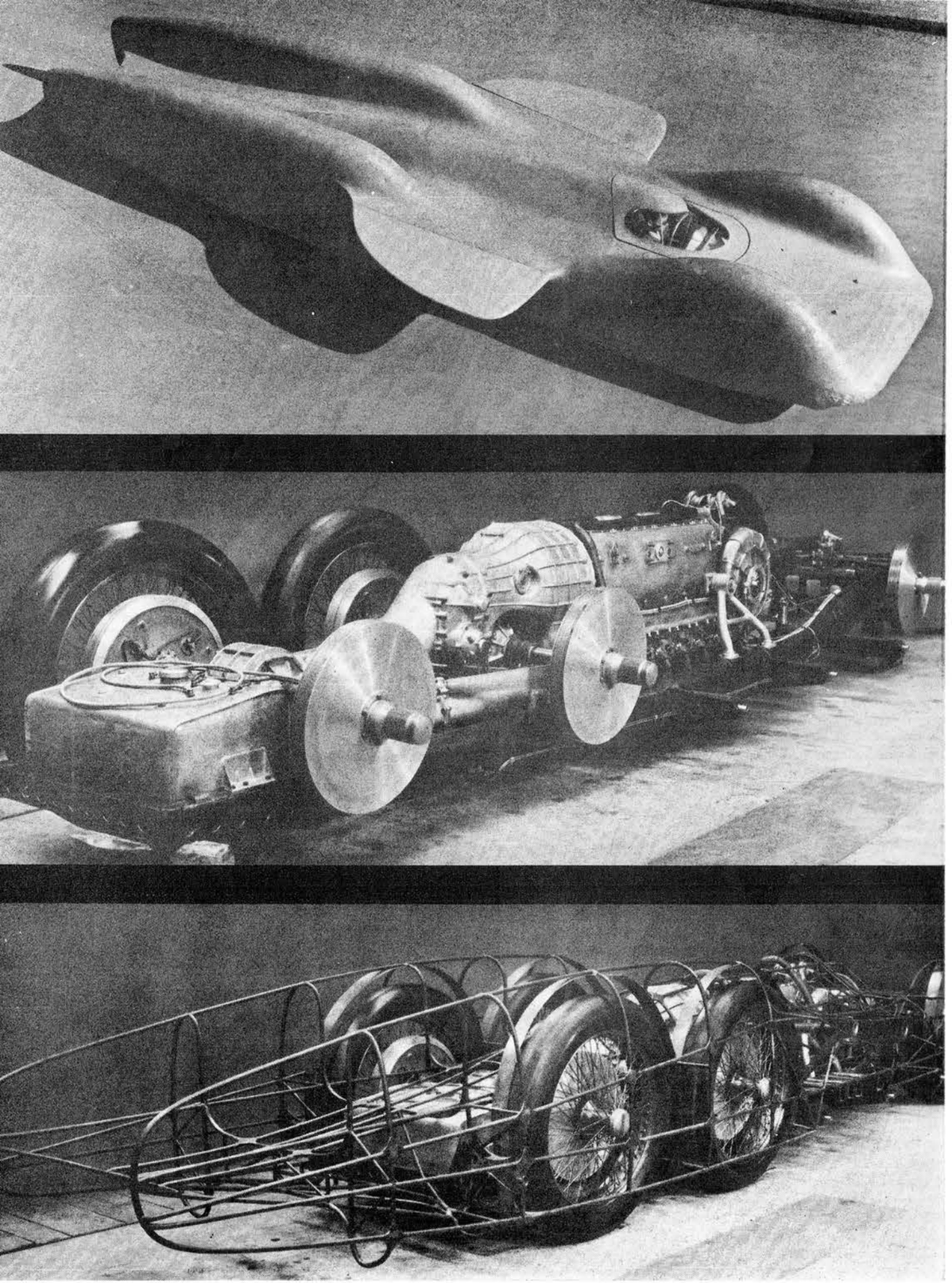


Mercedes T-80

One of the great Land Speed Record cars still sits untried in a German museum. Could it still pose a threat to the mph mark?

by Griff Borgeson

ONE OF THE BIGGEST *IFS* in the evolution of the Land Speed Record will always be, "What would have happened if Daimler-Benz' attempt on the LSR had not been shot down by the outbreak of World War II?" The machine was designed and built in 1937-'39 with hopes of breaking the 450-mph mark. Today, 23 years later, the untried streamliner stands in D-B's great museum in Stuttgart. If it were thoroughly gone through, prepared and shipped to Bonneville this fall, would it be serious competition for the several up-to-the-instant designs that, after two decades, are aimed at that same, still-distant target? And its many radical features... have they still lessons to teach?

