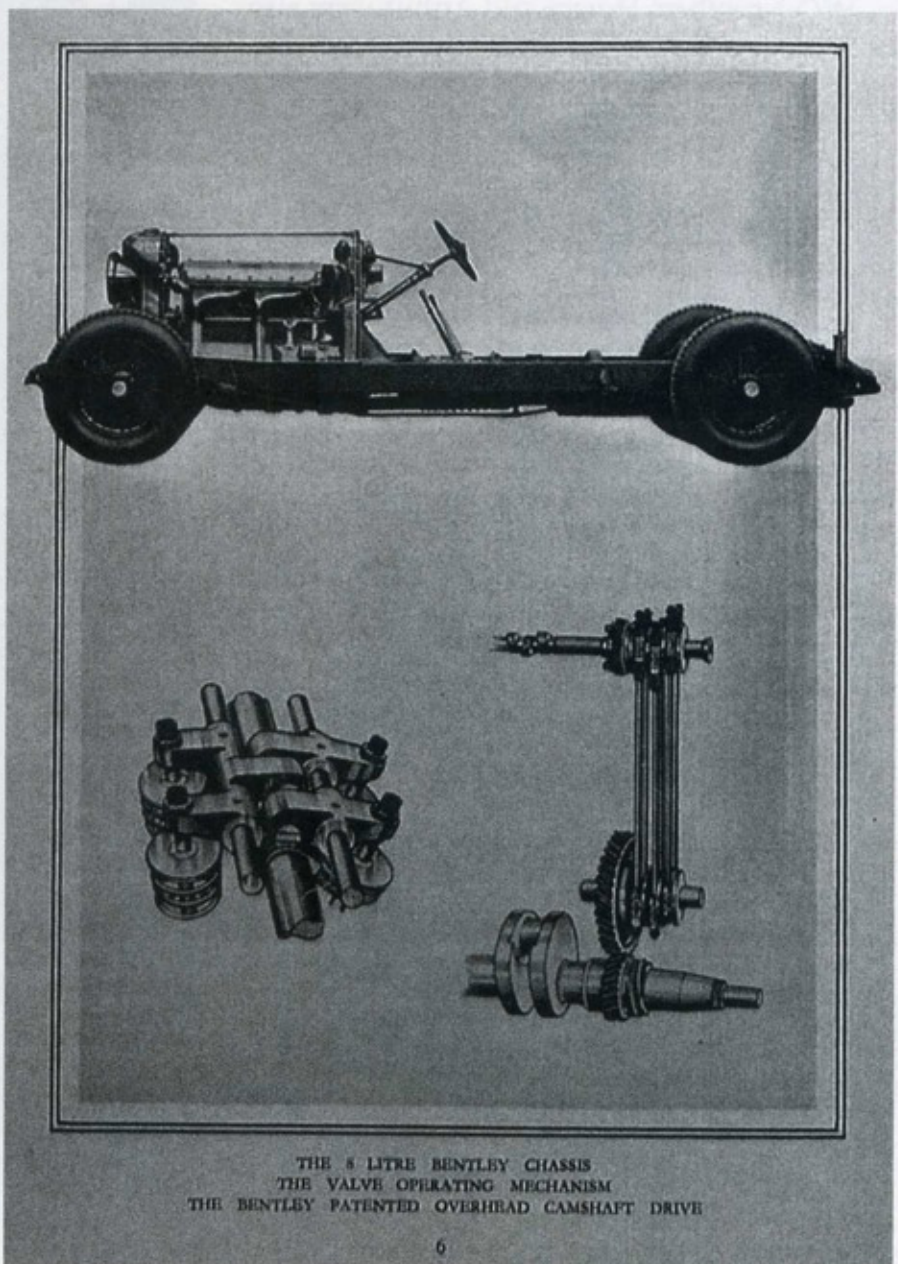
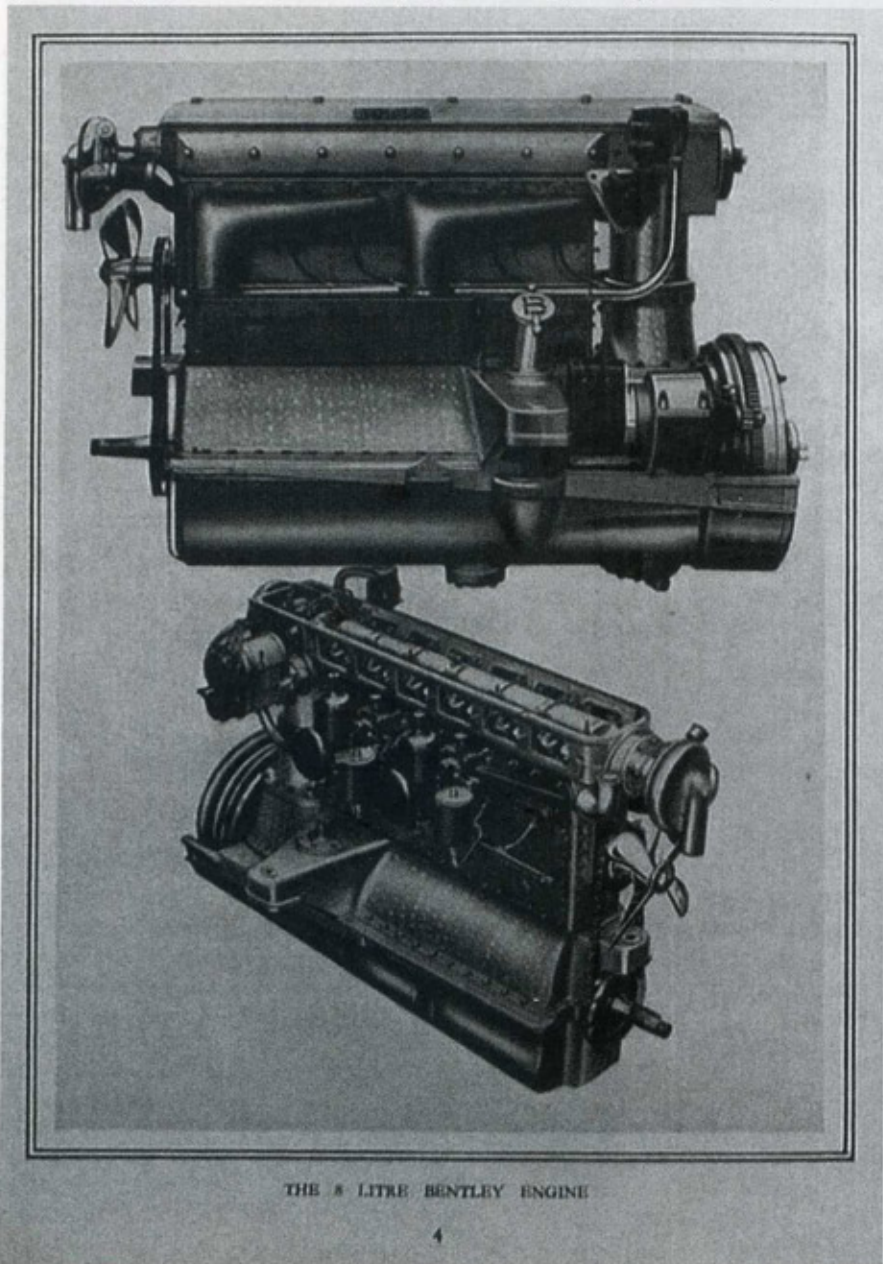
aero engines. Quality and reliability were foremost in his mind.

