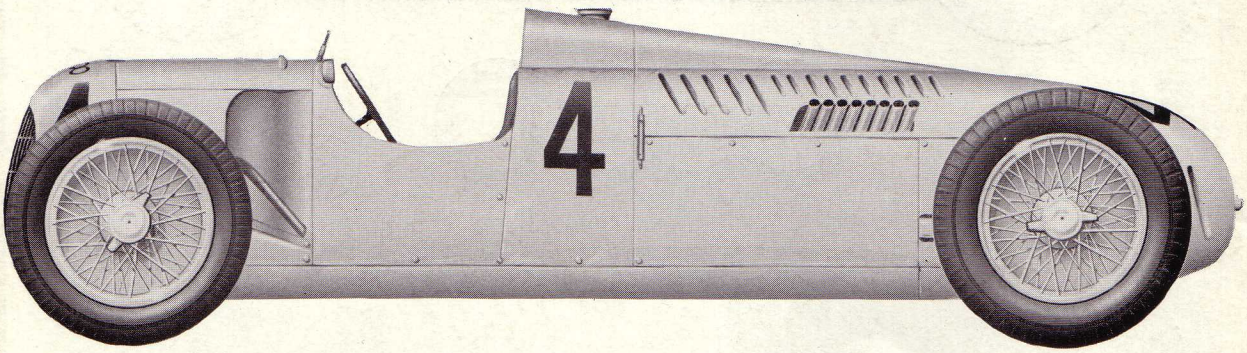
The 16-cylinder G.P. Auto Union



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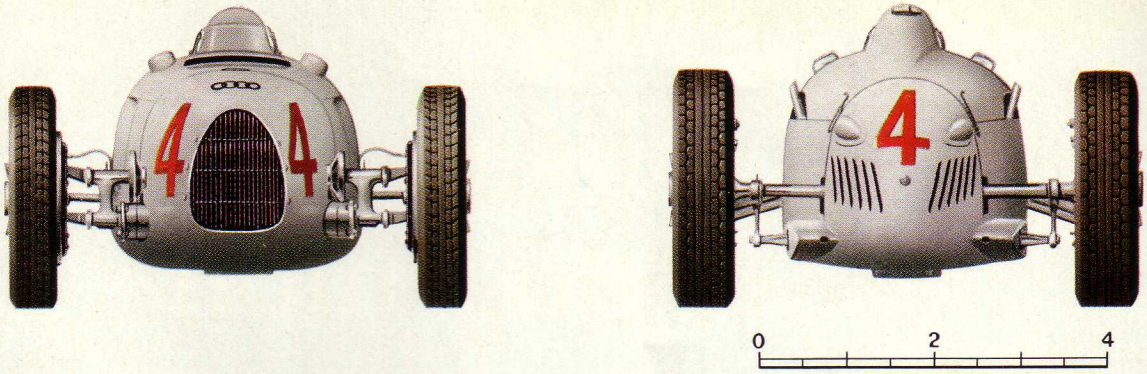
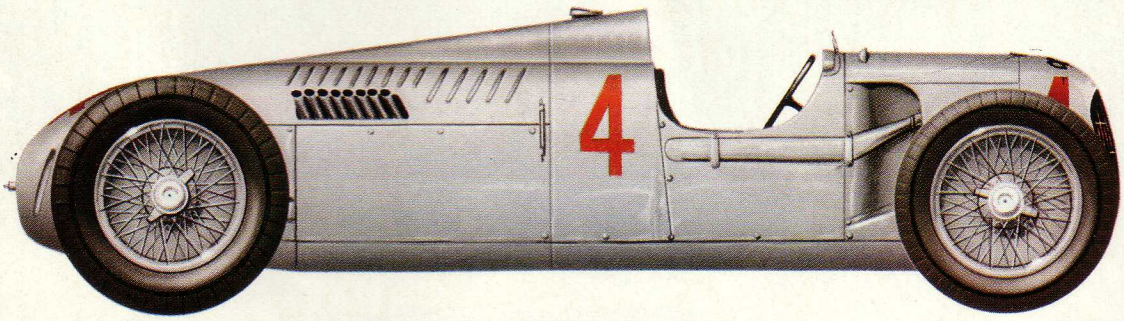
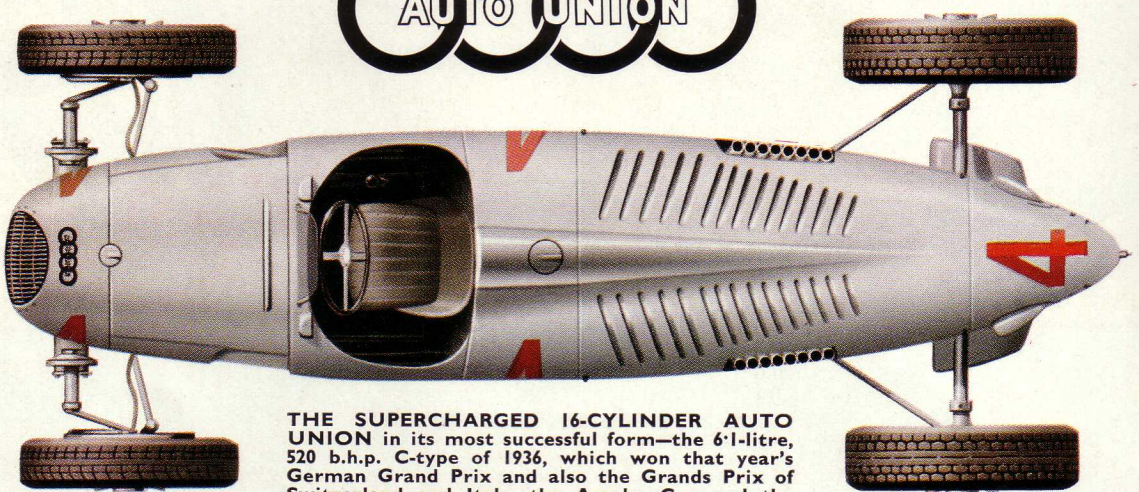
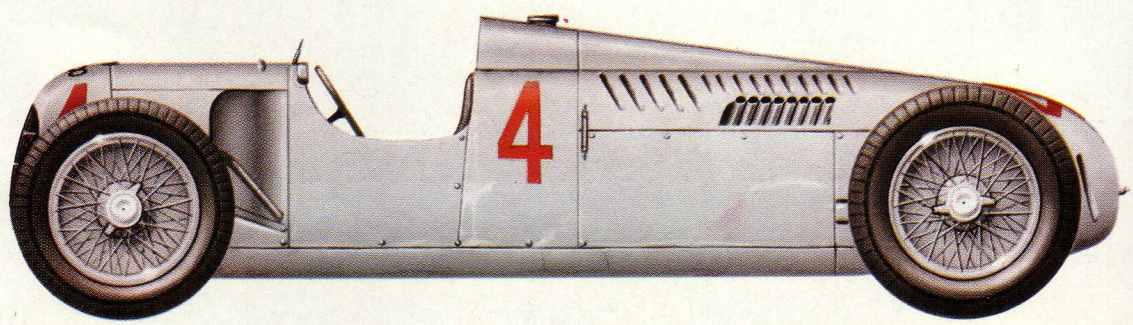




AUTO UNION



THE SUPERCHARGED 16-CYLINDER AUTO UNION in its most successful form—the 6·1-litre, 520 b.h.p. C-type of 1936, which won that year's German Grand Prix and also the Grands Prix of Switzerland and Italy, the Acerbo Cup and the Eifelrennen, all in the hands of Bernd Rosemeyer.



