MAY 26, 1950

The Autocar

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Actual and

ALFA-ROMEO TYPE 158

THE ALFA-ROMEO, VICTOR AT SILVERSTONE, CARRIES ON THE FRONT-ENGINE FORMULA. IT IS THE MOST SUCCESSFUL DESIGN OF THOSE NOW RACING.

Engine.—8-cylinder in line. 58×70 mm. 1,479 c.c. Piston area 32.7 sq in. Twin overhead camshafts, gear driven. One triple choke carburettor feeding two-stage Roots superchargers. One oil pressure pump, two scavenge pumps. Oil radiator. Centrifugal water pump. Power with single Roots type supercharger, over 200 b.h.p. at 7,500 r.p.m. Power with two stages now exceeds 300 b.h.p. at 8,500 r.p.m. **Transmission.**—multiple disc clutch. Four-speed gear box in unit with self-locking differential at rear. **Structure.**—Steel box section with aluminium panels. Single fuel tank behind driver. **Suspension.**—Trailing links at front connected to ends of transverse leaf spring. Swing axles at rear with diagonal radius arms and transverse leaf spring. Piston type hydraulic dampers, and separate friction dampers at rear. **Brakes.**—Hydraulic with two leading shoes. **Dimensions.**—Wheelbase: 8ft 2 27/64in (2.50 m). Track, front and rear, 4ft 1in (1.25 m).

TWO Grand Prix racing cars recently in the news, the all-conquering 158 Alfa-Romeo, which won the Grand Prix of Europe at Silverstone, and the Cisitalia, which was revealed to the public at the Turin Motor Show, emphasize the rich diversity of opinion which still exists among leading designers on the best layout for the Grand Prix racing car and make it clear that if the best existing cars, including Britain's B.R.M., can be developed and raced, international Grand Prix contests will have a technical and sporting interest comparable with anything known before the war.

Design data and drawings of the Grand Prix racing cars for the period up to 1939 have been made public and have been subject to detailed analysis in Laurence Pomeroy's book, "The Grand Prix Car," which has quickly become the standard work of reference on the subject. Manufacturers of current cars which are now running, or which could be run if financial difficulties were overcome, are naturally reluctant to reveal their secrets in such detail, but enough is known about the Alfa-Romeo and the Cisitalia to enable some interesting comparisons to be made.

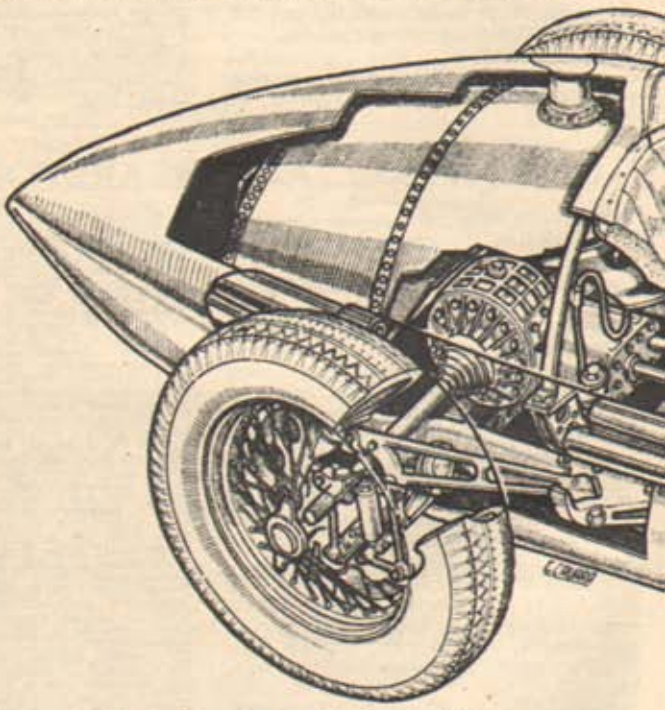
The feature of Grand Prix racing in the immediate pre-war period was the competition between the front engine school, represented by Mercedes-Benz and Alfa-Romeo, and the cars with the engine behind the driver, represented by the Auto Union. For the Auto Union it was claimed that the concentration of engine, gear box and final drive in one unit, eliminating the propeller shaft, effected an important weight saving, while the position of the fuel tank between engine and driver ensured that there was virtually no change of fore and aft weight distribution as the fuel was used up. Despite this, however, the Mercedes had the more successful record and was reckoned the easier car to drive. With the engine at the front and the fuel tank in the tail the main masses were distant from the centre of gravity, giving a high polar moment of inertia about the vertical axis through the centre of gravity. The driver sat behind the centre of gravity and received early warning of rear wheel skids, which could be corrected with comparative ease. Dispersal of the main masses also made it easier to provide good suspension, a vital factor in good road holding. On the Auto Union, the driver sat ahead of the centre of gravity, and found it difficult to sense approaching changes of direction, which were apt to be sudden.