W.O., Harry Varley from Vauxall and F.T. Burgess, former head designer at Humber, worked for nine months on the design of a new engine. They set up shop on the top floor at 16 Conduit Street Mayfair, London. Ironically, this location was to be the showroom for Rolls-Royce. He wanted to build a fast powerful rugged car that could stand up to all-day hard driving at speeds of 60 mph or more over rough road surfaces, all the while without tiring the driver. The car was to be built without compromise using the best engineering principles known. There was no money for manufacturing prototypes and they knew that copying others without a thorough examination of a design could lead to disaster. Two designs were influential in the prototype, the 1912 Peugeot and the 1914 Grand Prix Mercedes. The engineering experience with aero engines had a profound effect on the design team's approach to creating the new car. W.O. was trying to set up agreements with machine shops and foundries while others along with Colonel Clive Gallop set about putting the new company on a financial footing. Clive Gallop was a former pilot who had flown the BR1 and had driven at Brooklands. He became a member of the design team assisting in the design of the new camshaft gearing.

A number of potential investors were invited to a party which resulted in raising £20,000 start-up money for the newly-incorporated Bentley Motors Ltd. W.O. was paid the sum of 2,334 £1 Sterling shares for his drawings and design work.

In October of 1919, the company's move to a new location in the stable-loft Mews off Baker Street was celebrated by the raucous noise of the new 3-litre engine. By January 1920 the first

Shown here are pages from the Bentley 8-Litre catalog listing six main features of this car: performance, silence, safety, reliability, strength and comfort.



car, EX 1, was completed. The single-overhead-camshaft four-valves-per-cylinder design incorporating a shaft-bevel-gear drive was used in this 3-litre car (as well as in the later 4-½-litre cars). The combustion chambers were hemispherical, fitted with two spark plugs fired by twin magnetos separately switched from the driving compartment. The cylinder block had removable plates for cleaning with optimum water passages for the best cooling. The lower half of the engine was an original design with the oil sump a separate casting from the crankcase for cooling. The engine-lubrication system provided full pressure to all bearings, and the valve gear pumped from the 2.5-gallon flat tank/sump via a filter. The generator was driven from the rear of the camshaft.