The 16-cylinder G.P. Auto Union

by Cyril Posthumus

Master at work: Rosemeyer winning the 1937 Eifelrennen by over 50 seconds from the Mercedes of Caracciola and von Brauchitsch.

Every racing car today is rear-engined, even the specialised Indianapolis track machines in the U.S.A. Yet only eight years ago such a layout rated as unconventional, and was exploited alone in Grand Prix racing by the British Cooper, a car which, to its critics, was just a 'jumped-up 500'. The many successes of this make in the 1958–1960 period caused a world-wide *volte-face* in engine location and rendered the front-engined racing car obsolete. Yet the real credit for proving that rear-engined racing cars were practical must go to the German Auto Union of over thirty years ago.

The man who did it was Dr Ferdinand Porsche, the eminent Austrian designer, although it wasn't entirely original thought on his part. Of course, the earliest cars of all had their engines at the rear, but Panhard-Levassor soon established the forward-mounted engine as conventional. Crouch of Britain and Benz of Germany produced rear-engined racing cars in the early '20s, and it was the latter design, an advanced six-cylinder, 2-litre G.P. car with independent swing rear axles, which set the example for Dr Porsche to improve upon.

He actually laid down the design destined to become the Auto Union when working as a freelance designer in 1932. Intended to comply with the 750 kg. Formula regulations announced in October of that year and due to come into force in 1934, it was a complete departure from the sterotyped, front-engined supercharged G.P. car with hard semi-elliptic springing all round. The link with Benz lay in Porsche's commercial manager Adolf Rosenberger, a keen amateur who raced one of the Mannheim-built rear-engined cars with some success in hillclimbs during 1924 and 1925 before switching to a Porsche-designed SS Mercedes. It was he who, with Porsche, formed a small separate company in November 1932 to pursue development of the rear-engined racing design. The company was called the Hochleistungs Fahrzeugbau G.m.b.H. (High Performance Vehicle Development Co.); their car they called the P-wagen after Porsche, its designer.

At that time the German motor industry was in so precarious an economic state that three well-known Saxon marques, Horch of Zwickau, founded in 1899, Audi of Zwickau, founded in 1909, and DKW of Zschopau, founded in 1916, took the defensive step of combining to assure their joint survival. The new group then acquired a fourth firm, Wanderer of Chemnitz, founded in 1902, and collectively called themselves Auto Union AG, based at Zwickau, adopting the now-famous insignia of the four linked circles as their symbol.

Just how the P-wagen came to be taken over by Auto Union is a story which varies with the teller. Richard von Frankenberg in *Porsche, the Man and his Cars*[1] says that Auto Union approached Porsche for a G.P. design, and that he replied 'I've got it already here in my pocket'. K. B. Hopfinger in *Beyond Expectation*[2] says that Porsche approached Wanderer shortly after its amalgamation with the other Auto Union companies, and that the group finally agreed to take over Porsche's design.

There is doubt, too, as to the exact time when Auto Union decided to embark on a G.P. racing programme. Porsche's design, we are told, was finalised by about October 1932, and several sources suggest that Auto Union took it over *before* the advent of Hitler and the Nazi party as leaders of Germany on 30th January, 1933. In view of the country's precarious economic state in 1932, however, it seems unlikely that a new group, only formed that year and fighting for survival, would undertake so costly a venture as building four entirely new and highly expensive cars and racing them all over Europe as a team, without some State encouragement. This they got when Hitler came to power in 1933, but not before, and it argues remarkable boldness and prescience on their part if they actually did plan a full onslaught on G.P. racing in the same year–1932–that their future rivals Mercedes-Benz had to give up racing, even on a shoestring, and let their No. 1 driver Caracciola go to the Alfa Romeo

[1] G. T. Foulis & Co. Ltd., 1954.
[2] G. T. Foulis & Co. Ltd., 1961.

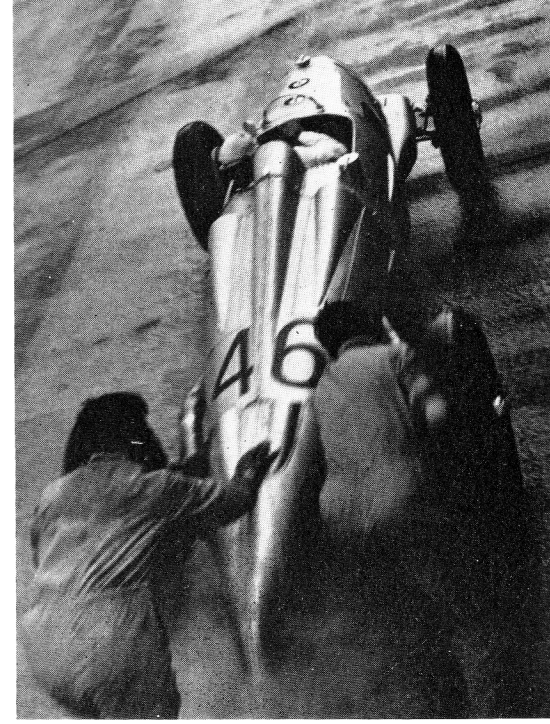
works team, as is recorded in Alfred Neubauer's book *Speed was my Life*[1].

Whenever and however the agreement between Porsche and Auto Union came about, it was certainly the subject of exciting rumours by mid-1933. By then the cars were being built under a mantle of secrecy at the Horch works, while the engines, 'twin 8-cylinder units' as rumour had it, were said to be under construction at the Zundapp works, which seems doubtful considering Zundapp was not a member of Auto Union. By then Adolf Rosenberger, to whom part credit for the original design must go, had left. He was Jewish, saw the way of the Nazi wind, and left for the U.S.A. By the Autumn the first car was almost ready, and rumour added 'a body like an aeroplane fuselage' to the twin engines, which were set *behind* the driver and the fuel tank.

To the select few who saw the P-wagen at its first appearance at Nurburgring on a chilly November day in 1933 these descriptions did not seem far out. It was indeed a revolutionary design, with independent springing all round, the driver seated behind a short bonnet and ahead of the engine—or 'engines', while the gearbox was in the tail and had five speeds.

Specific technical details were not offered, for Auto Union were markedly reticent about the P-wagen; the 'hush-hush' angle suited them well at that stage. The car wasn't driven at Nurburg, but Auto Union's new No. 1 driver, the Austrian hillclimb expert Hans Stuck, tried it briefly at Avus, then went with Dr Porsche and the Zwickau equipe to Italy for ten days of testing on the Monza circuit; they experimented with different superchargers, and covered some 200-250 miles daily in quest of stamina. Stuck then took the car through a measured stretch of the Milan-Varese autostrada at 155 m.p.h., after which everyone returned to Germany, and rumours of the remarkable performance of the new 'mystery' P-cars redoubled.

Auto Union's next move was to the Avus track outside Berlin, from whence the sudden news that the P-wagen had broken three records, including the world's hour, made tremendous impact upon the racing world and the nationalistically-minded German public. For years they had seen Italian and French cars winning their races: now it looked as if, at last, a white (or silver) car would beat them. Stuck drove the car, and his average for the hour of 134·9 m.p.h. was all the more remarkable considering that he had to brake hard twice each lap for the 70-80 m.p.h. loops at each end of the 12-mile circuit. He also broke the 100-mile record at 134·76 m.p.h. and the 200 km. at 134·85 m.p.h.—a striking debut indeed.



