

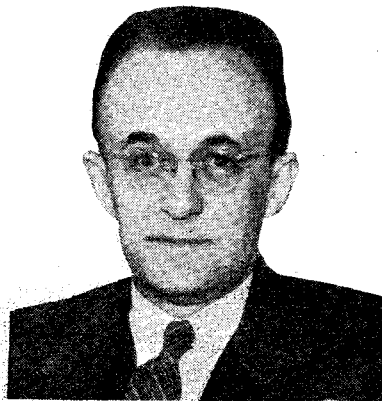
Pronounced negative camber, understeer and different cornering technique : Wimille (Type 158 Alfa Romeo) at Gueux.

AN ENGINEER AT THE GRAND PRIX

A Commentary on the Rheims Race

FOR many years Mr. Maurice Olley has been regarded in this country as an automobile engineer with a talent for pungent criticism based upon penetrating technical logistics in which neither friend nor foe is spared. His observations published herewith arose after a visit to the recent French Grand Prix on the Rheims-Gueux circuit with a party from "The Motor" and are possibly the more interesting in that this was the first time that Mr. Olley had witnessed motor racing in the European

by



MAURICE OLLEY

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THE recent French Grand Prix did not provide a contest, as the Alfa Romeo team was so obviously superior that the result was scarcely in doubt, but it provided a valuable demonstration, which would have been even more valuable had teams been present from Britain, France and the U.S.A. representing advanced practice.

To produce power at the rate of over 200 h.p. per litre with the faultless reliability of the Alfa Romeos is in itself a remarkable achievement which must come close to the maximum performance of a piston-type engine made of known materials, but I would class it as of secondary importance as it could doubtless be surpassed by a gas-turbine, especially when running under conditions when fuel consumption is not a criterion.

To produce engines of extremely high performance is not too difficult.

The technique is known and materials are available. There is no mystery.

To my mind the really outstanding feat is to provide a suspension for a light road vehicle running at speeds in excess of 180 m.p.h. in which the wheels visibly stay on the ground, which handles impeccably on an open road in a gusty wind, and which, above all things, appears to provide a steady and comfortable seat for the driver.

The Alfa Romeo clearly demonstrated the possibilities of swing axles when properly applied. It was noted that the rear axles were running with a pronounced negative camber, which may have been as much as three degrees. The rear

manner. His knowledge of high-speed motoring is, however, undenied. His experience includes years with Sir Henry Royce's personal designing team, followed by a lengthy period on the General Motors' pay roll in the U.S.A. In later years he has been seconded to Vauxhall Motors, in a specialist and research capacity. He is the leading authority on suspension problems, contributing valuable papers to learned societies on such subjects.

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tyres were much larger than the front. [700 x 17 rear; 500 x 17 front. —Ed.]

With parallel-action independent suspension to the front wheels there must have been a marked understeer effect with very high cornering power in the rear wheels. I do not know whether the rear wheels were also running toed-in, but the geometry on the Alfa Romeos is such that each wheel toes-in uniformly as it rises, certainly increasing the cornering power on turns if the car rolls. Actually, however, the roll axis is raised so much at the rear by the swing axle, and the centre of gravity of the cars is so low, that they roll very little, even on a flat, right-angle bend as at the Gueux corner.

On this turn it could be seen that the Alfas took the corner quite differently from the rest and apparently with complete uniformity and

precision. On the faster curves along the circuit the Alfas made no particular business of them at all, the cars simply going where they were pointed.

When passing other cars the drivers made the necessary swerve with absolute certainty. At times on the straight I seemed to detect a slight weaving effect which might have come from the swing axle, but it was certainly never sufficient to discomode the driver.

The performance of the conventional rear axles in other cars was not in the same class, obviously. In this layout, by reason of the central mass of the differential, the centres of percussion are removed some distance inwards from the tyre treads, which accounts for the tendency of all such axles to tramp and their refusal, when they hop, to hop parallel.

In racing cars, with light weights and light sprung loads and with great engine torque applied to the axle centre, the right rear wheel is being partially lifted all the time. This would be corrected if the hull of the car was so designed that the engine torque reaction was carried entirely on the rear springs but, in practice, this reaction must be carried largely on the front end.

It was evident that the rear wheels—particularly the right rear wheels—on cars with conventional axles did not stay down, and in some cases drivers were having a very rough ride. One considers that no car with a conventional axle should compete in Grand Prix racing.

These arguments do not apply to two of the alternatives, either the De Dion axle of the highly developed type so successful on the pre-war Mercedes and Auto Union cars, or the cars with front drive through independent wheels and dead rear axles. Neither of these types, unfortunately, were in the race, although the D.B. ran in the small-car event.

Alfa Romeo suspension is by leaf springs front and rear, and most cars had a combination of friction and hydraulic damping. This appears to confirm that it is difficult to make a hydraulic damper which will produce the constant friction effect known to be essential to good suspension on any vehicle. We seem to know but little about this in an accurate, quantitative manner, but only know that one must have the right sort of dry friction mixed in with hydraulic damping.

Among details of suspension of various cars it was noted that all the parts, including leaf springs, were highly polished and in some cases

An Engineer at the Grand Prix— Contd.

ground beforehand. One wishbone-type of front suspension was even chromium plated. Nearly all these components were loaded, principally, in one direction. Therefore, to obtain maximum fatigue strength, they should never be left polished, but should be correctly shot-peened under controlled conditions. Any form of plated condition, especially chromium, should be avoided like the plague. One would have thought that to get maximum fatigue strength nitriding might have been employed, possibly followed by shot-peening. These remarks apply also to engine parts and certainly to transmission gears. Shot-peening of non-ferrous parts (such as crankcases, gearboxes) would also be an insurance against fatigue failure.

The race would have been a disappointment to a stylist. Apparently the fastest car is obtained by having the narrowest body, decently shaped like an upturned canoe, carrying its wheels well out from the hull as separate entities. The flush-sided, full-fashioned body appeared uniformly unsuccessful, although one does not know whether on account of directional instability, because they simply displace too much air, or because the driver on a road course likes to see his front wheels.

The rejection of the two British E.R.A.s of pre-war vintage—one a B-type, the other a modified C type

with fixed suspension and Zoller blower—may be criticized, but the problem confronting us is whether Britain, as a matter of national prestige, is going to compete seriously in international racing against the strong Continental teams or not. The old models offered are obviously outclassed to-day.

A Continental reaction could be that British engineering can no longer produce a modern, high-performance vehicle, which is a viewpoint that can be damaging to Britain's export trade—not only in automobiles. Enormous importance, therefore, attaches to the successful outcome of projects now maturing in this country.

Prestige is not the only gain. From the development work of Grand Prix racing over a period of years, the German manufacturers, for instance, derived a heap of accurate information which others did not possess, and in suspension alone, others followed where Germans led. The Americans, too, are known from performances at Indianapolis and elsewhere, to have produced engines capable of advancing the art.

In the writer's opinion, Britain should push such developments at once, so that in two to five years' time this country can produce world-beating teams all over the globe. The question seems to be whether the British Government, which, for 50 years has treated road transportation in all its forms as a faintly criminal ugly duckling, is prepared to change its attitude and to encourage the production of racing cars, not only as a means of national advertising but also for the technical information it will provide.



"... no car with conventional axle should compete"—and Chiron thinks no cars should get in the way either. Talbots at Gueux.