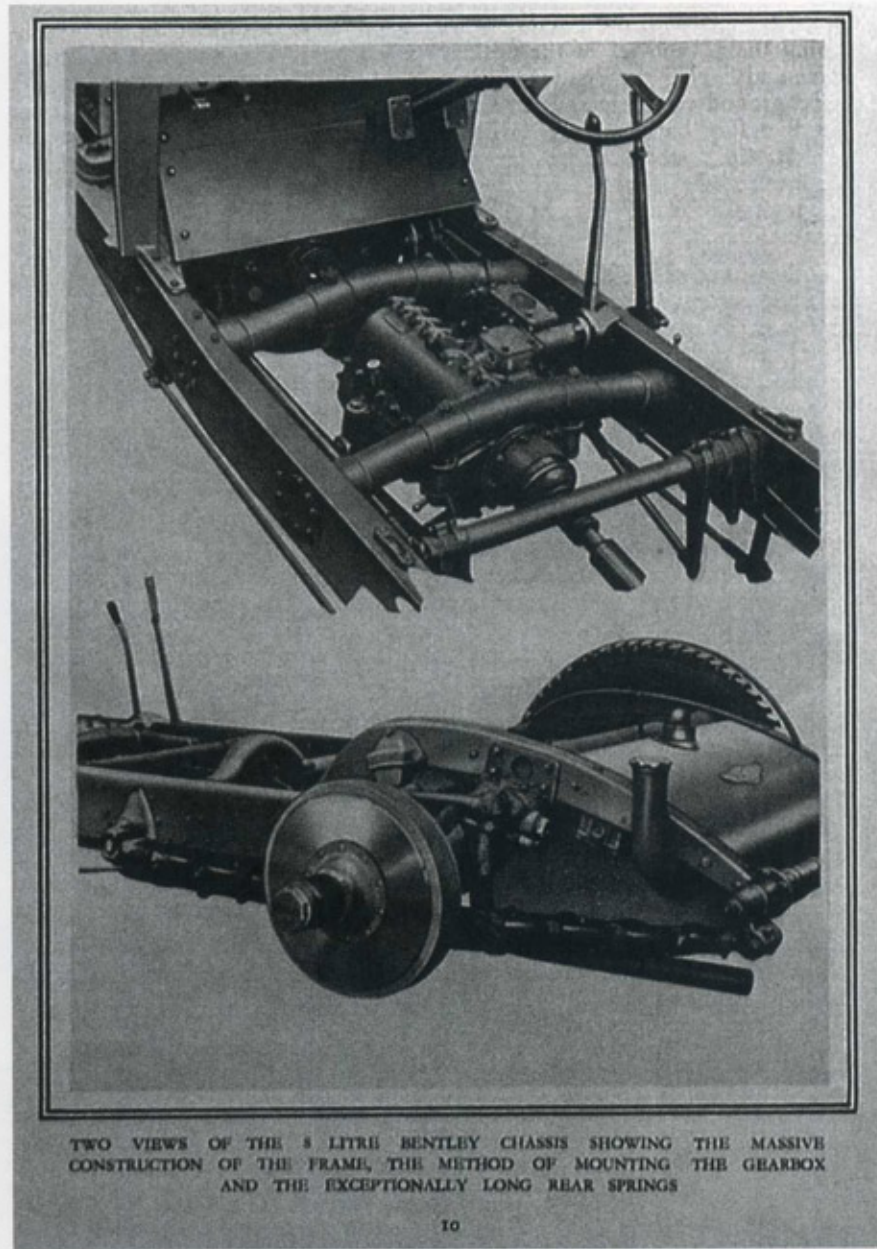
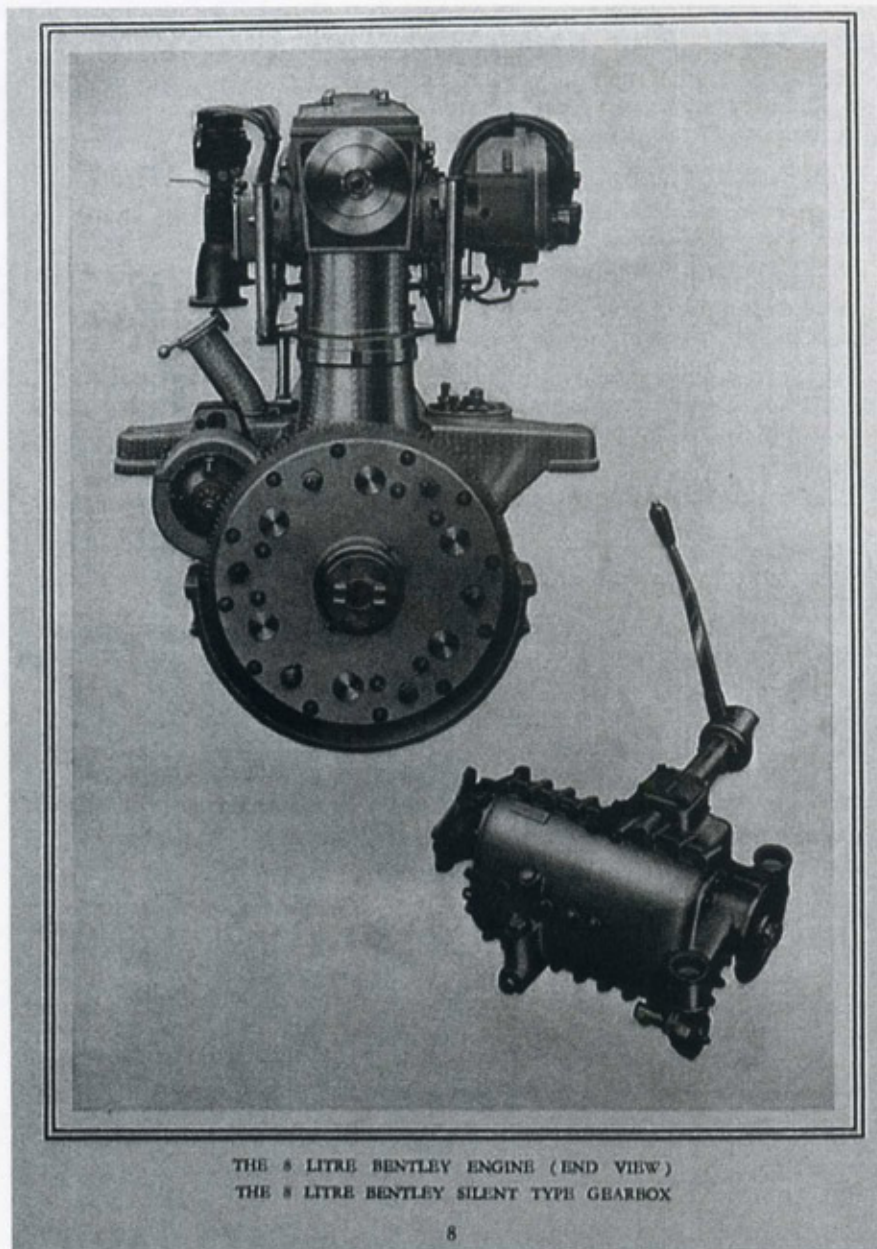
The chassis was orthodox with semi-elliptic springs and an open Carden drive shaft. Brakes were on all four wheels with a simple take-up adjustment. Much intensive modifying and re-designing was carried out since no firms existed to supply off-shelf components and parts were manufactured by various companies to the Bentley design. The prototype 3-Litre was subjected to almost two years of intense testing and modification. One change was to eliminate the dry-sump-lubrication system. It had a pressure and scavenge pump that fed from the sump up to a tank on the dashboard. The gearing of the pumps made a lot of noise. The design was dispensed with and a wet-sump system used. During the initial test, W.O. commented that the car was a delight to drive with light steering, very good handling, tractable pulling power and a good-shifting gearbox. He stated that the ride needed improving, something that was attended to later. Bore and stroke dimensions of 80 mm x 140

mm yielded a capacity of 2,996 cc.