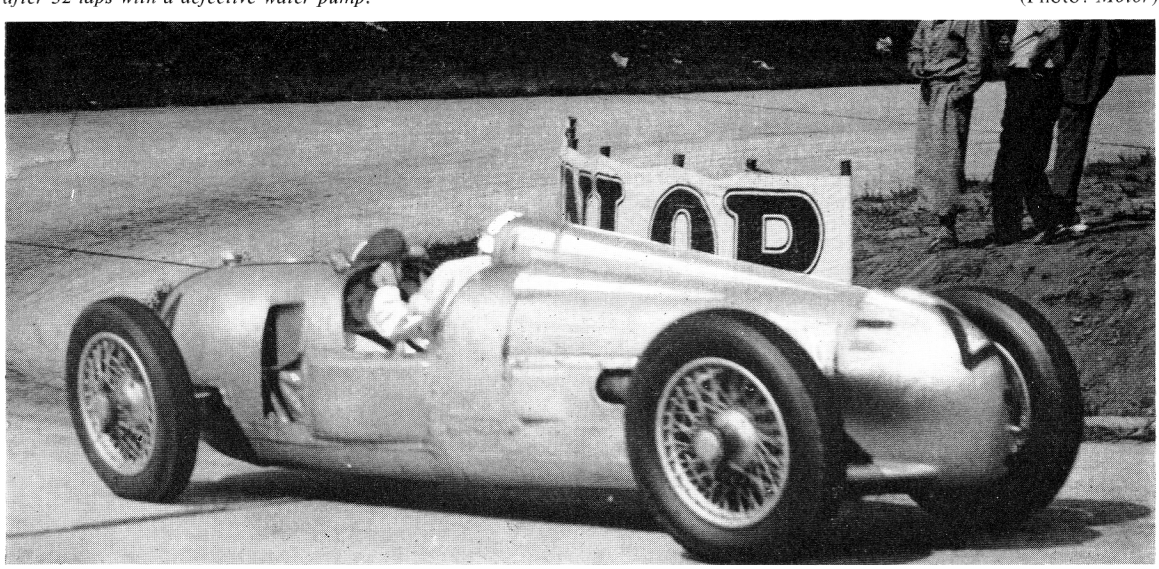
First race: Hans Stuck, leading the 1934 Avus G.P., pulls away after the pit stop which preceded his retirement through clutch slip. (Photo: H. von Perkhammer)

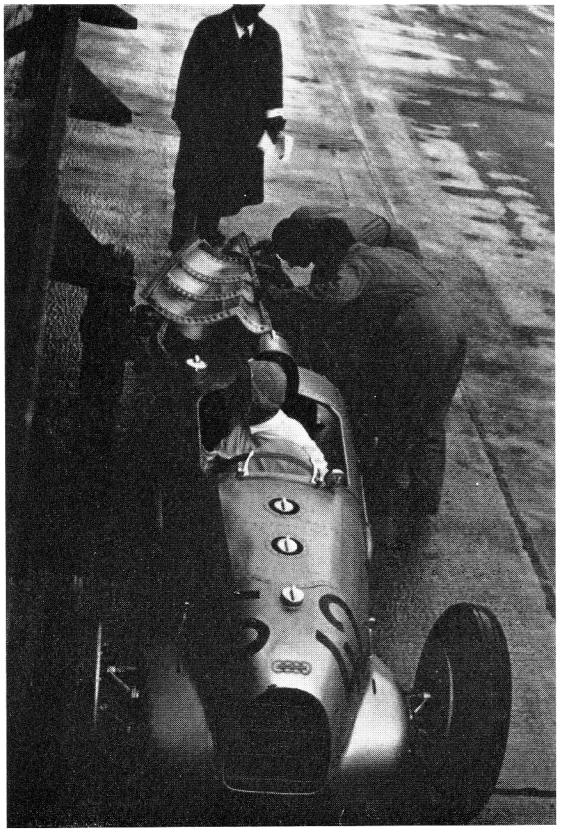
THE P-WAGEN DESCRIBED

Now much of the mystery of the P-wagen was revealed. That engine set behind the driver was a single 16-cylinder unit, not two 'eights', while the body, made of light alloy with side panels of doped aircraft fabric, *did* resemble an aircraft fuselage. The independent front suspension did not use conventional springs but

[1] Barrie & Rockliffe Ltd., 1958.

Strange new shape: Stuck's Auto Union taking the Faye hairpin at Montlhéry while leading the 1934 French G.P. He had to retire after 32 laps with a defective water pump. (Photo: *Motor*)





Early setback: Prinz zu Leiningen's Auto Union was the first retirement at Avus in 1934, with engine trouble.
(Photo: H. von Perkhammer)

torsion bars, as on the remarkable new front-drive Citroen saloon announced the same month (a coincidence which must have annoyed both parties); those on the Auto Union were set transversely, housed within the front cross tube, and connected to trailing links, while the swing axles at the rear were suspended by a big transverse leaf spring.

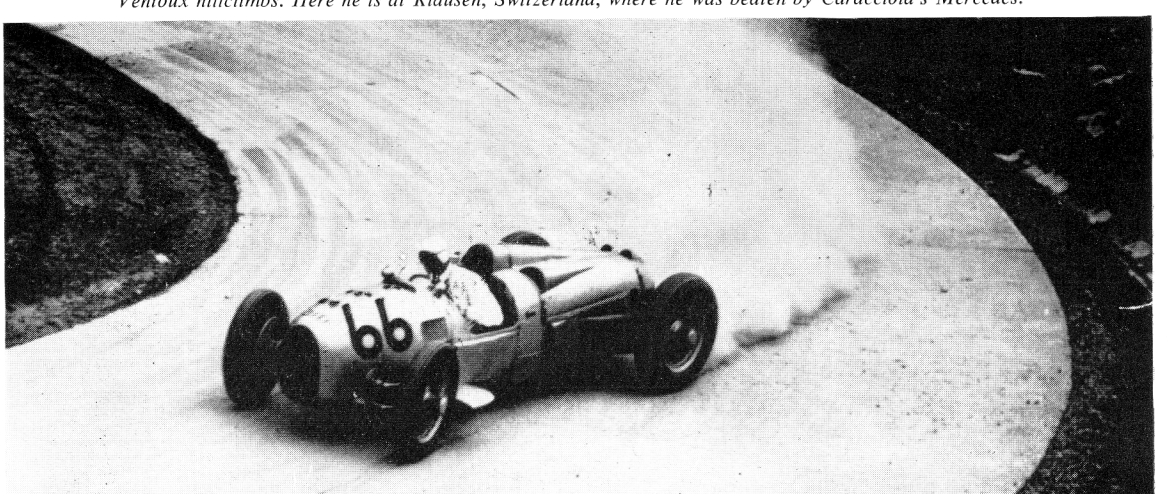
The frame, scorning conventional channel section members, was built up of steel tubes, ladder fashion, the main side members also conveying the cooling water between the engine at the rear and the radiator in the nose. Between the driver's cockpit and the engine was a 46-gallon petrol tank. Located thus, it left the weight distribution (and hence the handling) unaffected whether the tank was full or empty, at the cost of putting the driver farther forward than would be approved of today. Criticism of the Auto Union as the first rear-engined G.P. car centres on this driver location, which delayed his detection of the impending slide until it was too late to control it, while the 'tucking under' tendencies inherent with swing axles further increased handling difficulties.

The engine itself was a remarkable piece of work. Dr Porsche sought power coupled with lightness, compactness and reliability, and prescribed a narrow-angle (45 deg.) V-16 of 4·4 litres (68 × 75 mm. bore and stroke). It was remarkably compact, with a short, sturdy one-piece crankshaft running in plain lead-bronze main bearings: the big ends, too, were plain originally, and a single shaft-driven camshaft mounted over the centre of the vee was kept busy operating all 32 valves, the inlets in both banks of cylinders directly, and the exhausts by pushrods in tunnels passing over the heads.