By Gordon Wilkins

Turning now to the post-war Grand Prix contenders, we find that the Alfa-Romeo follows the general Mercedes-Benz layout, but is not so low built as the last of the German cars, as the propeller shaft passes under the driver's seat instead of being offset to one side. The Cisitalia is superficially similar to the Auto Union, but Dr. Porsche has introduced significant changes into the layout which indicate further thought on the subject of weight distribution.

There are two fuel tanks alongside the cockpit, as on the 3-litre 485 h.p. Auto Unions built after Porsche's association with the company ceased, but the engine has been moved forward and the gear box is in front of the differential. The designer clearly intended that this time there should be nothing behind the rear axle but the cars of the other competitors. The result of the new layout is to shift the centre of gravity forward and give approximately equal distribution of weight between front and rear wheels, with fuel tanks full or empty, whereas the Auto Unions carried about 42 per cent of the weight on the front wheels and 58 per cent on the rear, laden or light.

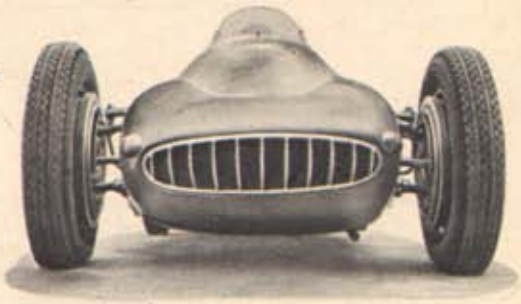
The Alfa-Romeo is now a relatively old design, having been constructed in 1938, when it won its first race at



Livorno. After the war, extensive modifications were made, and the engine, which previously had a single Roots supercharger, was given two-stage blowers which produced a considerable increase in power. The cylinder block and crankcase are cast in one piece and there are inserted wet liners. There are two separate cylinder-head castings, containing four hemispherical combustion chambers each, and the two camshafts are driven through gears from the front of the crankshaft. Cool air is led from an intake near the radiator to a triple choke carburettor near the rear of the engine which feeds into the first of the two superchargers. There is dry sump lubrication with one pressure pump and two scavenge pumps.