When introduced, the motoring press and owners alike praised the car. While the 3-Litre was never intended to carry closed coachwork, dealers received many requests for such and various coachwork options were later included in catalogues. The British press in particular was impressed with the car's high performance capability. *Autocar* gave its first report March 8, 1919, stating the car could easily do 80 miles per hour and driving at 50 seemed like a loafing gait. Prices ranged from £1,225 sterling for an open tourer to £1,450 for a saloon landaulet.

A higher performance "Speed" model was introduced in 1925 and guaranteed 100-mph capability. This was not a radically modified 3-Litre; it was fitted with twin SU carburetors and had a short wheelbase of 108 inches. The 3-Litre became an instant success both on the racing circuits and with owners, and a total of 1,624 cars were built. In the interim, a new plant near London at Cricklewood was established, serving as the final and famous address of the great Bentley motorcars.

In 1927 a new 4-½-litre four-cylinder car was produced as it became evident that more power was needed both for carrying heavier coachwork and for greater competitive edge. In essence, the car was an outgrowth of the 3-Litre model with the same basic engine design of extreme ruggedness. Bore and stroke were 100 x 140 mm, with wheelbases of 117-½ and 130 inches offered. Frank Clement repeatedly broke the lap record at Le Mans with this car. In standard form the car could reach 92 mph and when equipped with a 3.3-to-1 rear axle could easily top 100 with specially-tuned versions reaching 120 mph. Total



production was 662 and 6 R.C. cars from spares acquired by Rolls-Royce at Bentley Motors receivership.

It is said that the supercharged 4-1/2-Litre car was the idea of Tim Birkin, the famous and fearless racing driver about whom a volume could be written. This entailed the fitting of an Amherst Villiers supercharger for an increase in speed and power. W.O. was not in favour of this idea; he believed in increasing engine size rather than compromising reliability. The racing team of Birkin/Paget wanted the car for Le Mans. In order to be entered at Le Mans a minimum quantity of 50 cars had to be produced. W.O. attached some blame on this move as contributing to the early demise of the company. Total production was 55. (*The 4-1/2 was a performer. In 1959 Stanley Sears took his car to Belgium and in the speed trails covered the flying mile at an average speed of 125.676 mph in both directions.*)

Design work on the next model, the 6-1/2-litre car began in 1924. W.O. wanted to build a car that could carry heavier coachwork and still deliver high performance but in relative silence. The prototype engine was a 4-1/2-litre and the car named "The Sun" fitted with an ugly radiator for a disguise. During one of his many test drives in France, he met up with what turned out to be a Rolls-Royce Phantom I prototype. A side-by-side race ensued for several miles but ended when the Rolls Royce driver's hat blew off and he stopped to retrieve it. W.O. was relieved since his tires were well worn. W.O. then realized that this car would not have a significant margin in performance over the Rolls-Royce. The bore was increased from 80 mm to 100 mm

and the new engine performed extremely well with greater acceleration and higher maximum speed. After six months of experimental work and more road tests a polished chassis and engine were shown at the 1925 motor show and, by early 1926, 58 cars had been sold.