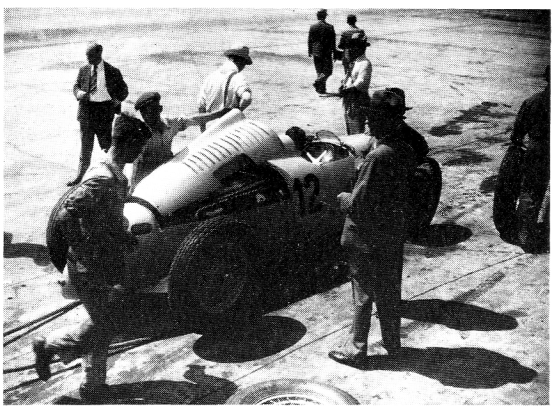
Unusually, the light alloy heads were detachable, and 'wet' cylinder liners were used. A single Roots-type supercharger, driven by gears from the camshaft, was mounted vertically behind the block, delivering the mixture from two Solex carburettors through a manifold formed integrally with the cylinder head castings. For its time this engine was not quick-turning, peak output of about 290-to 295 b.h.p. being produced at 4,500 r.p.m. The remarkable thing was that Porsche could produce so big an engine for a car obliged by the Formula to weigh under 750 kg. (14¾ cwt.) dry, and minus driver and tyres. Extensive use of light alloys helped, but so did the lack of a propeller shaft and universal joints, rendered redundant by putting the engine behind the driver and ahead of the rear axle. The drive passed below the axle to the five-speed gearbox behind it, then forward again to the differential.

Naturally, not all these details became known immediately, but enough was now known about the Auto Union, and its compatriot rivals, Mercedes-Benz, to make it clear that Grand Prix racing was being revolutionised. The car's first race further demolished the AIACR's hope that the new 750 kg. Formula would reduce maximum speed. It was at Avus on 27th May, 1934, that three Auto Unions met the Alfa Romeos of Italy, before a crowd of over 200,000, including Adolf Hitler himself, numerous Nazi officials and far too many Brownshirts.

Mountain Champion: Hans Stuck took the title in 1934 by his wins with the Auto Union at the Kesselburg, Freiburg and Mont Ventoux hillclimbs. Here he is at Klausen, Switzerland, where he was beaten by Caracciola's Mercedes.



Centre of intrigue: The unorthodox Auto Unions attracted attention wherever they appeared. This picture shows the team in the paddock at Nurburg before the 1935 Eifelrennen; note the detachable steering wheel resting on the short nose.



Pitwork: Paul Pietsch's Auto Union at Montlhéry during practice for the 1935 French G.P.
(Photo: Keystone Press Agency Ltd.)

FIRST RACING SEASON

In pouring rain Stuck shot his strange, long-tailed silver Auto Union into an immediate lead, passing the pits in clouds of spray at over 150 m.p.h., and pulling out a lead of 85 sec. by two-thirds distance. Then serious clutch slip developed and he had to retire; Prinz zu Leiningen in another of the Auto Unions had already dropped out, and only August Momberger's car survived the fifteen laps to finish third behind two Alfa Romeos. Thanks to teething trouble, not altogether unexpected, round one had fallen to the old guard.

Round two was the Eifelrennen at Nurburgring, where two of the new G.P. Mercedes emerged to face the three Auto Unions; tyre trouble and poor pitwork retarded the rear-engined cars, but Stuck finished second after leading at one stage. Round three was a far bigger test—the French G.P. at Montlhéry—for which race the Auto Unions appeared with shorter tails. Only two took part, but Germany's challenge turned to debacle in this gruelling race, All three Mercedes and both Auto Unions retired one by one, Stuck's car the last to go after leading for 32 laps, and the race-seasoned monoposto Alfa Romeos roared home to a rousing 1–2–3 finish.

It was their last great triumph, for now the tables turned as the Germans found reliability to match their undoubtedly superior speed, acceleration and road-holding. In the German G.P. at Nurburg, Stuck led every lap but one, and won by over two minutes. At Pescara it was Mercedes' turn; Stuck retired and only AU's reserve driver-mechanic, Wilhelm Sebastian finished, taking fifth place after clocking 171·1 m.p.h. through a flying kilometre. At Berne, in the first Swiss G.P., Stuck led unchallenged from start to finish on a tricky course made trickier by rain, with Momberger second, which suggests the rear-engined cars were not so unmanageable as legend made them.

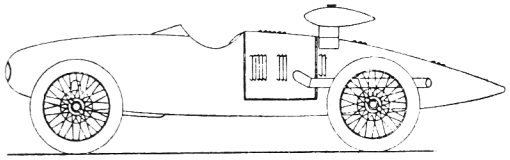
The Italian G.P. brought a second place for Stuck despite failing brakes and a foot so badly burnt by escaping oil that he had to hand over to Prinz zu Leiningen. At San Sebastian in the Spanish G.P. the same pair drove into fourth place, and in the 1934 'final', the Masaryk G.P. over a long, rugged, bumpy circuit outside Brno, Stuck won his third major victory before an immense crowd of over 300,000 people, while Leiningen was fourth.

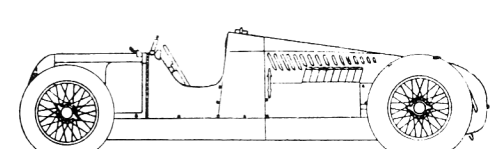
Dr Porsche must have been well satisfied with the first year's achievements of his revolutionary design. As for Hans Stuck, had there been a World Championship based on the premier G.P.s of 1934, he would have won it. As it was, he made sure of another title that exciting year, that of European Mountain Champion, by winning three hillclimb victories for Auto Union in the Kesselberg, Freiburg and Mont Ventoux events. And he wound up his finest season with some remarkable record breaking, again at Avus, where he set up a new 50 km. record at 150·21 m.p., 50 miles at 151·54 m.p.h., 100 km. at 152·18 m.p.h., all on the circuit with slow loops at each end, plus the standing kilometre at 101·37 m.p.h. and the standing mile at 116·73 m.p.h.—astonishing speeds in 1934.

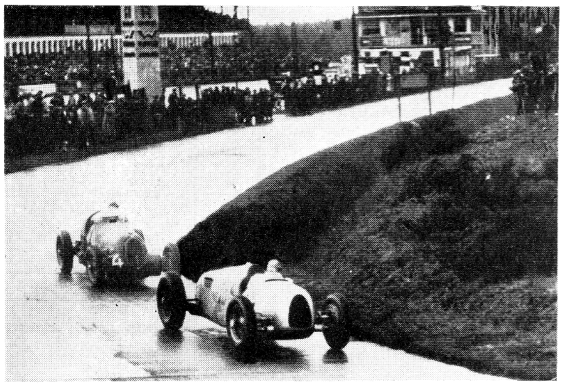
1935 MODIFICATIONS

For 1935 Auto Union emerged immeasurably stronger for a season's 'blooding'. and were fortified by the vastly experienced Italian driver Achille Varzi. The cars were modified in many ways; the tail pipes were replaced by stub exhausts discharging vertically; the fabric side panels were replaced by light alloy sheet; the cooling modified so that water no longer passed through the frame tubes owing to leakage problems and occasional 'parboiling' of the drivers; the heavy transverse leaf rear springing gave way to torsion bars carried in the frame tubes; detachable steering wheels were used to ease entry into the cockpit; and portable electric starters were employed. In the engine, the plain big end bearings were changed to roller type, and

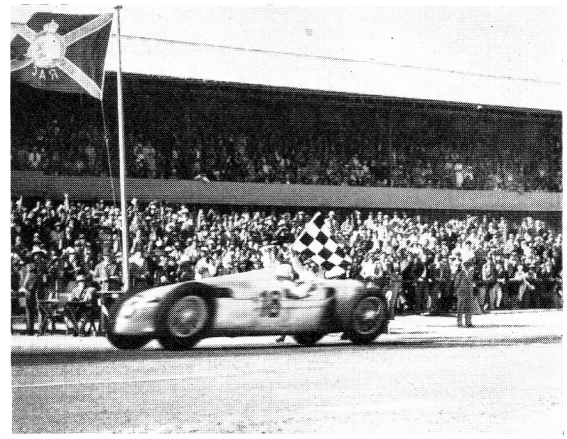
Eleven years between: The revolutionary rear-engined 2-litre G.P. Benz of 1923 (top) and the equally revolutionary but more successful rear-engined G.P. Auto-Union (below) which first appeared in 1934.