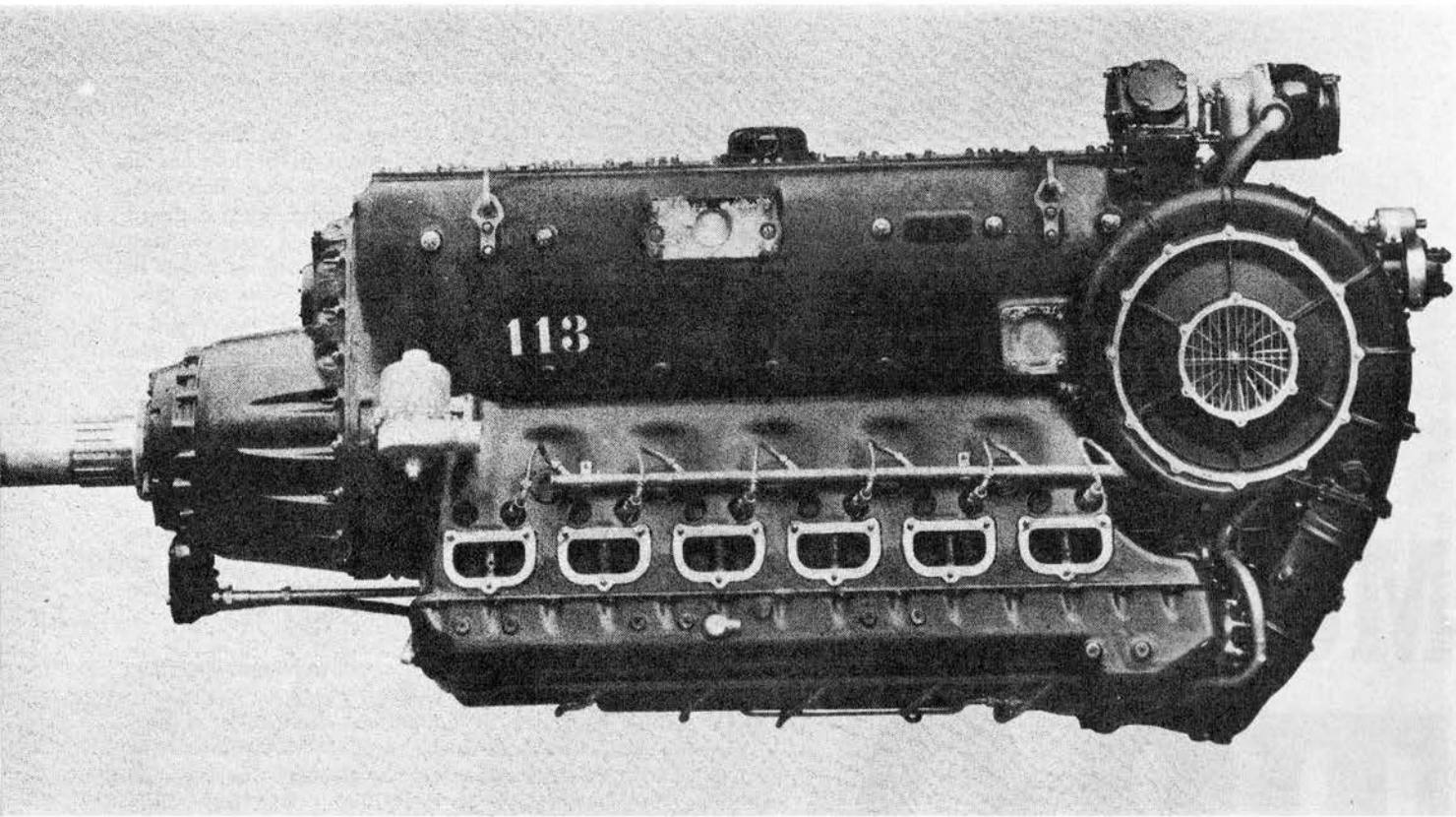
Daimler-Benz eventually called the weird six-wheeler the T-80 but the project did not originate with them. It was Auto Union's ace driver, Austrian Hans Stuck (later an Allied partisan in WW II), who wanted to become the fastest man on wheels. He took his rough ideas for an LSR contender to his countryman, Dr. Ferdinand Porsche, designer of the early Auto Union race cars, and the head of his own independent consulting firm. Porsche liked Stuck's conception and agreed to develop it if an angel could be found. The only obvious one, Daimler-Benz, snapped at the opportunity.