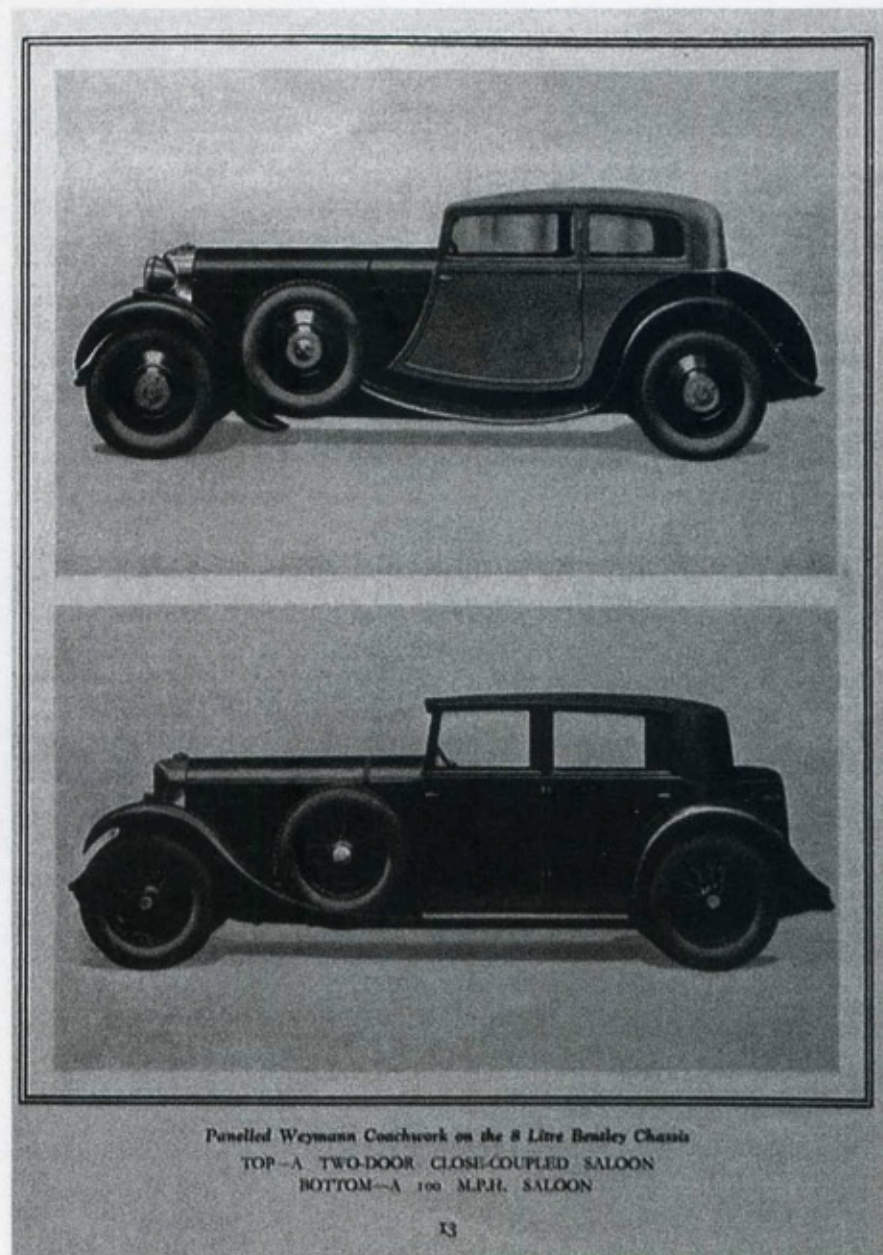
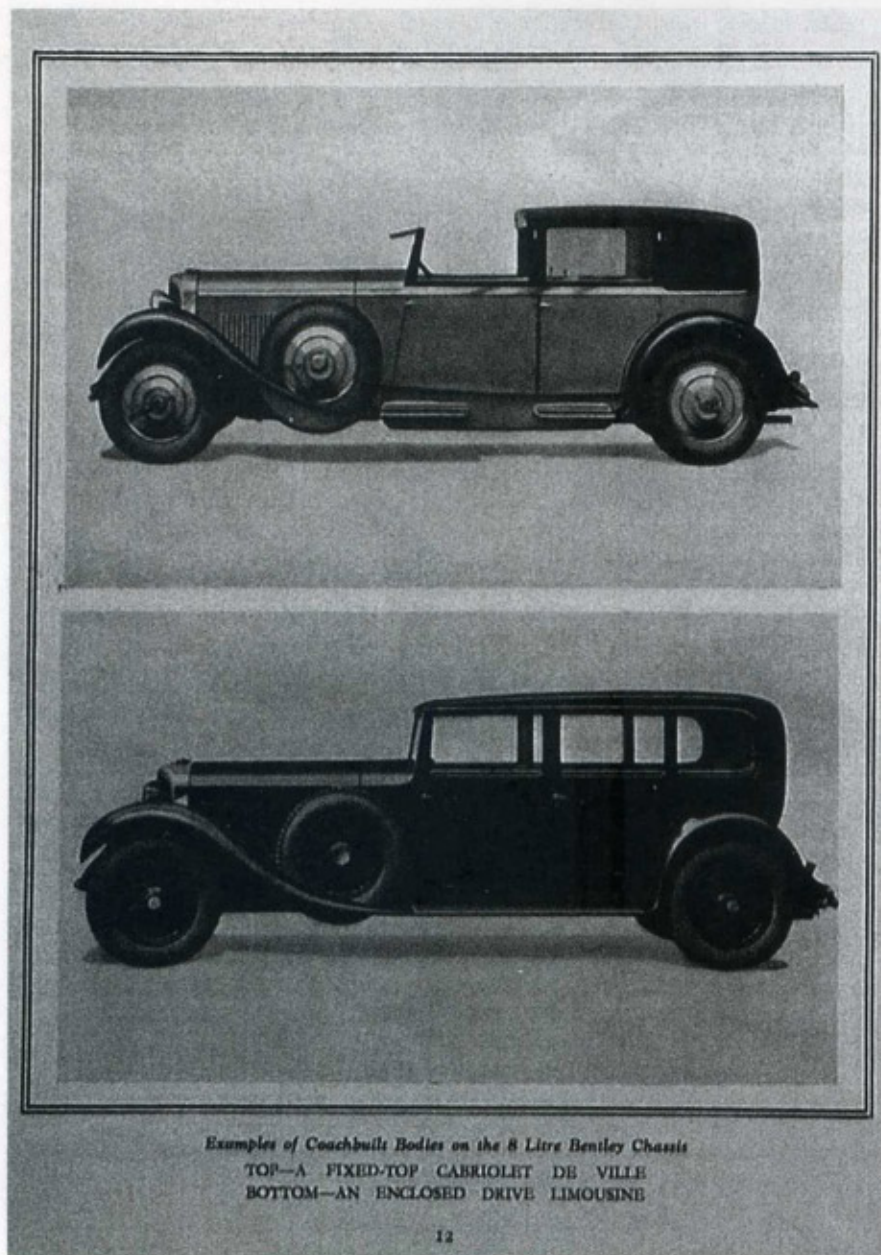
The engine was still a four-valves-per-cylinder design but with a radical departure in the camshaft drive. Many months of design work were required to produce the three-throw connecting-rod system that was not only silent, but eventually proved very reliable even in the grueling Le Mans races.

The Le Mans version could reach 134 mph when fitted with the 15/42 gear ratio. Capt Woolf Barnato, the famous Bentley financier, and Lieutenant Commander Glen Kidson drove Speed Six #4 1,821 miles with an average speed of 75.88 miles per hour to win at Le Mans in 1930. It is an interesting sidelight that W.O. never allowed his cars to be driven faster than it was necessary to win. The Daimler-Benz team completely underestimated the Speed Six. The cars could have been driven much faster and could have run for another eighteen hours with no problems.

The 6-1/2-litre car was produced in a standard version rated at 147 bhp @ 3500 rpm with a 4.4:1 compression ratio. Ignition was by twin magnetos. The Speed Six version was rated at 180 bhp with the single-port block and twin SU carburetors. Bosch magneto and Delco coil ignition were used by 1930. W.O. preferred coil ignition for better slower running speeds.