Master of the mists: Bernd Rosemeyer, the wonder driver of 1936, leading Nuvolari narrowly in the 1936 Eifelrennen, before the fog descended and the Auto Union driver pulled out a two-minute lead.



Distant victory: Ernst von Delius winning the Grosvenor G.P. at Cape Town, South Africa, early in 1937. Rosemeyer was second with a heavier handicap.

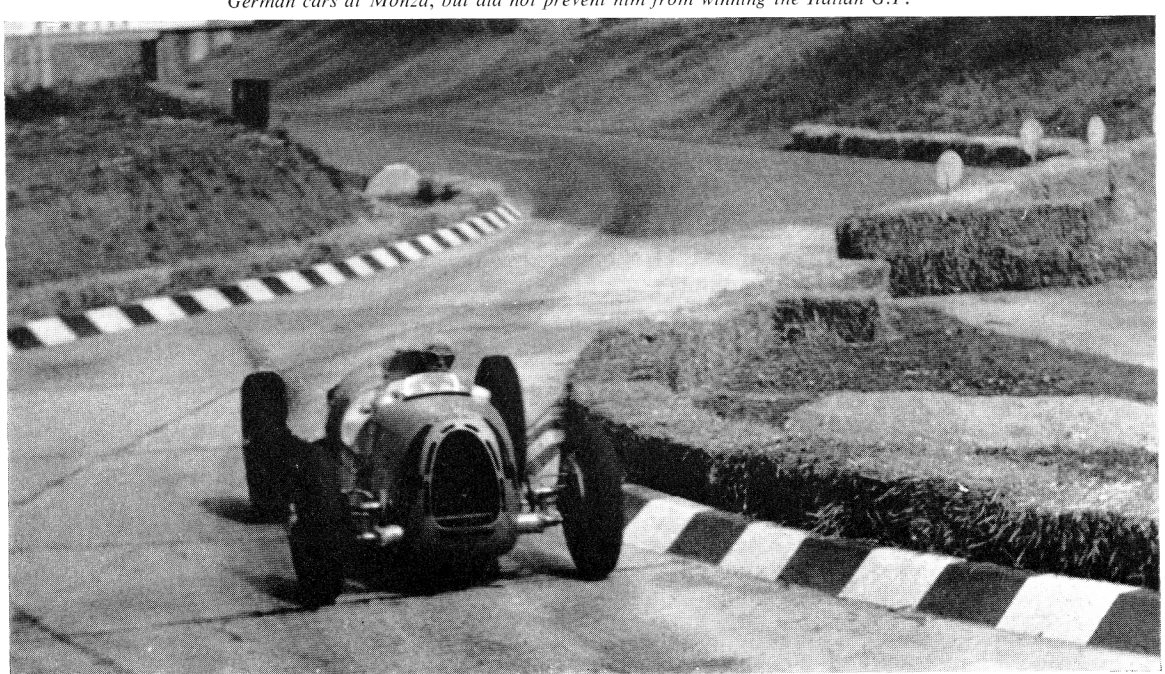
the crankshaft to a Hirth built-up pattern instead of one-piece. And engine capacity was raised to 4·95 litres (72 × 75 mm.) which, with a blower pressure of 11 p.s.i., produced 370 b.h.p. at 4,700 r.p.m., and raised the maximum speed from 170 to 180 m.p.h. The car in 1935 form was known as the B-type.

With the front-engined Mercedes-Benz now on top form, the Auto Union B-type did not have a very successful 1935 season, although Varzi won his first race, the Tunis G.P., with ease. But at Tripoli he lost to Mercedes five laps from the end when a tyre burst and he was placed second, while Stuck's car, of record-breaking type with a covered-in cockpit, caught fire, the brake pipes burning through at high speed. Stopping his car through the gear-box, Stuck could not get out of his coupé, but prompt action by an official saved his life. More misfortune followed at Avus, where Stuck won his heat but lost the final through tyre trouble; Varzi placed third, Leiningen, driving his last race for AU, left the road and the race at 150 m.p.h., and a new recruit from the Auto Union-DKW motorcycle racing team, Bernd Rosemeyer, also retired.

This young man was the sensation of the next race, the Eifelrennen at Nurburg, adapting himself remarkably well to the tail-heavy, oversteering Auto Unions. From fifth in lap five he moved to leader Caracciola's tail in one round. Despite a broken screen and broken goggles he then staggered the crowd—and Caracciola—by passing the master on lap eight, making the fastest lap and staying ahead until the last corner of the last lap, when the wily Caracciola caught him to win by 1·9 secs.

For the French G.P. two of the AU engines were further enlarged to 5·6 litres, but such a crop of plug, lubrication and brake troubles assailed the cars that only one finished, in fifth place. Dr Porsche withdrew the cars from racing until the German G.P., but there, like Mercedes-Benz, they suffered the humility of defeat by the genius of Nuvolari and his old Alfa Romeo on a dampish circuit. But Stuck was second

European Champion, 1936: Rosemeyer threads his Auto Union through one of the chicanes which made things difficult for the German cars at Monza, but did not prevent him from winning the Italian G.P.



and the other cars 4th, 8th, and 9th—a 100 per cent finish, if not victory. Three 5½-litre cars then contested the Acerbo Cup race in Italy, Varzi winning from Rosemeyer, and clocking 183 m.p.h. through the flying kilometre.

Stuck again won the Freiburg and Kesselberg hillclimbs, and Rosemeyer and Varzi were 3rd and 4th in the Swiss G.P. At Monza it was Stuck's day again, when he won the Italian G.P. after pacemaker Varzi blew up in the struggle with Mercedes. The same pair both retired in the Spanish G.P., but as in 1934 the Masaryk G.P. in Czechoslovakia proved a grand finale for Auto Union. The winner this time was young Rosemeyer, for Varzi retired and Stuck met a partridge at about 125 m.p.h. when leading; it broke his goggles and he retired with an injured eye.

AU's GOLDEN YEAR

For 1936 Dr Porsche increased the engine size of his cars yet again, to 75 × 85 mm., giving 6·1 litres and 520 b.h.p. at 5,000 r.p.m., running on fuel of high alcohol content—and all that in a 750 kg. car! Coupled with Rosemeyer's talents the Type C, as it was called, brought Auto Union their most successful year—thanks in part to the unexpectedly poor performance of the rival Mercedes that season. The latter started well by winning at Monaco and Tunis, but thereafter were thoroughly outpaced. Varzi was second at Monaco in a short-wheelbase Auto Union, and Stuck third, and a week or so later this couple scored a dramatic 1-2 victory in the Tripoli G.P., Stuck far from pleased at being pipped by his team mate to lose by ·4 sec., after leading most of the way. Rosemeyer's car caught fire and, curiously, staged a repeat blaze at Tunis, being burnt out. Varzi, too, had a startling accident there when his car was caught by the strong sea wind while travelling at over 175 m.p.h. The car somersaulted several times but Varzi was thrown out, scarcely scratched but naturally shaken.