The timing happened to be perfect. Germany's military destiny was clear-cut for all to see then, in '37. Daimler-Benz had failed to convince the German Air Ministry that it should authorize the development of a 3000-bhp, 2715-cubic-inch, V-12 aircraft engine. The LSR project gave D-B the patriotic justification to proceed with this program, knowing that the realization of its military potential was just around the corner. Porsche and Stuck got their capital and the project was launched feverishly but very quietly. Porsche worked closely with D-B engineers and retained the consulting services of famous aerodynamicist Baron von Fachsenfeld.

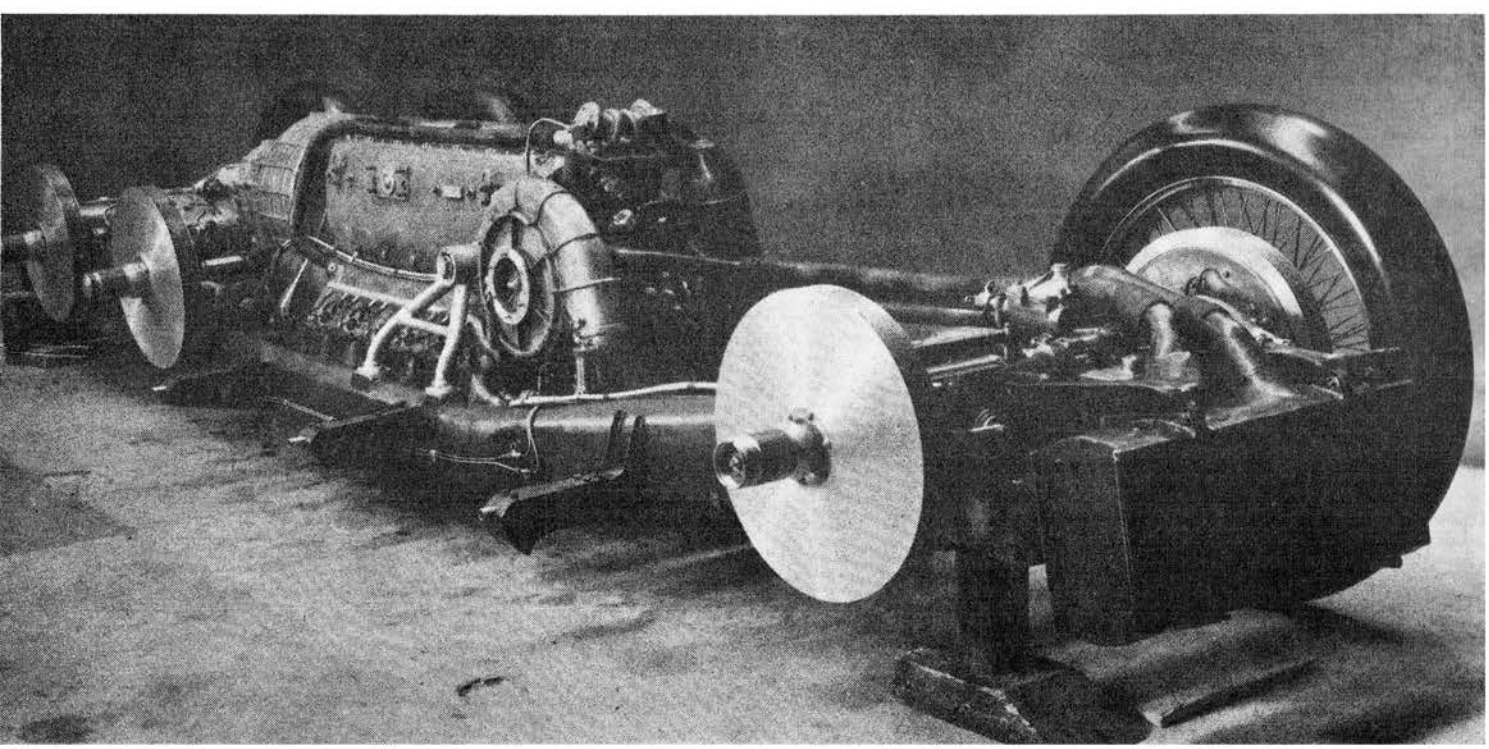
The record machine's frame was made up of large oval-section side members and circular tube cross members. The massive, inverted, centrifugally-blown, injected engine was located amidships, behind the driver. There was no change-ratio transmission; output flowed from flywheel, through a hydraulic coupling, to a twin swing-axle, four-wheel, driving truck or bogie. This assembly contained one of the T-80's most significant (then and now) features: an over-riding throttle control which automatically reduced the power output if excessive spin developed at the driving wheels. It is important enough to justify the following description from a British Intelligence report.