Le Mans cars were rated at 200 bhp @ 3500 rpm with

Coachwork illustrated in the catalog included a fixed-top cabriolet, an enclosed-drive limousine, a two-door close-coupled saloon and a 100-mph saloon.



compression of 6.1:1. Bore and stroke were 100 x 140 mm. These cars were superb performers in either open- or closed-body form. One could be started in top gear and cruise all day at 70 mph, accelerate from 0 to 50 in 12 seconds, even with an eight-seat landaulet body. Salesmen loved the car and so did most customers, except for one. He said: "It's a very nice car, very nice, but I do miss that bloody thump". Of course he was referring to his previous 4-1/2-Litre. (From: "W.O." The autobiography of W.O. Bentley)

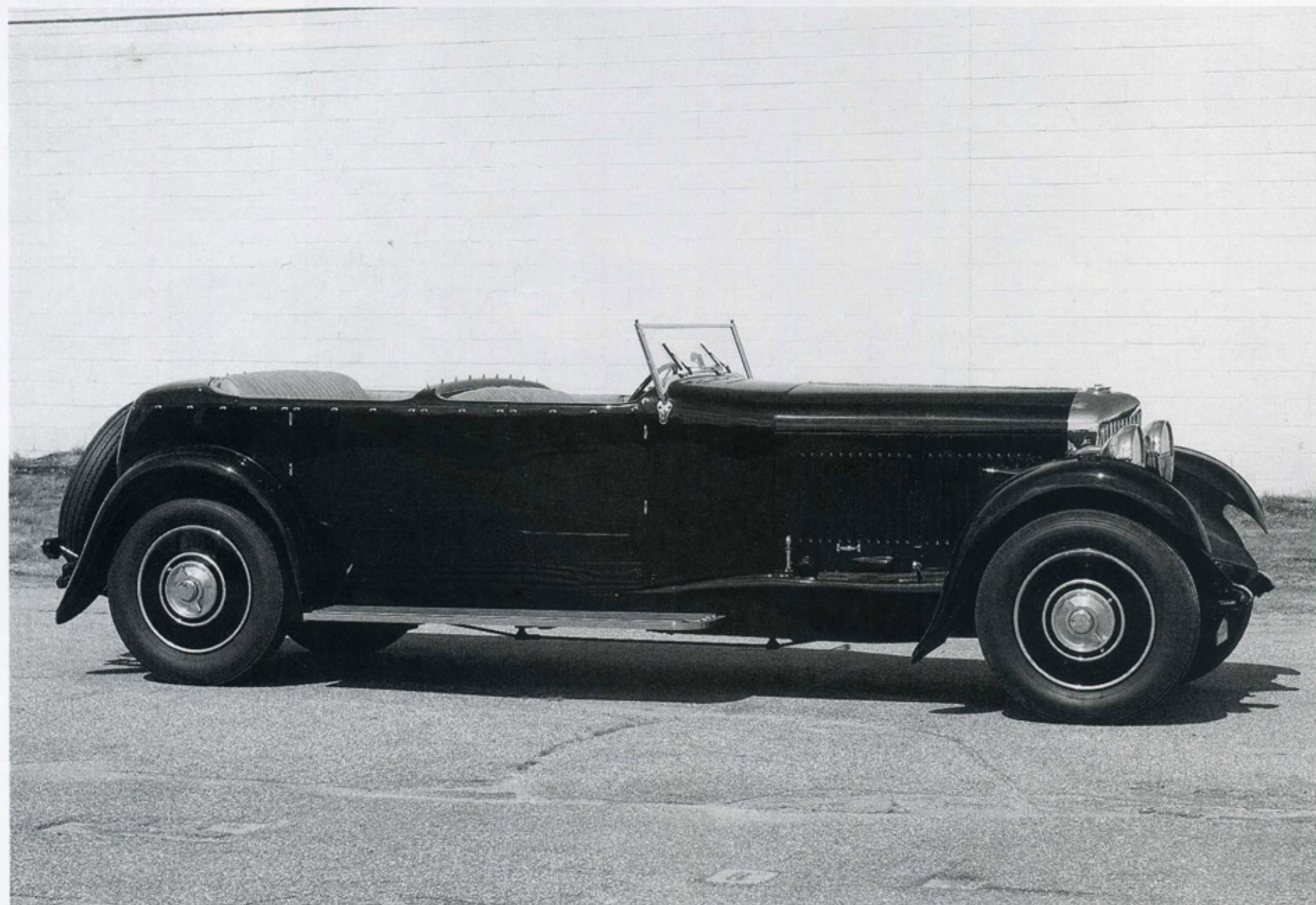
Prices ranged from £1,975 to £2,500 Sterling depending on coachwork. Incredibly, the guarantee covering the car lasted for five years. Total production was 544 cars; 373 in standard 6-1/2-litre form and 171 in Speed Six form.