At Barcelona AU had a poor race, with only 4th place to a new team driver, Ernst von Delius, and fifth to Rosemeyer after hitting a lamp post. He atoned for it in the Eifelrennen by winning a fantastic race in drizzling rain and fog; scarcely slackening his pace where visibility was down to 20 yards, he gained a 2-min. lead on the rest and earned the nickname *nebelmeister* (master of the mists) for his victory; his team mates Varzi, Stuck and Delius were way, way behind in 7th, 8th and 9th places.

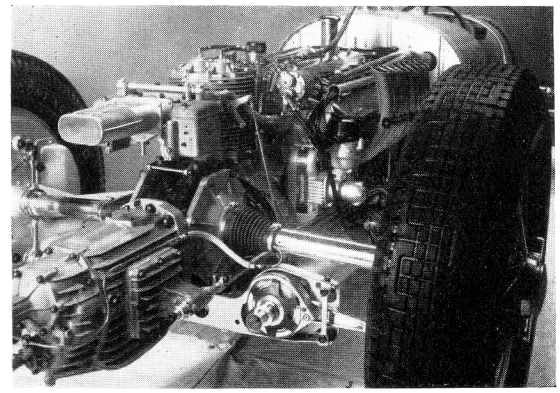
The rest of the season was largely a Rosemeyer story; he suffered honourable defeat by Nuvolari in the Hungarian G.P., won the German G.P., with Stuck second, new boy Rudi Hasse fourth and Delius sixth; won the Acerbo Cup in Italy followed by Delius and Varzi, 1–2–3; won the Swiss G.P. where AU were again 1–2–3, and won the Italian G.P. at Monza, where Delius was third. Overall he won the European Championship, and for good measure broke Stuck's record in winning the Freiburg hillclimb.

For the other drivers the season was less brilliant; Varzi was beaten by Nuvolari (Alfa) in the Milan G.P. over a twisty course wholly unsuited to the rear-engined car. The same demoniacal Italian beat all three cars at Leghorn in the Coppa Ciano when they ran out of brakes, Stuck alone finishing a lowly fourth to three Alfas—a lesson never to neglect preparation which Auto Union did not forget.

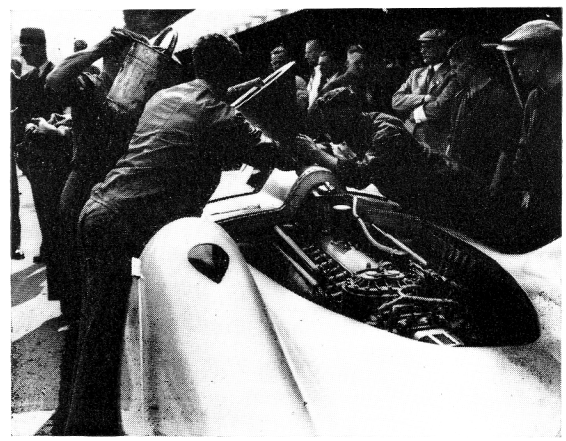
THE FORMULA EXTENDED

The 750 kg. Formula was due to finish with the 1936 season, but the AIACR extended it to encompass 1937. After their poor 1936 season Mercedes had produced formidable new 5½ litre cars which threatened to eclipse the basically older but very reliable Auto Unions. Porsche modified the steering and introduced two-leading shoe braking, but other than this the C was much as in 1936. Zwickau were weaker on drivers too, Rosemeyer fighting practically a one-man battle against the very strong Mercedes team, for Varzi and Stuck had largely dropped out, Fagioli had joined when past his prime, and the other drivers were virtually of the second league. Yet this season epitomised the 'age of the titans' of G.P. racing at its most dramatic, the rival German teams fighting some unforgettable battles. It also epitomised the classic big-engined G.P. car in its most ferocious and exciting form, with the Mercedes and Auto Unions able to spin their wheels in the lower gears at over 100 m.p.h. in the dry, and at over 160 m.p.h. in any gear in the wet!

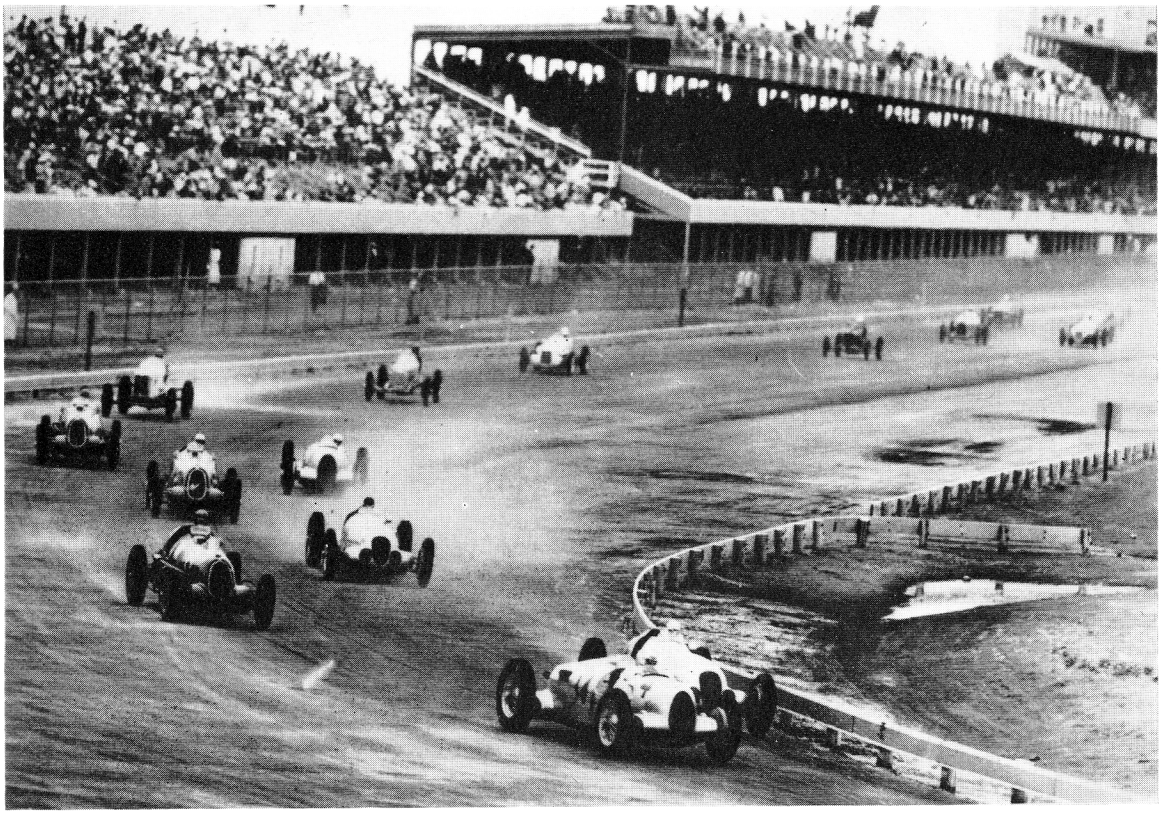
At the very beginning of 1937 Auto Union took a gamble by entering the South African and Grosvenor G.P.s in South Africa, both of them handicap events, Rosemeyer and von Delius were the drivers, but neither could do anything against their heavy handicap in the South African G.P.; Rosemeyer broke the old lap record by 3 m.p.h. on his first *standing* lap, and progressively raised it a further 12 m.p.h. but with tyre trouble to increase his handicap he could not better



Business end of the C-type Auto Union, showing the 16 cylinder engine ahead of the swing rear axles, the vertical supercharger behind it, and the gearbox behind the final drive.