"A flexible drive, similar to that of a normal speedometer,

On the opposite page are three views of the massive Mercedes speed-record contender. Built in the late 1930's, the car shows the strong aircraft influence which was so dominant in the minds of its designers at that time. The body shell itself is open to criticism because of the excessive amount of stabilizing surfaces. Proper wind-tunnel testing would result in a much cleaner and certainly a more effective shape.



Major emphasis in the development of the T-80 was placed upon the 3000-hp V-12 engine. This 2715-cubic-inch powerplant was the Daimler-Benz proposal for use in military aircraft. The T-80 project was a showcase for the engine.



THE INVERTED, CENTRIFUGALLY-BLOWN AND INJECTED ENGINE WAS LOCATED AMIDSHIPS. THE DRIVE WAS TO ALL FOUR REAR WHEELS.

is taken from one of the front road wheels, and a second one from a point in the transmission just before the final drive unit, both drives terminating adjacent to the fuel injection unit. The drives are geared so as to rotate at equal speeds, but in opposite directions when the front and rear road wheels of the car are also rotating at equal speeds, i.e., when there is no rear-wheel spin. The output ends of the two flexible drives are led into the opposite sides of a small differential unit, which is of similar construction to a normal final drive bevel-type differential. In this case, however, the power is transmitted in the reverse direction, with the two flexible drives taking the place of the half-shafts.

"When there is no rear-wheel spin, relative to the front wheels, the two drives are rotating at equal speeds, but in opposite directions, and the differential cage therefore remains stationary. If at any time the rear wheels rotate more rapidly than the front wheels, this discrepancy is imparted by the drives to the sun-pinions of the differential, and the cage is forced to rotate. A drive is taken off the differential cage, through a governor to the Bosch fuel injection unit in such a manner that whenever the speed of rotation of the differential cage rises above a certain predetermined figure, due to excessive wheel slip, the driver's control of the fuel injection unit is over-ridden, reducing the fuel injection and, consequently, the power output. No details of the effectiveness of this device could be obtained."

That such a device to eliminate a huge factor of human error has not been perfected for all-out dragsters and Bonneville machines is more than surprising, in view of the age of the concept and the glaring need for such correction. So much for the T-80's chassis details.

Aerodynamically the machine is in a class by itself. It is slab-sided and therefore subject to considerable boundary-layer separation, and turbulence and highly susceptible to yawing in response to cross-winds. As means of reducing this tendency and causing the vehicle to weather-vane, the front wheel humps were greatly exaggerated vertically and the rear humps both vertically and horizontally. In other words, the wheel humps were made to do double duty as large fins or stabilizing surfaces.