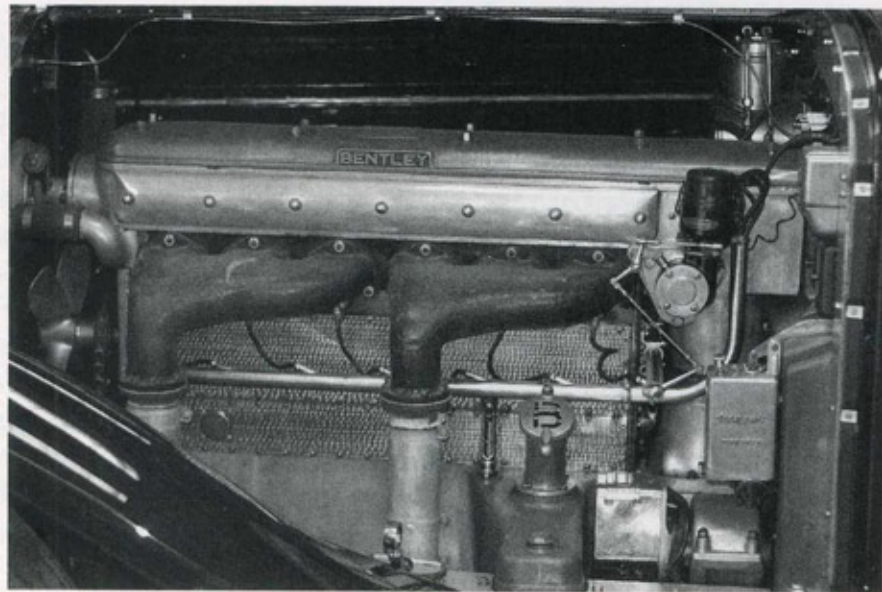


The Eight-Litre was a natural successor to the great 6-1/2-litre cars and a rather enlarged version of the Speed Six. The car was designed to exceed 100 miles per hour with seven-passenger coachwork fully loaded in relative silence. In this W.O. succeeded admirably. The engine was similar to the 6-1/2-litre unit with a larger bore of 110 mm, the stroke remained at 140 mm giving a capacity of 7982.81 cubic centimeters (487.14 cu inches). Horsepower was a conservative 220 @ 3500 rpm. The manifold arrangement was reversed left to right from the 6-1/2-litre arrangement. The Bentley-patented connecting-rod/drive-valve operating system was again used to operate the four valves per cylinder. The crankshaft and camshaft each ran in eight large bearings. Connecting rods were H-section two-bolt designs machined all over. Gudgeon pins were secured by aluminum buttons against side thrust. The block was cast iron with a non-detachable head. Pistons were aluminum fitted with four rings. The strengthened upper and lower halves of the crankcase and valve covers were *Electron* castings. This is a very lightweight magnesium alloy invented in Germany in 1914 and is presently used in the aerospace industry.

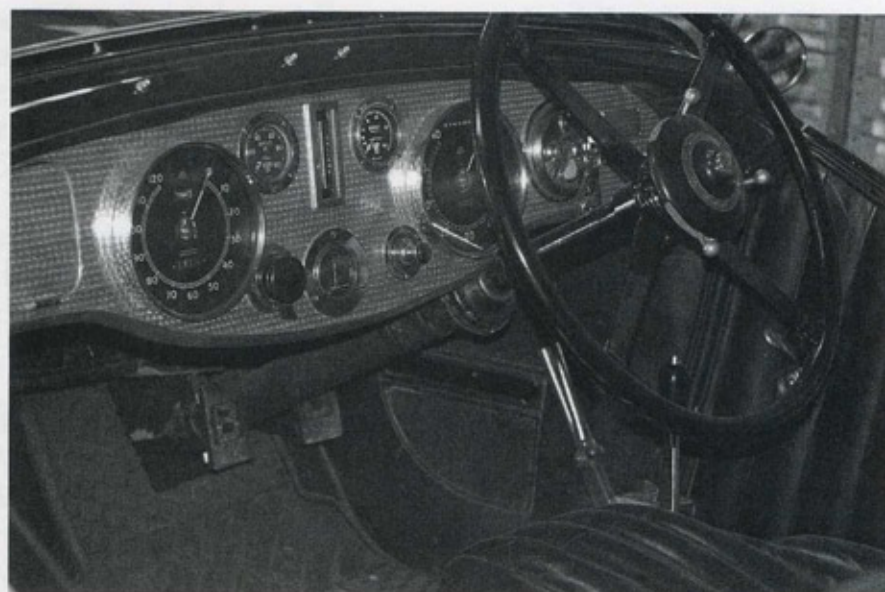
The sump capacity was 5 Imperial gallons. Two spark plugs per cylinder were fired by magneto and coil ignition, each separately switched from the dashboard. The generator was connected to the crankshaft damper enclosed in a casing at the front of the engine. The water pump was driven directly from a vibration damper connected to the front of the camshaft. A geared oil pump supplied full pressure to the main bearings and

Chassis # YM5044, Lancefield tourer





connecting rods. Cylinder walls and Gudgeon pins were lubricated by splash from the sump. The only belt-driven item on the engine was the fan via a pulley on the front of the crankshaft. The dual-chamber Autovac fuel system was connected to a 26-gallon tank. Twin SU carburetors with foot- and hand-throttle control were used. The clutch was a single-plate dry type with a central duraluminum disc. Thermostatically-operated radiator shutters were fitted. The four-speed gearbox was of a new split-case design to allow the fitting of improved gearing and bearings between gears for silence. Top gear was direct to the differential. The propeller shaft was open with double-sealed universals. The four-wheel brakes were vacuum Dewandre servo-power-assisted with an