Avuswagen: for the ultra-fast 1937 Avus G.P. Auto Union fielded both fully streamlined and open road race machines; this is Luigi Fagioli's streamlined car which retired after leading the second heat.

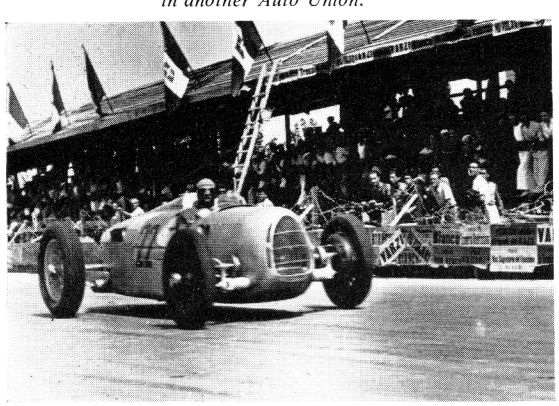


Showing the New World: Rosemeyer just beats Caracciola's Mercedes into the first turn of the first lap of the Vanderbilt Cup race on Long Island, New York, in 1937. The Auto Union won. (Photo: Keystone Press Agency Ltd.)

fifth place. Von Delius retired, but in their next race, the Grosvenor G.P., he won narrowly from Rosemeyer after starting 10 sec. earlier. One result of this trip was that Auto Union increased their production car sales considerably in South Africa—an important point then as now.

Back in Europe, the brilliant Rosemeyer gained four magnificent victories against full Mercedes opposition in the Eifelrennen, the Vanderbilt Cup race in the USA, the Coppa Acerbo in Italy, and the Donington G.P. in England. Of his team mates, Auto Union's No. 4, Rudi Hasse, surprised all by winning the Belgian G.P. at Spa with Stuck second, but on the short, twisty Milan course Hasse was eclipsed by the Alfa boys in their own backyard, finishing a very tired fourth. Then Stuck, who won the La Turbie and Freiburg hillclimbs, also suffered defeat at the hands of the Alfa Romeos in distant Brazil, when Pintacuda and a pit stop jointly beat him in the Rio de Janeiro G.P. over the notorious Gavea mountain circuit. As for poor Delius, who followed his South African win with a third at Tripoli and a second at Avus, his life ended tragically in the German G.P. Duelling with Seaman's Mercedes at about 140 m.p.h. he crashed and was killed when his car landed askew after leaping a hump-backed bridge: the Auto Union went end over end through a hedge and a wire fence into the Coblenz road outside the Nurburgring—the only fatal accident ever to take place during a race in the reputedly dangerous 16-cylinder Auto Union.

In sunny Italy: Hermann Muller's Auto Union passing the pits during the 1937 Acerbo Cup race at Pescara, won by Rosemeyer in another Auto Union.



Rosemeyer's victory in the Donington G.P. in October 1937 marked the last race for the 750 kg. Formula and the last for the 16-cylinder Auto Union. Tragically, it was also to prove the last victory for Bernd Rosemeyer, for this great driver was killed in a record attempt in January 1938, when his ultra-streamlined 16-cylinder Auto Union crashed on the Frankfurt-Darmstadt autobahn at about 270 m.p.h.

Auto Union being based in Saxony, which came into the Russian Zone after the war, none of their cars have since been seen in Western Europe save one C-type chassis which survives in the Munich Deutsches-Museum. The rest remain in Russian hands, their fate uncertain, although one at least is on permanent exhibition in a Moscow technical institute as an example of superb engineering and workmanship. The memorial to Auto Union enterprise is to be seen, however, in every racing car today with its rear engine. Ironically, in 1957, the year Coopers reintroduced the rear-engine to racing, Auto Union G.m.b.H., the Western Zone successors to the original group were taken over by their old rivals of the circuits, Daimler-Benz AG.

Hans Stuck, master of the lightning getaway, leads Caracciola and Rosemeyer off the line at Berne in the 1937 Swiss G.P.

List of Race Victories

1934 German G.P., Nurburgring (H. Stuck)
Swiss G.P., Berne. (H. Stuck)
Masaryk G.P., Brno, Czecho-Slovakia (H. Stuck)

1935 Tunis G.P., Carthage (A. Varzi)
Coppa Acerbo, Pescara, Italy (A. Varzi)
Italian G.P., Monza (H. Stuck)
Masaryk G.P., Brno, Czecho-Slovakia (B. Rosemeyer)

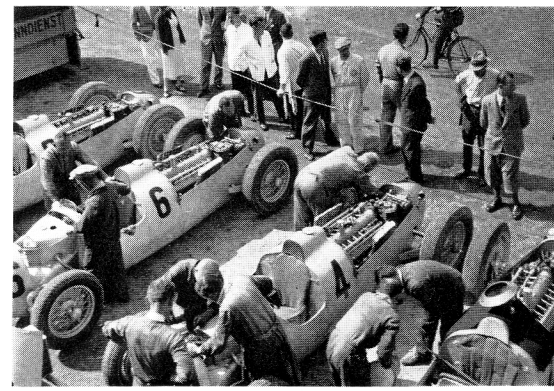
1936 Tripoli G.P., Mellaha (A. Varzi)
Eifelrennen, Nurburgring (B. Rosemeyer)
German G.P., Nurburgring (B. Rosemeyer)
Coppa Acerbo, Pescara (B. Rosemeyer)
Swiss G.P., Berne (B. Rosemeyer)
Italian G.P., Monza (B. Rosemeyer)

1937 Grosvenor G.P., Cape Town, S.A. (Handicap) (E. von Delius)
Eifelrennen, Nurburgring (B. Rosemeyer)
Vanderbilt Cup, Long Island, U.S.A. (B. Rosemeyer)
Belgian G.P., Spa (R. Hasse)
Coppa Acerbo, Pescara (B. Rosemeyer)
Donington G.P., Donington Park (B. Rosemeyer).

Hillclimbs

1934 Kesselberg, Germany (H. Stuck)
Mont Ventoux, France (H. Stuck)
Freiburg, Germany (H. Stuck)

1935 Kesselberg, Germany (H. Stuck)
Freiburg, Germany (H. Stuck)



Getting ready: Auto Unions lined up before a race; an interesting overhead view showing 'bonnets' off at front and rear.