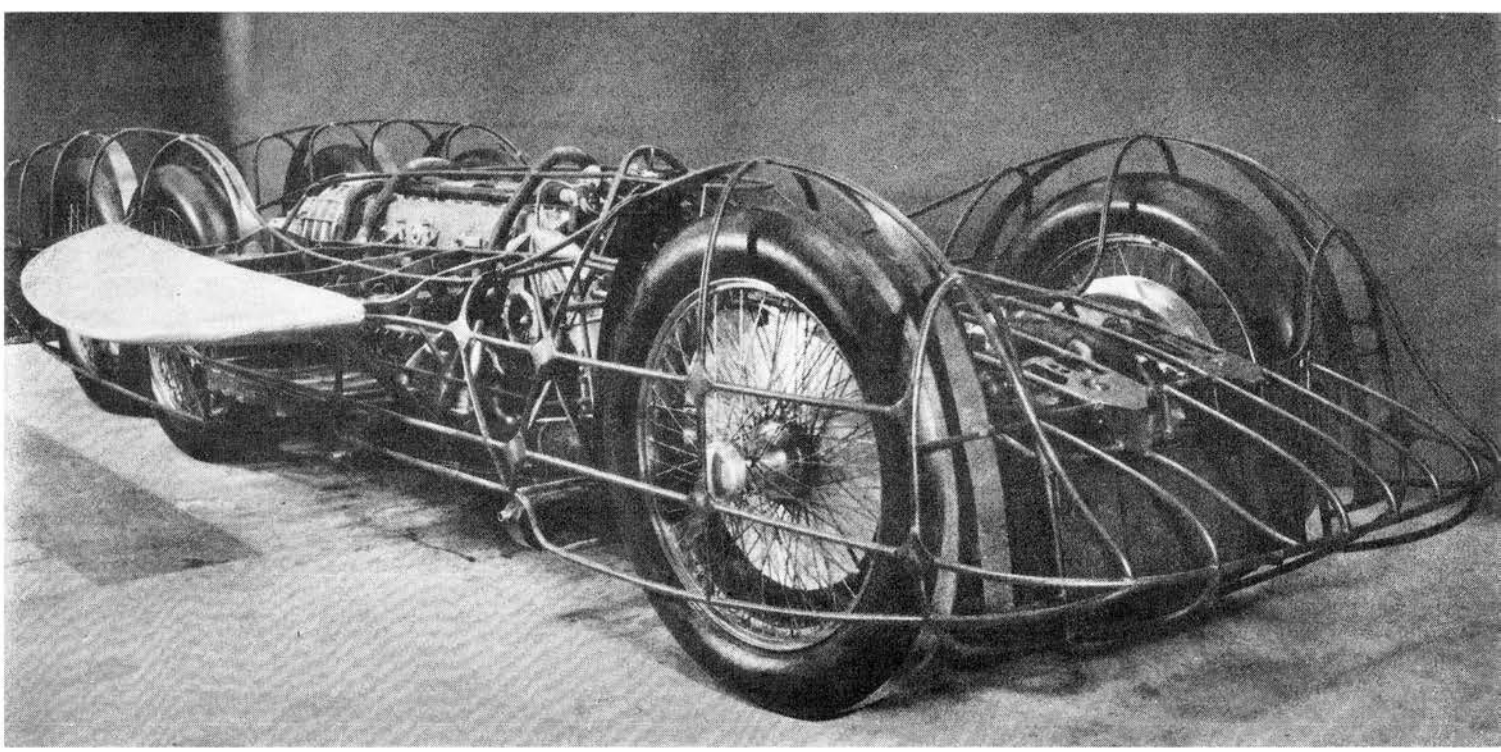
Then, just ahead of the rear wheels and on each side is a large horizontal fin with a five-degree negative angle of attack. The intended purpose of these fins was to increase rear-wheel loading more or less in proportion to total wind resistance. If this worked, the tires would be lightly stressed during the greater part of a run, without the risk of wheelspin at very high speeds.

This vehicle was incomparably less sanitary aerodynamically than, for example, some of the Mercedes-Benz small-displacement record machines and the Cobb-Railton LSR holder. In the light of all we have learned at Bonneville its assorted stabilizing surfaces seem to be makeshift corrections for problems that could and should have been solved with a clean shape in a wind tunnel.

Even in the light of alternative courses it seems naive. Stuck wanted to run it at Bonneville but when the Nazi-controlled motorsport organization learned of the project the Salt was damned. German records will be made on German soil, was the firm dictum, and preparations were made for the construction of a seven-mile-long, 100-foot-wide addition to the Dessau autobahn. No wonder Stuck went over to the Allies. His superiors wanted him to attempt on a short tightrope what Campbell, Eyston and Cobb had been doing on a 200-square-mile slab! More naivete.

Other hitches kept the car from making any serious attempts that we know of. Daimler-Benz kept coming up with improved engines for the car. When it was finally pronounced ready Continental Gummiwerke still hadn't completed the development of its tires. When the project was shelved because of more pressing matters in the winter of '39 the tires had been tested under load only up to 270 mph and, spinning free, only to 404 mph.

Perhaps some relatively low-speed tests indicated that the car was inherently unstable, that the radical anti-slip device didn't work. Since its frontal area (19 square feet) is about that of Donald Campbell's locomotive it is unlikely that the claimed, briefly-available 3030 bhp would have propelled the T-80 to anything near its dream-speed. Perhaps, like a Detroit *traumwagen* or circus car, it was just an exercise. But it did help Daimler-Benz to help the German Air Ministry, in spite of *its* naivete. /MT



FINS AHEAD OF AND AT SIDE OF REAR WHEELS WERE MEANT TO INCREASE REAR WHEEL LOADING WITH BUILD-UP OF WIND RESISTANCE.