In the years immediately before the war, both the Mer-

Potential



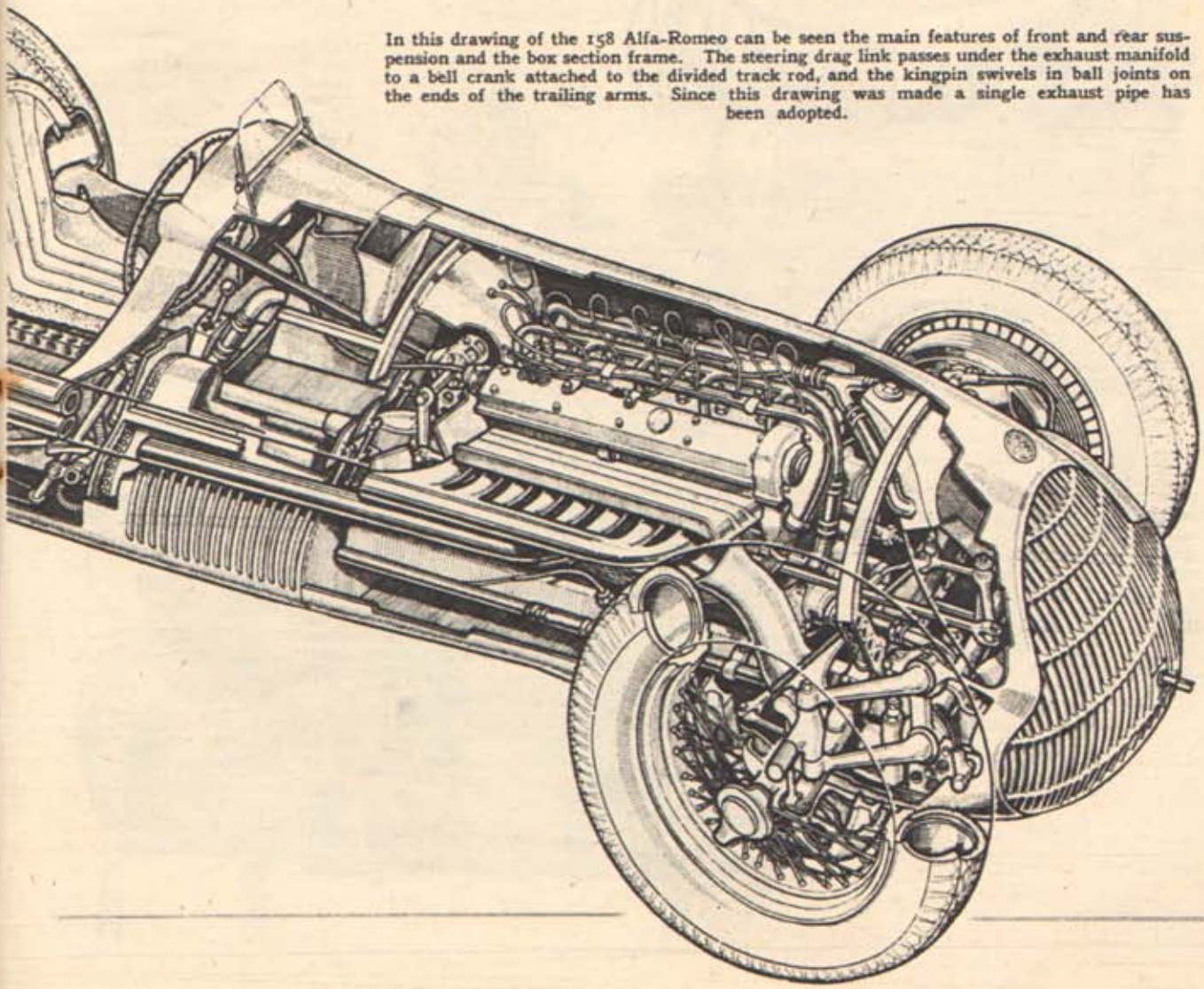
CISITALIA GRAND PRIX 1.5 LITRE

Engine.—12-cylinder horizontally opposed. 56 × 50.5 mm. 1,492.6 c.c. Piston area 45.8 sq in. Twin overhead camshafts to each bank of cylinders with shaft drive. Two carburettors on common manifold feeding separate vane type supercharger on each block. Designed power, with single stage supercharging at 28 lb per sq in (3 Ata approx.), 296 b.h.p. at 8,500 r.p.m. Single cylinder tests show this can be exceeded. Max. torque 195 lb ft at 6,000 r.p.m. **Transmission.**—Four-disc clutch in oil behind engine and five-speed gear box in unit with self-locking differential. Shaft below gear box drives to front differential which can be connected to drive front wheels while running. **Structure.**—Steel tube frame with aluminium panels. Two fuel tanks, one each side of driver with common filler. Capacity 44 gallons approx. **Suspension.**—Parallel action trailing arms at front with torsion bars. Independent rear suspension with torsion bars attached to short parallel arms and longitudinal radius arms. Hydraulic dampers all round. **Brakes.**—Hydraulic with four shoes to each wheel. **Dimensions.**—Wheelbase: 8ft 6 23/64in (2.60 m). Track, front and rear 4ft 3⅛in (1.30 m).

THE CISITALIA, DESIGNED BY Dr. PORSCHE, SHOWS LATEST THOUGHT ON THE ENGINE-BEHIND-DRIVER FORMULA. IT HAS MORE CYLINDERS THAN THE AUTO-UNION, FEWER THAN THE B.R.M.

cedes and Auto Union cars adopted the De Dion rear axle, owing to handling difficulties experienced with the simpler and lighter swing axle, but the current Alfa-Romeo uses the swing axle layout, which has also been found on their production sports cars for some years past. There are certain interesting refinements. The radius arms are set at an angle to the frame and there is a slight tendency for the wheels to toe in, as well as a change of camber as the wheels rise and fall. To minimize interference with the steering of the car through variations in rear wheel position, the vertical deflection seems to be rather limited. In the static position the wheels have a slight negative camber and they are not allowed to drop to a position where appreciable positive camber arises, as this, combined with the accompanying reduction of track at the rear, helps to produce aggravated over-steering characteristics.

The Cisitalia is a much later design. Work was begun on the project only in January, 1947, and the car was completed by the end of 1948, a really magnificent achievement under the conditions existing at that time. 400 million



In this drawing of the 158 Alfa-Romeo can be seen the main features of front and rear suspension and the box section frame. The steering drag link passes under the exhaust manifold to a bell crank attached to the divided track rod, and the kingpin swivels in ball joints on the ends of the trailing arms. Since this drawing was made a single exhaust pipe has been adopted.