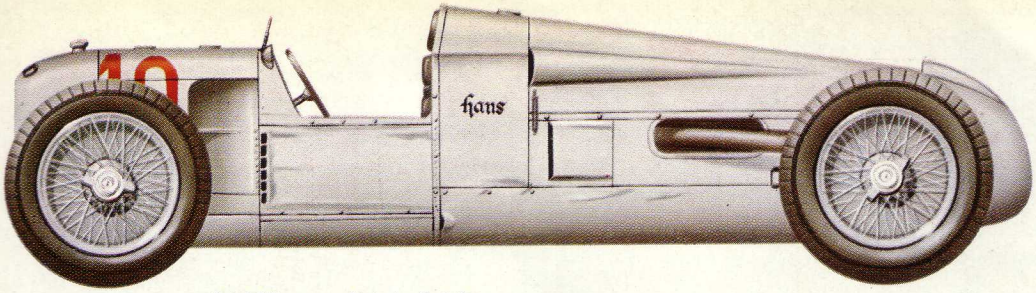
1936 La Turbie, France (H. Stuck)
Freiburg, Germany (B. Rosemeyer)

1937 La Turbie, France (H. Stuck)
Freiburg, Germany (H. Stuck)

SPECIFICATION: V-16 GRAND PRIX AUTO UNION, 1934-1937

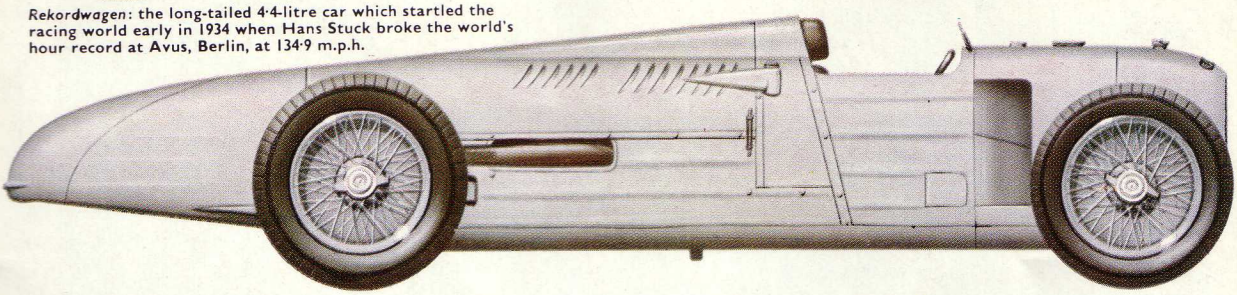
Engine: 45 deg. 16 cylinders. 'Wet' cylinder liners in light alloy blocks with detachable alloy heads. Two valves per cylinder at 90 deg.: inlet valves operated directly by single central overhead camshaft driven by shaft and bevels; exhaust valves by pushrods and rockers. Single Roots-type supercharger, mounted vertically; two Solex carburettors. 1934 Type A: 68 × 75 mm. bore and stroke, 4,360 cc.; 295 b.h.p. at 4,500 r.p.m. 1935 Type B: 72·5 × 75 mm. bore and stroke, 4,950 c.c.; 375 b.h.p. at 4,800 r.p.m. 1936-37 Type C: 75 × 85 mm. bore and stroke, 6,010 c.c.; 520 b.h.p. at 5,000 r.p.m. Plain main bearings; plain big end bearings in 1934; roller-type big ends 1935-37.
Ignition: by twin magnetos; one 18 mm. plug per cylinder.
Lubrication: Dry sump.
Transmission: All-indirect gearbox at rear (5-speed on A-type, 4-speed on B- and C-types); driven by shaft from engine passing below differential; ZF limited-slip differential on C-type. Multi-plate clutch.
Chassis: Tubular frame; with parallel side members; tubular cross members.
Front suspension: by twin trailing links, with bottom arms linked to transverse torsion bars housed in front frame cross-member, and top arms linked to friction-type shock dampers.
Rear suspension: on 1934 A-type by transverse leaf spring forming top link, in conjunction with swing axles and longitudinal torque arms. On 1935-37 Types B and C transverse leaf spring replaced by longitudinal torsion bars housed in frame side members; friction shock dampers.

Symbol of the times: Bernd Rosemeyer, watched by massed Nazi officials, rushes upward to win the 1937 Freiburg hillclimb at record speed. (Photo: *Motor*)



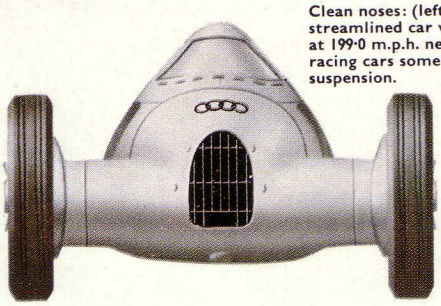
The Auto Union in its 1934 road-racing form with short tail, winner of the German, Swiss and Czechoslovakian G.P.s.

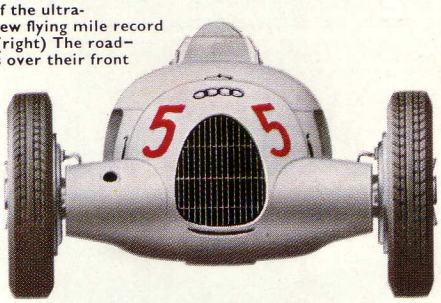
Rekordwagen: the long-tailed 4·4-litre car which startled the racing world early in 1934 when Hans Stuck broke the world's hour record at Avus, Berlin, at 134·9 m.p.h.



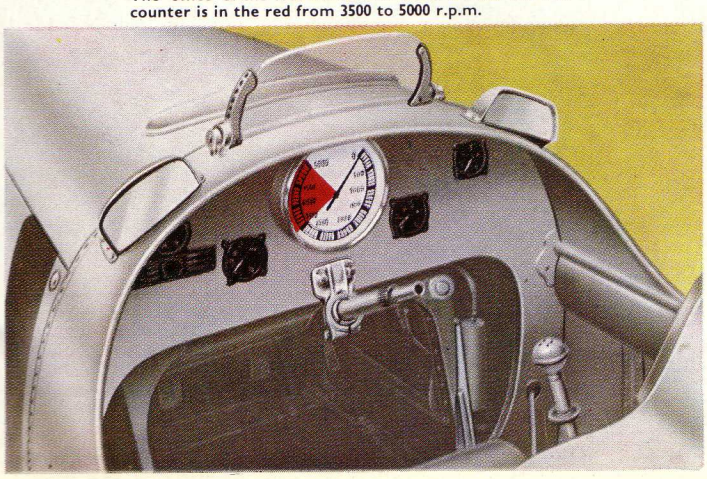
Stromlinienwagen: the weird streamlined Auto Union developed for record breaking and driven, without success, by Rosemeyer and zu Leiningen in the 1935 Avus G.P.

Clean noses: (left) front-end treatment of the ultra-streamlined car with which Stuck set a new flying mile record at 199·0 m.p.h. near Lucca, Italy, in 1935. (right) The road-racing cars sometimes wore neat fairings over their front suspension.





The 'office' of the 1936 Grand Prix Auto Union. The rev counter is in the red from 3500 to 5000 r.p.m.



In some races during 1936 and 1937, the Auto Unions appeared with extra cooling slots around the radiator grille, plus an extra vent below.

Big boots: the huge rear tyres on the C-type Auto Union are emphasised in this picture, showing Rosemeyer swirling into a corner during the 1937 Italian G.P. at Livorno.

Fuel capacity: 46-gal., fuel tank mounted on frame between drivers' compartment and engine.

Radiator: in nose, connecting to engine in A-type through frame tubes; in B- and C-types by separate water pipes.

Steering: by worm and rocker shaft to individual track rods; 16½ in. dia., steering wheel.

Brakes: Lockheed hydraulic; 2-leading shoe with twin master cylinders on 1937 C-type.

Wheelbase; A-type 9 ft. 4 in. B-type 9 ft. 5½ in. C-type 9 ft. 6½ in.

Track: front 4 ft. 8 in. rear, 4 ft. 8 in.

Wheels and tyres: Rudge Whitworth wire type; Continental tyres, 5·25 × 17 front; 6½ or 7 by 19 or 22 rear according to type of race.

Weight: A-type 16·6 cwt unladen; B-C-types, 16·2 cwt unladen; weight (starting line): 22·4 to 22·8 cwt.

Maximum speed: 172-195 m.p.h. according to drive ratios and tyre sizes used.

All wheels in the air as Rosemeyer pursues Lang during the 1937 Donington G.P.—Rosemeyer's last victory and his last race. Three months later he was killed in a record attempt. (Photo: *Motor*)