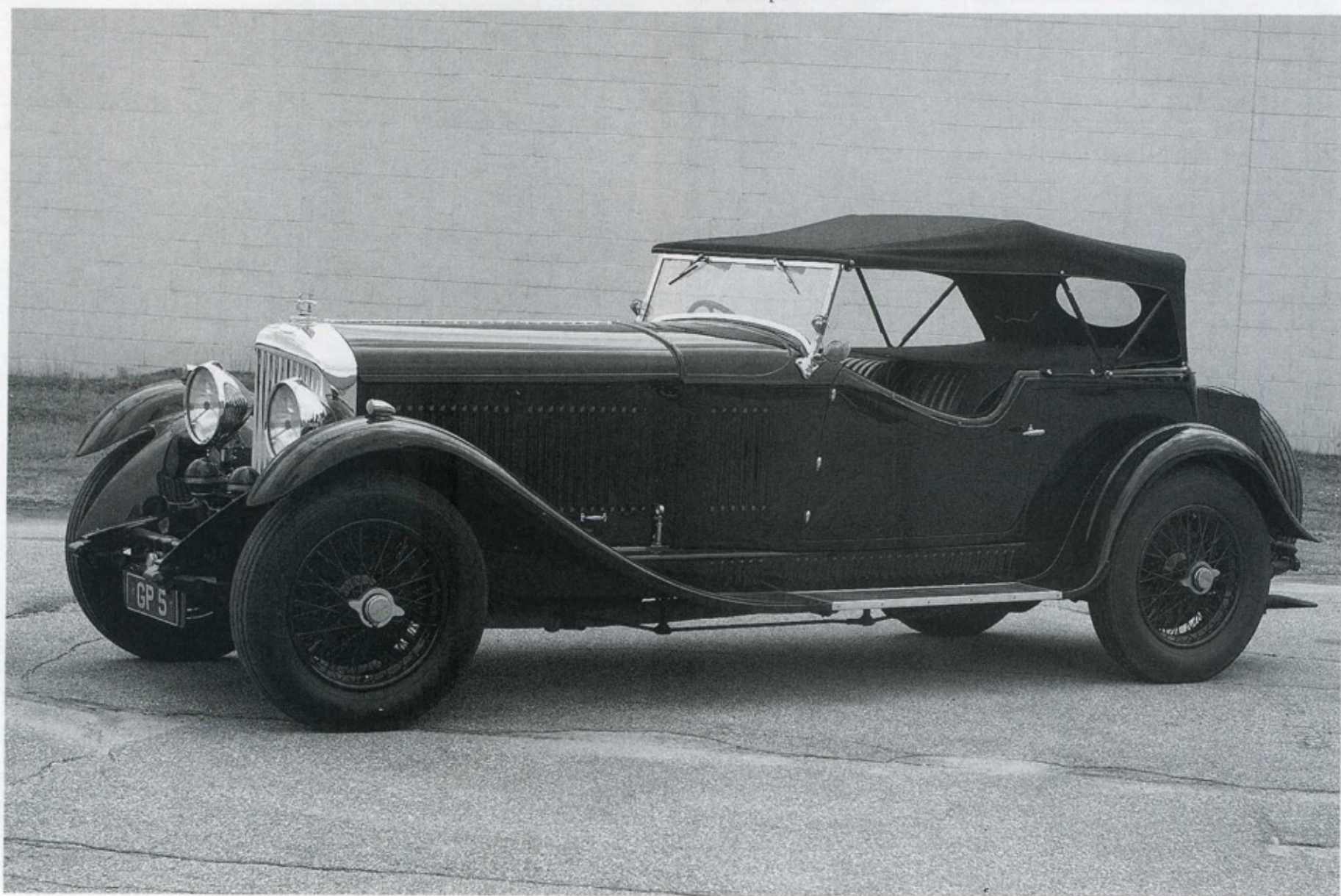
automatic compensating system to equalize wear. The hand brake connected to the rear wheels only.

The frame was re-designed completely and was much heavier for rigidity as well as to support heavier coachwork. Both short (144-inch) and standard (156-inch) wheelbases were offered.

W.O. tested a prototype extensively and stated: "It was about as quiet as a car can be and could do 110 m.p.h. on the open road without apparent effort." (From "My Life And My Cars".)

With the optional 3:53 back axle, 60 mph translates into a fast idle engine speed of 2,000 rpm. Even third gear gives 77 mph @ 3,500 rpm. In fourth gear at 3,500 rpm the car is traveling at 104 mph! With the lowest 4.07:1 gearing for large limousine body, speed is 91 mph @ 3,500 rpm.

Chassis #YR5097, Vanden Plas drophead tourer



A 1930 issue of *Autocar* described how smooth the 8-Litre was: "This car can be driven really softly on its high top gear, as slowly as a man walks, and can accelerate from that without snatch and without difficulty, and the whole time the engine, being well within its power, is silent and smooth. In fact, it is only rarely apparent that there is a big engine working under the bonnet at all, and that so high a top ratio is used, when the machine is accelerated from a crawl. For all practical purposes, therefore, the machine does its work on the one gear. In France the car has kept up a cruising speed of 70 mph without the engine seeming to do anything at all and 100 mph is achieved with very little effort."

Country Life stated in 1930: "In the beginning Bentley Motors set out to build the world's finest sporting car, and they succeeded admirably. When they turned their attention to luxury and comfort, they were equally successful. A test run in one of the six-cylinder cars is slightly embarrassing, as literally nothing one can find to criticise."

The huge and impressive 8-Litre was displayed at the 1930 Olympia Motor Show. It was very well received and 63 were sold. W.O. has credited the company's survival for an additional nine months to these sales and the fact that it was the most profitable car they ever produced. The chassis alone was priced at £1,850 Sterling.

As good as it was upon introduction, the car was never developed to its full potential. To give an idea of what might have been, Forrest Lycett, a record holder and Brooklands racing driver regained his once-held Belgian record at age 74 by driving his modified Eight-Litre at more than 140 miles per hour. The engine was modified with three carburetors and higher compression pistons and re-designed manifolds. This engine produced an astonishing 340 horsepower.

Neither the Eight-Litre nor the company was to survive. By 1931 the company had lost £84,174. The cost of building cars without compromise, without interference by cost accountants, coupled with the worldwide Depression was too high. In 1931 a hastily produced 4-litre car was introduced in a desperate attempt at survival using the Eight-Litre chassis fitted with an



BENTLEY MOTORS LIMITED

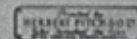
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Wolff Barnato, W. O. Bentley, Sir Waldemar Stoleary, J. K. Currah, H. Pile, R. J. Wiskell



overhead-valve, side-exhaust engine. The power-to-weight ratio was poor and W.O. would have nothing to do with this design. A total of 50 cars was built. Bentley production ceased in June 1931 and by July Bentley Motors Ltd. went into receivership with Rolls-Royce emerging as the winning bidder. Some cars were produced from assembled parts and sold but the "Winged B" era was over.

Of the 100 Bentley Eight-Litre models produced, 78 are known to exist today. Many driven regularly by Bentley Drivers Club and Classic Car Club of America® members.

A special thanks to Mr. Robert McClellan of Houston, Texas for the reproduction of the Eight-Litre catalog from his archives. Thanks also to Malcom Lee, George Holman and Jackie Holman for their gracious help with my photographic endeavors.



B E N T L E Y

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